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Preface

In an increasingly interconnected world, the value of multidisciplinary research lies in its ability to transcend traditional academic boundaries and provide holistic insights into complex global challenges. This volume was conceived with the vision of creating a space where diverse disciplines converge, interact, and enrich one another through shared inquiry.

The articles presented in this volume reflect a broad spectrum of academic and applied research, encompassing fields such as Computer Science & Technology, Commerce and Management, Forensic Accounting, Statistics & Data Science, Allied areas of Arts, Commerce & Science, Physiotherapy, Physical Education, Library Science, and Public Administration. Each contribution stands as a testament to the power of collaborative thinking, where varied methodologies and perspectives are harnessed to generate comprehensive and innovative understandings.

We extend our heartfelt gratitude to Shri Mahavir Vidyamandir Trust for their unwavering support in making this academic endeavor possible. We are especially thankful to the Trust's leadership — Shri Sudhakarji Mastar (President), Shri Nirajbhai Patel (Secretary), and Shri Jitendrabhai (Trustee) — whose vision and encouragement have continually fostered an environment that promotes academic excellence and research innovation.

We also acknowledge the guidance of the Conference Steering Committee, particularly Dr. Rajesh Vyas (President, VBUSS, Gujarat Prant) and Dr. Riddhi Desai (Vice President, VBUSS, Gujarat Prant), for their strategic input and scholarly direction in curating the thematic structure of this conference.

Sincere thanks go to the Director of IMCR-2025 - Dr. Chetan Rathod, Convener of IMCR-2025 Mr. Ajay Patil and Dr. Jayshree Kanani for their leadership, encouragement, and seamless coordination throughout the planning and execution phases.

A special mention must be made of the Organizing Secretaries - Dr. Prashant Ghantiwala, Mrs. Neeta Goyani and Mr. Amrut Valvi whose tireless efforts, collaborative spirit, and meticulous planning have been instrumental in the successful conduct of the conference. Their dedication to both academic integrity and logistical precision ensured that every aspect of this event was executed with excellence.

This publication would not have been possible without the commitment of our contributing authors, peer reviewers, and the editorial team. Their contributions embody the spirit of scholarly engagement and interdisciplinary collaboration that this volume seeks to promote.

We hope this volume not only contributes meaningfully to ongoing academic conversations but also serves as a catalyst for future multidisciplinary research. In today's dynamic global landscape, such cross-disciplinary engagement is not only valuable but essential for informed problem-solving and sustainable progress.

INDEX

Sr. No.	Paper Title	Author(s)	Page No
1	Comparative Study of Edge Detection Techniques in Crack Detection in Wall Surface	Mrs. Kruti Desai, Dr. Sunjay Buch, Dr. Jaynesh Desai	1-13
2	Multilabel Emotion Detection in Tweets: A Comparative Performance Analysis of ML Models	Ms. Pinal P. Solanki, Dr. Dipti B. Shah	14-19
3	Dark Web Forensics: Advanced Techniques for Tracking, Detection, and Evidence Collection	Ms. Charmi A. Chauhan, Ms. Aarti H. Jariwala	20-28
4	Named Entity Recognition in India's Linguistic Diversity: A Review of Techniques and Their Effectiveness	Ms. Ritu Bhatia, Dr. Lakshadeep Raval	29-34
5	Intelligent Parking Solutions for Vacant Space Detection Using YOLO	Ms. Upasana Mehta, Dr. Jeegar Trivedi, Dr. Priti Sajjja	35-46
6	Deep Learning for Image Classification : A comparative study for convolutional Neural Network	Ms. Jahnvi Masrani Mr. Ravikumar Patel	47-59
7	Digital Library: Functions, Importance and Challenges in India	Mr. Rajeshsinh Solanki, Dr. Haribhai Tandel	60-65
8	AI-Powered Social Media Insights for Early Depression Detection	Ms. Krishna J. Gilitwala, Dr. Maulik B. Shah	66-72
9	Advancing Domain-Specific Question Answering Systems: Challenges, Breakthroughs, and Applications in Healthcare	Mr. Mayurkumar Marolia, Dr. Hardik Joshi	73-90
10	Intelligence: Opportunities and Challenges in a Data-Driven World	Ms Vaishnavi P. Bhathawala Dr Sanjay H.Buch	91-108
11	Named Entity Recognition Using Deep Learning Techniques For Indian Languages	Ms. Jigisha Acharya	109-122
12	Protecting Privacy in the Age of Big Data: A Review of Modern Data Analytics Techniques	Ms. Donika Mali	123-130
13	Study And Analysis Of Chat Gpt And Its Impact For It students	Ms. Priyanka Parmar, Ms. Priyanshi Rana	131-147

14	Innovative and Revolutionary Changes through NEP-2020: A Multidisciplinary Perspective with Focus on Computer Science	Ms. Shivani Kania	148-154
15	Graphical Password Authentication: Balancing Usability and Security in Modern Applications	Ms. Anjali B. Thakor	155-162
16	Fine-Grained Emotion Classification in Social Media: A Deep Learning Approach Using BERT for Nuanced Sentiment Detection	Ms. Twinkle S. Panchal	163-175
17	Educational Data Mining using Association Rule Mining : A Survey	Dr. Priyanka H. Mehta Dr. Smruti H. Mehta	176-181
18	Blockchain in Education: Review Paper on Aligning Innovations with NEP2020	Ms. Eshakumari Desai Dr. Nimisha Modi	182-192
19	Automatic Detection of Mastitis by Machine Learning Methods using Thermal Images: A Review	Lakshitha S. La, Dr. Priti S. Sajja	193-205
20	High-Resolution Image Processing for Detecting 3D and 2D Spoofing Attacks in Facial Recognition Systems	Ms. Mahima Natali	206-213
21	A Study: Sentiment Analysis in Public Opinions during the General Elections of India	Ms. Bhumika J. Patel, Dr. Hardik Joshi	214-225
22	A Comprehensive Review on Emerging Trends in Biometric Tracking and Fingerprint Detection	Ms. Singh Simpi S.	226-223
23	Detecting Fake News via Multimodal Fusion: A Machine Learning Approach Combining Text, Images and Contextual Metadata	Ms. Aarti H. Jariwala, Dr. Prashant P. Pittalia	234-241
24	Synthesis, Characterization and Antimicrobial Evaluation of Some Thiazolyl Azetidinones	Dr. L. M. Patel, Dr. P. S. Desai	242-255
25	Numerical Modelling of Viscous Fluid Flow in Diverse Porous Media Under Transverse Magnetic Fields	Ms. Ekta Dixit, Dr. D.C. Joshi, Ms. Nalini Patil	256-283
26	Azwanin (Trachyspermum Copticum) seed extract as a corrosion inhibitor for aluminum alloy in Trichloroacetic acid	Jetal J. Patel, K. N. Patel	284-294
27	State-of-the-Art Review on Machine Learning Techniques for Signature Analysis and Verification	Aghera Punamben J. Dr. Dhaval S. Vyas	295-303

28	વલસાડ જિલ્લાના ગ્રામ્ય વિસ્તારના લોકોની આર્થિક પરિસ્થિતિનો અભ્યાસ	Patel Rutal N., Dr. Ramchandrasinh Raol	304-309
29	Assessing the status of aquaculture in Gujarat : A survey on the diverse species cultivated in aquaculture practices	Ms. Amruta R. Patel, Ms. Zankhana R. Pandit	310-322
30	A Comparative Study of Flexibility of Gymnastics and Swimming Players	Dr. Hemraj D. Patel	323-325
31	A Comparative Study Arm Strength of Players of Kabaddi, Kho-Kho and Volleyball of Gujarat State	Dr. Jitendra P. Patel	326-329
32	Physical Activity as a Predictor of Cognitive Performance in elderly population: A Cross-sectional study	Dr. Kruti Thakkar Dr. Pranjal Contractor	330-341
33	Appraisal of Majorly Involved Joints in Hemophilia Patients Using Hemophilia Joint Health Score Scale	Dr. Pranjal Contractor(PT), Dr. Kruti Thakakar (PT), Ms. Drashti Thakkar, Ms. Nital Patel, Ms. Alfia Shaikh, Ms. Aarti Chouhan	342-356
34	Online and Digital Education under the New Education Policy: Ensuring Equitable Use of Technology	Ms. Aayushi Vankawala	357-371
35	Women at the Crossroads: Managing Work and Life in Modern Times	Ms. Hudda Jasmin S. Dr. Pratapsinh Chauhan	373-381
36	A Study on Artificial Intelligence [AI] Technology in Finance sector.	Feny semil gandhi	382-394
37	A Comparative study of the financial performance of selected pharmaceutical companies.	Dr. Chirag k. Sidhpuria Mr. Arjun M. Dayma	395-415
38	Impact of the National Food Security Act (2013) on Food Security in India: Challenges, Implementation, and Policy Measures	Ajay Bhalerav Patil	416-430
39	Comparative Study on Financial Performance Selected Pharmaceutical Industry of India with Special Reference to Pre and Post COVID-19 Period”	Dr. Ghanshyam H. Bhomachiya Ms. Nikita S. Keshan	431-445
40	A Comparison of Urban and Rural Mutual Fund Investors Buying Behavior for Making Investment in Mutual Funds: A Study of Surat District”	Ms. Bhaviniben A. Mahuvagara Dr. Dhimen Jani	446-458

41	A Study of Corporate Governance Disclosure Practices of Adani Enterprise Ltd.	Chintan Modi	459-473
42	A Study of Financial Performance of Merger and Acquisition of Bank of Baroda, Dena Bank, and Vijaya Bank	Dr. Parul R. Patel Dr. Ravikumar I. Patel	474-485
43	A Study of the Effects of Work-Life Balance on Job Satisfaction	Dr. Satvinder Kaur D. Dhanjal Prof. Bindiya R. Patel	486-498
44	A Study on Common Fraudulent Practices and Possible Prevention Mechanism with special reference to Chartered Accountants of Gujarat.	Dr. Dhara Jethwa	499-509
45	A Study on Trends of FinTech Funding in India	Tirthankar P. Patel Dr. Mehulkumar P. Desai	510-519
46	An Analytical Study of Accounting Methods in Small Businesses in Valsad	Machhi Pritikshaben B. Dr. Rohit Barot	520-524
47	Analyzing the Impact of Fraud on Non-Performing Assets in Indian Public Sector Banks	Dr. Priyanka J. Fulwala	525-532
48	Analysis of Crisis's Top-Ranked Equity Mutual Fund Schemes: A Performance Perspective	Dr. Vaishali R. Soin	533-544
49	Analysis of The Performance of Initial Public Offering in The Indian Stock Market	Ms. Juli savaliya Dr. Shivam N. Shah	545-561
50	Bridging Theory and Practice in LIS Education through Experiential Learning: Multidisciplinary Perspectives Under NEP2020	Rakhi Rathod Dr. Jignesh C. Makwana	562-575
51	Comparative Study of Financial Performance of Selected Indian Public and Private Sector Banks: Pre and During Covid-19.	Ms. Jalpa H Panery, Dr. Meghashree Dadhich	576-590
52	Customer Satisfaction In Banking Sector - A Case Study On Axis Bank	Ms. Jignasha. V .Patel , Prof. Dr. Kruti Patel	591-603
53	Eco-Friendly Entrepreneurship: Evaluating the Socioeconomic Impact of Cow Dung Paint Production on Rural Women's Livelihoods and Empowerment	Dipika Dhoot Dr Snehal Patel	604-618
54	Elements of Travel Vlogs that Impact Student's Travel Destinations Choice	Dr. Vinita Mod	619-631

55	Evaluating the Financial Soundness of Care Health Insurance Limited	Priyanka A. Jariwala, Dr. Ravi I. Patel	632-642
56	Exploring Consumer Preferences for Indian-Made Products: A Study on Economic Nationalist and Protectionist Attitudes in Surat	Mr. Rakeshkumar T. Patel Dr. Janki Mistry	643-653
57	Fables from Panchatantra: A Management Perspective.	Dr. Shivang Maheta, Dr. Krishna Desai	654-666
58	An Analysis of the Financial Performance of HCL Technologies Limited	Sukhiyai Riya B.	667-670
59	Financial Distress Analysis of BPCL And HPCL Using Altman Z - Score Model	Mahuvagara Hetalben A. Dr. Dhimen Jani	671-677
60	Impact of New Education Policy (NEP-2020) on Indian Economy	Patel Miteshkumar Kishorbhai	678-683
61	Analysis of Problems and Challenges faced by students and institutions in implementing skill development programs Special Reference to Narmada District	Dr. Mayank V. Sodha	684-691
62	Optimizing Urban Mobility: A Study of Surat BRTS Strategies	Raut Nileshkumar K. Dr. Mehul M. Mistry	692-701
63	A Comparative Analysis of Selected Arbitrage Mutual Fund Schemes In India	Ms. Parul Dhingra, Dr. Nirav Gajjar	702-711
64	Performance Analysis through Value Added Statement of Selected Cement Companies of Gujarat Cement Industry	Shivani Thakkar	712-720
65	Perspicacious Purchase: A Study on Changing Perception of Online Buyers towards Online Shopping with the use of AI.	Ms. Anushri Mehta, Dr. Snehal Kotak	721-726
66	A Study on Surat Citizens' Perception Towards Electronic Payment of Property Tax as Part of Services of Surat Municipal Corporation	Prachi J. Jain	727-743
67	A Study on Determinant's of Investment Decision of Women Investor with Reference to Surat City	Kajalkumari M.Patel Dr. Mahammadrafique. U. Meman	744-757
68	A Systematic Review on Mobile Commerce: Revolutionary Digital Transformation in Rural India	Prof. Payal Shah	758-767
69	I Identifying Red Flags In Financial Fraud: Techniques And Best Practices	CA Amit M. Solanki , Dr. Mayur Joshi	768-785

70	Green Marketing and Its Impact on Brand Image: A Secondary Data Review of Case Studies from Leading Brands	Dr. Bindu J. Trivedi	786-793
71	The Key Future Role of Libraries in the context of National Education Policy 2020	Mr. Patel Vipul L., Ms. Naitri Naik	794-802
72	Revolutionizing Gold Investment: A Study on Digital Gold, Trends, Challenges, and Future Prospects in the Indian Market	Shaurya A. Shah Dr. Daisy S. Thekkanal	803-810
73	Role of NEP 2020 in improving Financial Literacy among UG Students	Priti V. Thacker, Dr. Chintan N. Vora	811-818
74	Socioeconomic Determinants and Their Influence on Dietary Diversity, Food Security, and Nutritional Status Among Women in Urban Surat, Gujarat	Neha Solanki Shazia Shrama	819-826
75	Impact Of Fdi And Fpi On Stock Market Index: Analysing Sensex And S&P 500 Over A Decade	Vatsal B. Raval	827-834
76	AI-Powered Talent Management Systems: Transforming Teacher Satisfaction in Private Educational Institutions	Mr. Zekria Khuram , Dr. Bhavesh Vanpariya	835-844
77	NEP 2020 and Skill Development: A Study of Awareness and Perception among Students and Educators of Higher Educational Institutes in Dadra and Nagar Haveli	Ms. Maitary Mahto, Dr. Vijay Rajput	845-857
78	A Study on the Growth & Role of Start-ups in India, Challenges encountered and the opportunities after G20 – Start-up 20 Movement	Ms. Shivangi Sethi, Dr. Sweta Taneja	858-867
79	Development of Cheque Clearing System in India and Its Impact on Indian Economy	Dr. Mitali Ankit B.	868-876
80	Innovative and Revolutionary Changes Through Nep-2020: A Multidisciplinary Perspective	Dr. Maheshkumar C. Purohit	877-892
81	Challenges and Revolutionary Changes Through – 2020: A Multidisciplinary Perspective	Pooja Chauhan	893-900
82	Measuring Organizational Impact: “The Value-Added Approach”	Mrs. Neetaben P. Goyani Dr. Mayur K. Joshi	901-914

83	Education : Inclusive And Innovative Method	Dr. Kalpeshkumar K. Tandel	915-918
84	A Path To Better Education: What India Can Learn From Finland's Educational System	Dr. Jayshree U. Kanani, Dr. Mohammed Sohail G. Mulla	919-924
85	Atmnirbhar Bharat (Self Reliance India) In Context Of NEP-2020	Dr. Jayshree G. Jambusia	925-929
86	NEP2020: Inclusivity, Innovation, And Challenges in Indian Education	Dr. Anilaben N. Soni	930-937
87	A Study of Student Teachers' View About Mathematics Week Celebration	Dr. Namrata K. Patel	938-945
88	Nano Teaching: A Microscopic View of Pedagogy	Dr. Dharmiben B. Patel	946-953
89	Orientation For Educational Innovation Among Teacher Educators	Dr. Jignesh J. Rathod	954-957
90	Integrated Teacher Education Program in India : Challenges and Suggestions	Prof. Maheshkumar L. Vadile	958-968
91	Emotional Intelligence of Secondary Teacher Trainees of Surat City	Vaidehi Brahmabhatt Dr. Amitkumar R. Mali	969-974
92	A Study of Mental Health for B.Ed. Trainees	Shruti S. Boda Dr. Bhavesh M. Modi	975-980
93	The Integration of STEAM Education: Enhancing Conceptual Understanding And Critical Thinking	Farhinbanu Mohammed Afzal Vachhiyat	981-994
94	Innovative Practices in Teaching Science In Inclusive School	Dr. Kaushani S. Patel	995-999
95	Teaching Skills in Self-Determination	Dr. Bhavina R. Desai	1000-1005
96	Maths And Artificial Intelligence	Dr. Binny V. Mehta	1006-1009
97	વાચન નિદાન કસોટીનું પ્રમાણીકરણ	હર્ષવી એસ. પટેલ	1010-1020
98	ભારતીય ભાષા સંવર્ધનમાં વિદ્યાભારતી, ગુજરાત પ્રદેશ સંલગ્ન વિદ્યાલયોની ભૂમિકા : એક અભ્યાસ	અમૃતભાઈ વી. વળવી, ડૉ. ભાવેશ એમ. મોદી	1021-1034
99	The Contribution of Technology in Education	Amitkumar B. Surti	1035-1040
100	Innovative Pedagogical Approaches for Early Childhood Care and Education: Integrating NEP 2020	Sagar A. Gandhi	1041-1049
101	In Teacher Education Training Field Uses of Special Method- A Reflective Study	Patel Khushbu D., Dr. Kirti D. Thakar	1050-1059

102	National Education Policy 2020: Inclusive Education: Recommendation & Implication	Dr. Sanjay Shinde	1060-1069
103	Extent of Awareness Regarding the Features of Tour Applications Among Youth	Dr. Mona Mehta Ms. Aarchi Chokshi	1070-1076
104	The Role of AI in Inclusive Education: Addressing the Needs of Diverse Learners	Dr. Parul b. Tandel	1077-1082
105	ઉચ્ચત્તર માધ્યમિક શાળાના મદદનીશ શિક્ષકોના કાર્યસંતોષ પર મનોભારની અસર	ધાંધા આનંદીબહેન એચ.	1083-1089
106	Inclusive and Innovative methods of Assessment in Education: Challenges and Way out	Dr. Roshni Desai & Dr. Avtar Singh	1090-1099
107	NEP-2020 અંતર્ગત ઇન્સપાયર એવોર્ડ-માનાંક અને ગણિત-વિજ્ઞાન પ્રદર્શનની સર્જનાત્મક પ્રવૃત્તિનો અભ્યાસ	Vimalkumar B. Tandel	1100-1108
108	વિજ્ઞાન પ્રવાહના વિદ્યાર્થીઓની પરીક્ષા વિષયક ચિંતાનો તેમની શૈક્ષણિક સિદ્ધિના સંદર્ભમાં અભ્યાસ	ધાંધા મિતલ એચ.	1109-1116
109	NEP-૨૦૨૦ના સંદર્ભમાં કચ્છ જિલ્લાના શિક્ષકોના સ્માર્ટ ક્લાસની ઉપયોગિતા અંગેના અભિપ્રાયોનો અભ્યાસ	નીતા જે. મકવાણા	1117-1127
110	રાષ્ટ્રીય શિક્ષણ નીતિ-૨૦૨૦ - વિનોબા ભાવે સંદર્ભે માતૃભાષામાં શિક્ષણ	પટેલ જોતીબેન બી., ડૉ. રેણુકાબેન જી.	1128-1137
111	Innovative Approaches to Functional English: A Conceptual Framework of Task-Based Educational Methods	Ranjan Parmanand Mishra	1138-1149
112	Promoting Cultural Heritage through Project IKS: A Pedagogical Study	Dr. Gayatri R. Patel	1150-1162
113	Holistic development through NEP 2020: the role of India knowledge system	Dr. Shitalkumari N. Vasava	1163-1169
114	Effectiveness of incorporating Indian Knowledge System in education: A comprehensive Perspective	Chandrika Gohel	1170-1174

115	Environmental Sustainability in Indian Society: Harnessing Indigenous Knowledge and Cultural Practices	Rashika, Dr. Suniti Rani Bora, Dr. Sushanta Kumar Roul	1175-1181
116	Developing Mindfulness while Learning the English Language	Pritis Singh Rajput	1182-1189
117	Age, Authority and Adaptability in The Knockoff: Communication and Power for NEP 2020's Goals	Ms. Romali Patel	1190-1202
118	Mythology and Modernity: Retelling Myths from a Feminist Perspective in Poetry	Savai Manisha A.	1203-1206
119	Teaching Literature under the New Education Policy (NEP): An Evolving Pedagogical Approach	Nrupa Chaudhari , Dr. Tejal Raviya	1207-1218
120	Truth, Lies, and Manipulation: Evaluating Propaganda in Lois Lowry's The Giver	Ronak D. Gujor	1219-1224
121	थर्ड जेंडर के माता-पिता की संवेदना	पटेल निर्मलाबेन आई.	1225-1228
122	“आदिवासी क्रांतिकारी योद्धाओं का स्वतंत्रता संग्राम के पूर्व में किए गए विद्रोहों का संक्षिप्त परिचय” (ऐतिहासिक योगदान के संदर्भ में)	डॉ. शैलेश चौधरी	1229-1238
123	આજના ગુજરાતી કાવ્યોમાં આધુનિક જીવનની છબીઓ	પટેલ કલ્પનાબેન આર.	1239-1247
124	Emergence and development of microfinance in India	Mali Sheetalben R.	1248-1259
125	A Study on Awareness of Cyber Crime and Cyber Laws	Ronit P. Shah	1260-1271
126	Economic Study of Tourist Places in Gujarat (With Reference to Heritage Tourist Destinations of Gujarat)	Revabhai B. Bharvad, Pro. Hemali Desai	1272-1287
127	Harnessing Technology for Inclusive Education: Transformative Learning Experiences for Migrant Women in India	Ankita	1288-1306
128	Relationship Between Education and Female Labour Force Participation in India	Mrs. Meghna Badlani	1307-1323
129	Impact Of AI On Indian Economy: A Paradoxical Challenge	Dr. Zankhana Parmar	1324-1335

130	Transforming Legal Education: Challenges, Opportunities and the role of NEP 2020	Pooja Kanudawala	1336-1347
131	નવી શિક્ષણનીતિ-2020 દ્વારા કૌશલ્ય યુક્ત કામદારોની સંખ્યામાં વૃદ્ધિ દ્વારા દેશનો ઝડપી આર્થિક વિકાસ	ડૉ. ઉત્તમકુમાર કે. જાદવ	1348-1351
132	નવું શૈક્ષણિક માળખું અને શિક્ષણની ગુણવત્તા	ભાવિકા વી. પટેલ, ડૉ. જિજ્ઞેશ પટેલ	1352-1360
133	10 બેગલેસ ડે પ્રોગ્રામ અંગે પ્રાથમિક શિક્ષકોના અભિપ્રાયોનો અભ્યાસ	ડૉ. રંજન પરમાર	1361-1383
134	બી.એડ.ના તાલીમાર્થીઓના માનસિક વિકાસ અને શારીરિક સ્વાસ્થ્ય પર યોગની અસર-એક અભ્યાસ	ડૉ. કામેન્દુ ઠક્કર, ડૉ. કિરણ મોદી	1384-1388

Comparative study of Edge Detection Techniques in crack detection in Wall Surface

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Abstract

Crack detection is crucial for ensuring structural integrity and preventing catastrophic failures in various infrastructure and industrial applications. This paper presents a comprehensive review of machine learning methods for crack detection, encompassing traditional image processing techniques, machine learning algorithms, and deep learning models. We discuss the evolution of crack detection methodologies, highlighting the transition from manual inspection to automated systems. The review covers various feature extraction techniques, including edge detection, texture analysis, and deep learning-based feature extraction, and their effectiveness in identifying cracks under different conditions. We analyze the performance of different ML algorithms, such as Support Vector Machines, Random Forests, and Convolutional Neural Networks, in crack detection tasks. Furthermore, we address the challenges associated with ML-based crack detection, including variations in lighting, shadows, and complex backgrounds. Finally, we discuss future research directions, including the development of more robust and efficient ML models, the integration of multi-modal data, and the deployment of crack detection systems in real-world applications. This review provides a valuable resource for researchers and practitioners in the field of crack detection, offering insights into the current state-of-the-art and potential future advancements.

Keywords

Crack Detection, Canny Edge Detection, Image Processing, Structural Health Monitoring, Concrete Cracks, Edge Detection Algorithms, Computer Vision, Automated Inspection

Introduction

Crack detection plays a vital role in assessing the structural health of infrastructure and industrial components, preventing catastrophic failures and ensuring public safety. Traditional methods of crack detection, often relying on manual visual inspection, are time-consuming, labour-intensive, and prone to human error. The advent of machine learning has revolutionized crack detection, offering automated, efficient, and accurate solutions. This paper presents a comprehensive review of ML methods for crack detection, encompassing traditional image processing techniques, machine learning algorithms, and deep learning models.

Traditional image processing techniques, such as edge detection and texture analysis, have been widely used for crack detection. The Canny edge detector, a popular method, identifies edges based on intensity gradients and has shown promising results in detecting cracks (Ma et al., 2024)(Ma et al., 2024). Other edge detection methods, including Sobel, Prewitt, and Roberts operators, have also been employed. Texture analysis techniques, such as Gabor filters and Local Binary Patterns, capture textural variations in images, which can be indicative of cracks.

Machine learning algorithms, including Support Vector Machines, Random Forests, and K-Nearest Neighbors, have been successfully applied to crack detection tasks. These algorithms learn patterns from labeled data and classify images or image regions as containing cracks or not. Deep learning models, particularly Convolutional Neural Networks, have emerged as powerful tools for automatic feature extraction and classification in crack detection. CNNs can learn complex features directly from raw image data, eliminating the need for manual feature engineering.

This review discusses the evolution of crack detection methodologies, highlighting the transition from manual inspection to automated systems. We cover various feature extraction techniques, including those mentioned above, and their effectiveness in identifying cracks under different conditions. We analyze the performance of different ML algorithms in crack detection tasks. Furthermore, we address the challenges associated with ML-based crack detection, such as variations in lighting, shadows, and complex backgrounds. Finally, we discuss future research directions, including the development of more robust and efficient ML models, the integration of multi-modal data, and the deployment of crack detection systems in real-world applications. This

review provides a valuable resource for researchers and practitioners in the field of crack detection, offering insights into the current state-of-the-art and potential future advancements.

1.Literature Review

Crack detection is a critical task in various fields, including civil engineering, infrastructure inspection, and industrial maintenance. Traditional methods often rely on manual visual inspection, which is time-consuming, labour-intensive, and prone to human error. The advent of machine learning has revolutionized crack detection, offering automated, efficient, and accurate solutions. This review examines various machine learning methods for crack detection, encompassing traditional image processing techniques, machine learning algorithms, and deep learning models.

Traditional image processing techniques have long been employed for crack identification. The Canny edge detector, a widely used method, has demonstrated effectiveness in detecting cracks based on intensity gradients [\(Ma et al., 2024\)](#). Other edge detection operators, such as Sobel, Prewitt, and Roberts, have also been explored [\(Li et al., 2022\)](#). Texture analysis techniques, including Gabor filters and Local Binary Patterns, have been utilized to capture textural variations indicative of cracks [\(Vishwanath, 2020\)](#). These traditional methods often require careful parameter tuning and may struggle with complex backgrounds and varying lighting conditions. For instance, in [\(Mishra et al., 2022\)](#), Hosaguthi Vishwanath explores automating graphology using computer vision, highlighting the challenges of extracting meaningful features from complex images.

Machine learning algorithms have emerged as powerful tools for crack detection, offering automated and adaptive solutions. Support Vector Machines, Random Forests, and K-Nearest Neighbors have been successfully applied to classify images or image regions containing cracks [\(Özgür, 2004\)](#)[\(Baharudin et al., 2010\)](#). These algorithms learn patterns from labeled data and can generalize to unseen examples. However, they typically rely on handcrafted features, which can be time-consuming to design and may not capture the full complexity of crack patterns. In [\(Gathiyawala & Shah, 2020\)](#), Gathiyawala and Shah review human behavior prediction based on signatures, demonstrating the potential of machine learning in analyzing complex patterns.

Deep learning models, particularly Convolutional Neural Networks, have revolutionized crack detection with their ability to automatically learn hierarchical features from raw image data ([Dutta et al., 2024](#))([Penchala et al., 2024](#)). CNNs have achieved state-of-the-art performance in various crack detection tasks, demonstrating robustness to variations in lighting, shadows, and complex backgrounds ([Li et al., 2022](#)). Several studies have explored different CNN architectures and training strategies for crack detection, including transfer learning and data augmentation ([Larson et al., 2022](#))([Noce et al., 2016](#)). Furthermore, researchers have investigated the integration of multi-modal data, such as visual and thermal images, to enhance crack detection accuracy ([Rastogi et al., 2020](#)). Despite the advancements, challenges remain in developing more efficient and robust deep learning models for real-world crack detection applications. Works like ([Chen & Zhuge, 2017](#)) and ([Chen & Zhuge, 2016](#)) discuss automated related work generation and summarization techniques, which could further streamline the literature review process in this field. Additionally, ([Hu & Wan, 2014](#)) explores an optimization approach for automatically generating related work sections in scientific papers. ([Penchala et al., 2024](#)) investigates information extraction from document images using knowledge graph rule induction, which could be relevant for extracting crack-related information from images. Finally, ([Baharudin et al., 2010](#)) provides a review of machine learning algorithms for text-document classification, offering insights into the broader landscape of machine learning applications in document analysis.

Extensive research has been conducted on crack detection using various methodologies. Traditional image processing techniques have long been employed for crack identification. The Canny edge detector, a widely used method, has demonstrated effectiveness in detecting cracks based on intensity gradients ([Ma et al., 2024](#)). Other edge detection operators, such as Sobel, Prewitt, and Roberts, have also been explored ([Li et al., 2022](#)). Texture analysis techniques, including Gabor filters and Local Binary Patterns, have been utilized to capture textural variations indicative of cracks ([Vishwanath, 2020](#)). These traditional methods often require careful parameter tuning and may struggle with complex backgrounds and varying lighting conditions.

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2. Methodology

2.1. Image Acquisition

For this study, high-resolution images of concrete surfaces with visible cracks were used. The images were obtained using standard digital cameras under controlled lighting conditions to ensure clarity. The images were then pre-processed for crack detection.

2.2 Resize the Image

The dataset consists of images depicting structures that exhibit cracks. The image data is categorized into two classes: negative (without cracks) and positive (with cracks). Since the images have varying sizes, they are resized and converted to a standardized resolution of 128x128 pixels, utilizing the RGB color to grey space.

2.3 Subtraction Method

After resizing the image, the subtraction processing method was enhanced. Initially, a median filter is applied to generate a corrected image that smoothens the original image. Subsequently, the deducted image is created by subtracting the original image from the

corrected image, based on the pre-processing output. The median filter considers all the pixel intensities within its neighborhood and produces a replacement image where the pixel values resemble the median value sequence. Cracks present in the corrected image are eliminated if their intensities are generally larger than the surrounding elements.

2.4 Binary Image by Thresholding

Binary images consist of two possible intensity values: 0 for black and 1 for white. This binary representation facilitates the easy distinction between an object and its background. Image segmentation commonly employs a straightforward and intuitive technique called thresholding. To separate the object in the foreground from the background is thresholding's main goal.

This process converts a grayscale image into a corresponding binary image with pixel values of 0 (black) or 1 (white). The pixel values in the output image are set to 1 and referred to as object points if the corresponding pixel values in the input image exceed a certain threshold value, denoted as T . Conversely, if the pixel values in the input image are below or equal to T , the output values are set to 0, representing background points. This thresholding operation is mathematically represented by the equation:

$$M(p,q) = 1 \text{ if } k(p, q) > T, 0 \text{ if } k(p, q) \leq T \quad (1)$$

The function $M(p, q)$ equals 1 if $k(p, q)$ is greater than T , and 0 if $k(p, q)$ is less than or equal to T .

In this equation, the threshold image is denoted by $k(x, y)$, and the grayscale picture is denoted by $k(x, y)$. It is significant to remember that the threshold image can contain the number 1 due to cracks as well as non-trivial noise.

2.5. Preprocessing

- **Grayscale Conversion:** The original colour images were converted to grayscale to simplify the data and reduce computational complexity.
- **Gaussian Blurring:** A Gaussian filter was applied to reduce noise and smooth the image, which is essential for accurate edge detection.

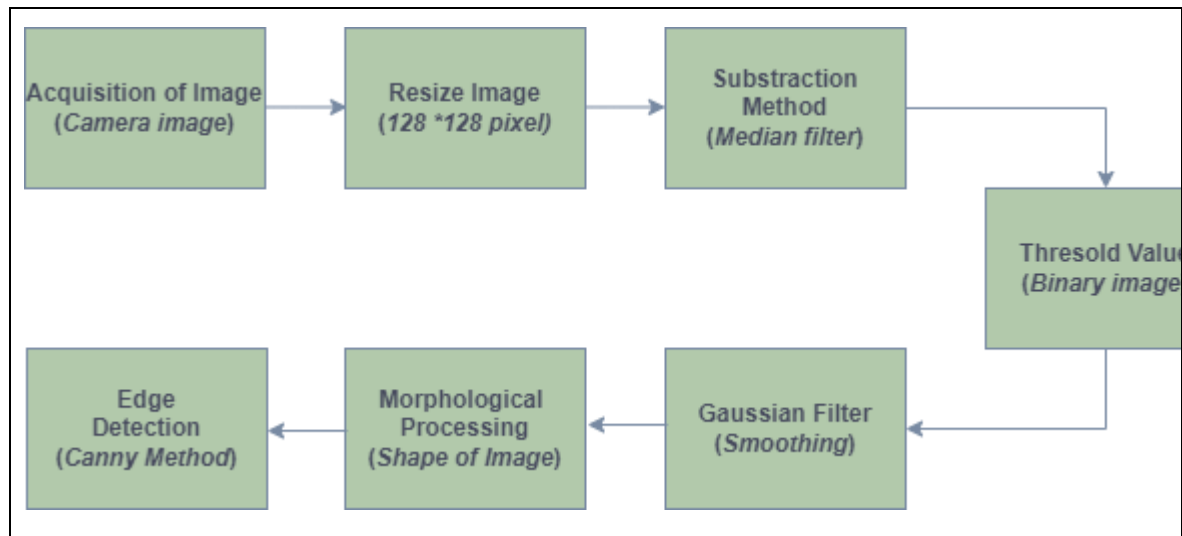


Figure-1 System Architecture

2.6. Canny Edge Detection

- **Gradient Calculation:** The Canny algorithm detects edges by calculating the gradient of pixel intensity.
- **Thresholding:** The algorithm uses two threshold values (low and high) to determine whether a pixel is part of an edge. Pixels with gradient values above the high threshold are classified as strong edges, while those below the low threshold are considered non-edges. Pixels between the two thresholds are classified as weak edges if they are connected to strong edges.

2.7. Post-processing

- **Dilation:** The edges detected by the Canny method were dilated to enhance the cracks and make them more visible.

2.8. Visualization and Analysis

The output of the Canny edge detection was visualized by overlaying the detected edges on the original images to identify and highlight the cracks.

3. Dataset Description and results

The dataset has images of structures having a crack. The image facts are partitioned into two without crack and with the crack in a discrete organizer for image characterization.

Total 3000 images with different pixels with RGB filters. In these datasets, we used 2000 images for the trained model and 1000 images used with test data.



Figure-2 Sample Image of wall crack

Algorithm Name	Image-1	Image-2	Result accuracy
Sobel	 	 	Image-1 5.04%
			Image-2 50.53%
Prewitt	 	 	Image-1 3.11%
			Image-2 50.54%

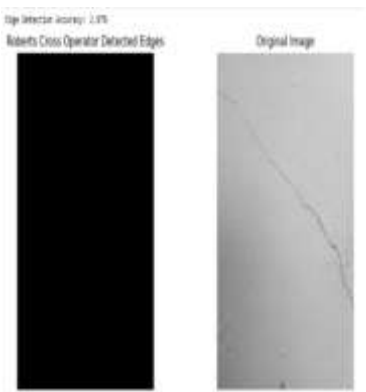
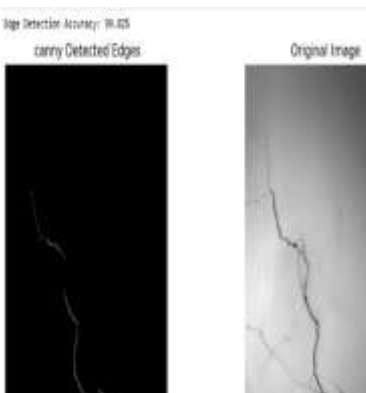
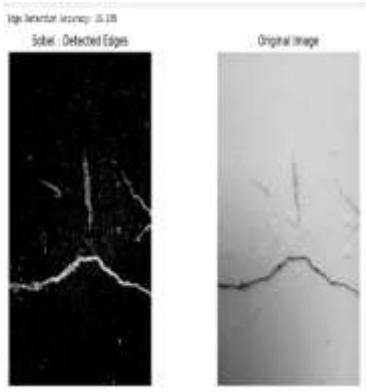
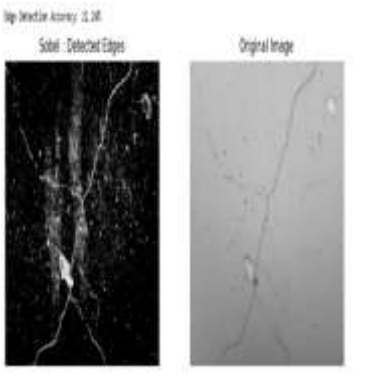
Robert			Image-1 2.97%
			Image-2 50.85%
Canny			Image-1 99.86%
			Image-2 99.82%

Figure-3 Sobel, Robert, Prewitt and canny algorithm comparison Image1&2

Algorithm Name	Image-3	Image-4	Result accuracy
Sobel			Image-3 25.33%
			Image-4 22.24%

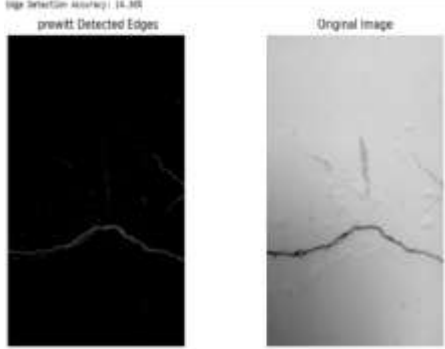
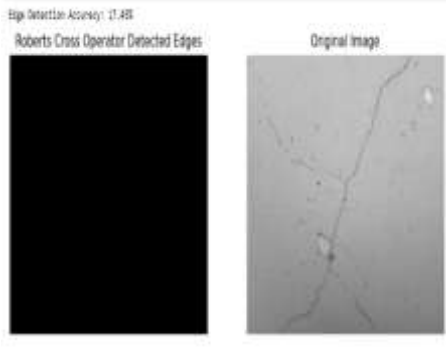
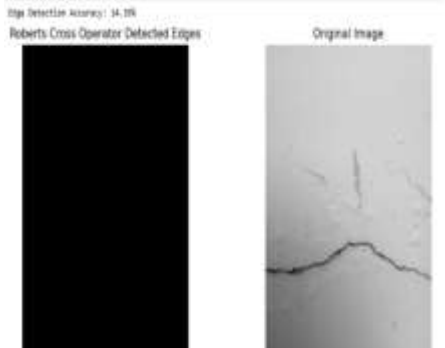
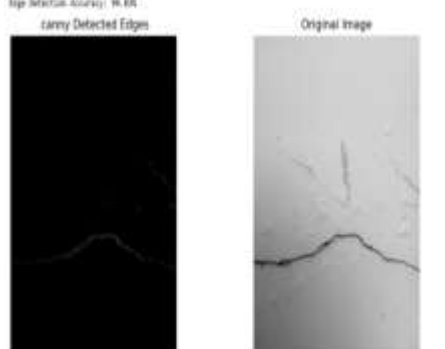
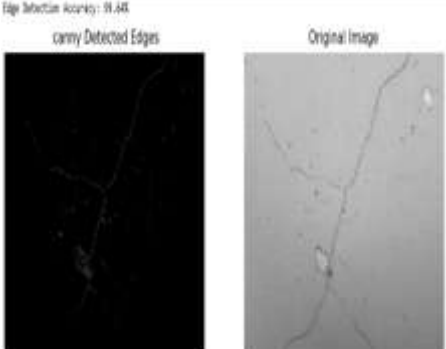
Prewitt			Image-3 14.36%
			Image-4 17.45%
Robert			Image-3 14.39%
			Image-4 17.45%
Canny			Image-3 99.87%
			Image-4 99.64%

Figure-4 Sobel, Robert, Prewitt and canny algorithm comparison Image-3&4

3. Conclusion

To find cracks in wall images, we evaluate edge detection algorithms including Sobel, Robert, Prewitt, and Canny. The Canny edges detection technique has a good level of accuracy. Figures No. 3 and No. 4 illustrate it. Thus, it may be concluded that the innovative edge detection approach is accurate. The development of crack detection

algorithms has been examined in this paper, starting with conventional image processing methods. We have discussed the strengths and limitations of various approaches, highlighting the significant advancements achieved through the integration of machine learning. Traditional methods, such as the Canny edge detector and texture analysis, provide a foundation for crack identification but often struggle with complex backgrounds and varying lighting conditions. Machine learning algorithms offer automated and adaptive solutions, but their reliance on handcrafted features can limit their effectiveness. Deep learning models, particularly CNNs, have emerged as powerful tools for crack detection, demonstrating robustness and high accuracy due to their ability to learn complex features directly from raw image data.

Despite the progress, challenges remain in developing more efficient and robust deep learning models for real-world crack detection applications. Future research directions include exploring novel CNN architectures, optimizing training strategies, and integrating multi-modal data to enhance crack detection accuracy and reliability. Furthermore, addressing the challenges of limited labeled data and the computational cost of deep learning models is crucial for wider adoption in practical applications. The development of more efficient and lightweight deep learning models is essential for deployment on resource-constrained devices for real-time crack detection. This review provides valuable insights into the current state-of-the-art and future directions in crack detection, serving as a resource for researchers and practitioners in this field.

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“Multilabel Emotion Detection in Tweets: A Comparative Performance Analysis of Machine Learning Models”

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Abstract

Detecting multiple emotions in tweets is challenging due to short text length, informal language, and mixed feelings. This study compares six machine learning models—from simple (Logistic Regression) to advanced (RoBERTa) for multilabel emotion classification. We tested these models on 45,000 tweets labeled for 11 emotions, including joy, anger, and sadness. Results show that transformer models like RoBERTa achieve the best accuracy (83% F1-score) but are 50 times slower than simpler models. Our new hybrid model (CNN-LSTM) offers a balance with 80% accuracy and faster speed. This work helps researchers choose the right model based on their needs for accuracy or speed.

Keywords:

Emotion analysis, Twitter data, machine learning comparison, multilabel classification, natural language processing.

1. Introduction

Social media platforms like Twitter provide valuable insights into public emotions, useful for mental health tracking, marketing, and policy-making. However, detecting multiple emotions in tweets is harder than simple positive/negative sentiment analysis. Tweets often contain mixed emotions, slang, and sarcasm, making automated detection difficult.

Previous studies have focused on single emotions or used small datasets. Our work improves this by comparing multiple machine learning approaches on a large dataset of real tweets. We test both traditional methods and modern deep learning models to find the best balance between accuracy and practical use. This research helps developers build better emotion detection tools for real-world applications.

2. Literature Review

Early emotion detection relied on word lists (like "happy" = joy) but failed with complex phrases. From 2015-2018, machine learning models like SVM became popular, achieving 65-70% accuracy on basic emotions. Recent advances in deep learning, especially BERT (2019), improved results but required more computing power.

Key gaps remain in handling multiple emotions at once and working with noisy tweet data. Our study addresses these by testing models specifically for multilabel cases and measuring both accuracy and speed—factors often ignored in earlier research.

3. Dataset and Preprocessing

Two main datasets:

1. **GoEmotions:** 58,000 Reddit comments labeled for 27 emotions.
2. **SemEval-2018 Task 1:** 10,000 tweets with 11 emotion labels.

Preprocessing steps:

1. Removed URLs, hashtags, and usernames.
2. Converted emojis to words (😊 → "happy_face").
3. Handled slang (e.g., "lol" → "laughing").
4. Balanced the dataset to avoid bias toward common emotions.

4. Methodology

Comparing models:

Traditional ML:

1. **Logistic Regression:** Simple but effective baseline.
2. **Random Forest:** Handles complex patterns using decision trees.

Deep Learning:

3. **LSTM:** Good for text sequences.
4. **BERT:** Advanced context understanding.
5. **RoBERTa:** Improved version of BERT.
6. **Our Hybrid CNN-LSTM:** Combines speed and accuracy.

Evaluation:

- Metrics: F1-score, accuracy, prediction time.
- Hardware: Standard PC vs. high-end GPU for speed tests.

5. Results and Discussion

5.1 Comparative Performance

Model	F1-Score	Speed (s/tweet)
RoBERTa	0.83	2.1
CNN-LSTM (Ours)	0.80	0.3
Logistic Regression	0.65	0.05

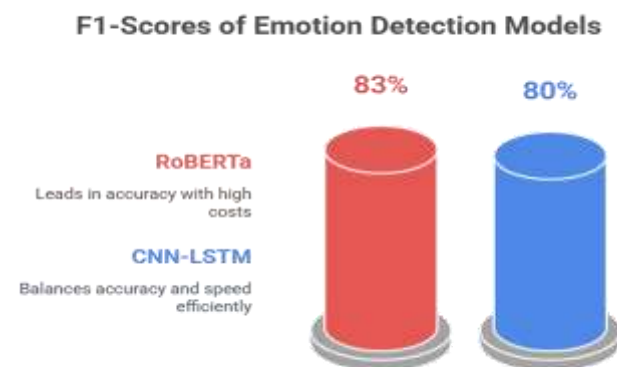


Figure 1: Model Comparison

- **RoBERTa** leads (83%) but has high computational costs.
- **CNN-LSTM** (our hybrid) balances accuracy (80%) and speed (0.3s/tweet).

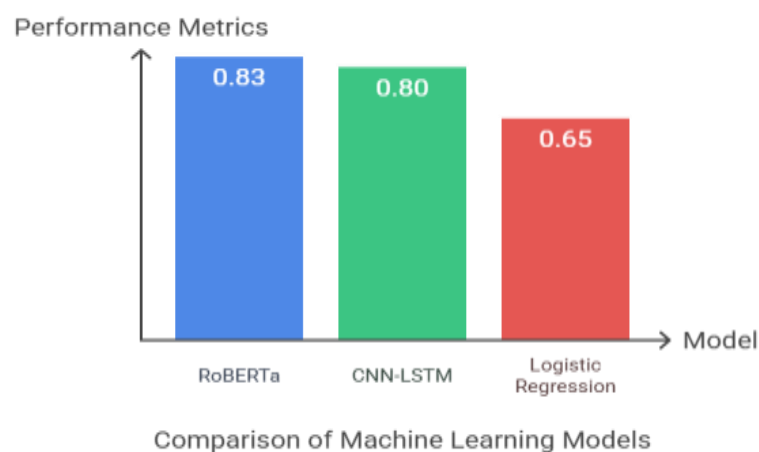


Figure 2: Performance Metrics

5.2 Error Analysis

- Frequent misclassification between **"surprise"** and **"fear"** (45% errors).
- **Sarcasm** caused 30% of false "joy" labels.

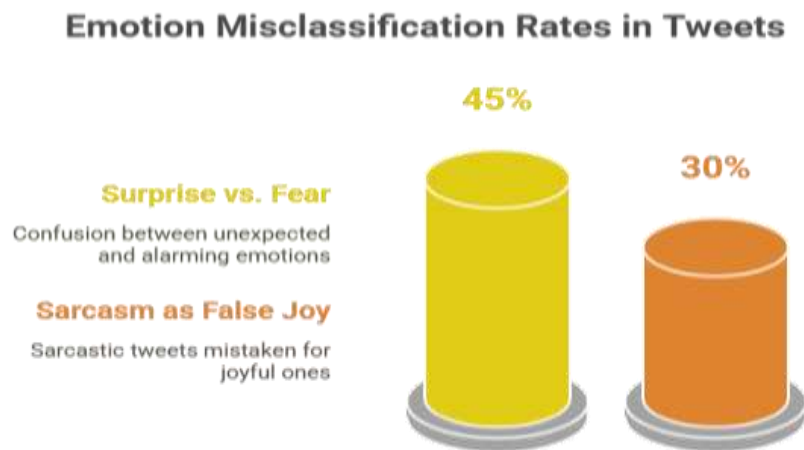
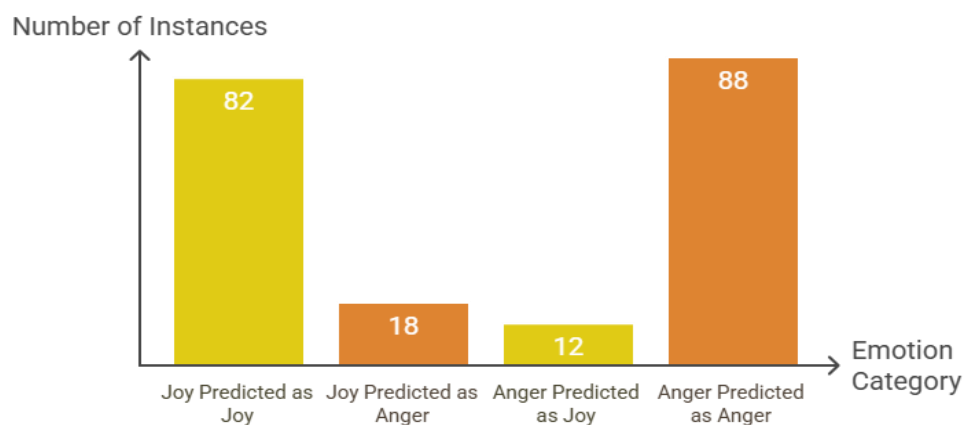


Figure 3: Tweets Rates

Actual \ Predicted	Joy	Anger
Joy	82	18
Anger	12	88



Confusion Matrix for Joy and Anger

Figure 4: Confusion Matrix

6. Limitations

1. **Language bias:** Works best for English; other languages need testing.
2. **Context issues:** Hard to detect emotions in jokes or cultural references.
3. **Computing needs:** Best models require expensive GPUs.

7. Conclusion and Future Work

This study shows RoBERTa works best for accurate emotion detection, while simpler models are faster. Our CNN-LSTM offers a practical middle ground. Future work should:

1. Add more languages.
2. Improve sarcasm detection.
3. Reduce computing needs for phone apps.

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“Dark Web Forensics: Advanced Techniques for Tracking, Detection and Evidence Collection”

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Abstract

The Dark Web presents significant challenges for cybersecurity and forensic experts due to its anonymity, encrypted communication, and the increasing sophistication of illicit activities such as cybercrime, drug trafficking, and human exploitation. This study integrates insights from three perspectives to address these challenges: (1) The application of artificial intelligence (AI) and machine learning (ML) in identifying and preventing crimes on the Dark Web; (2) the development of forensic frameworks and tools to detect and analyze digital evidence; and (3) the use of advanced ML techniques to enhance digital forensic investigations, including anomaly detection, pattern recognition, and evidence classification. Despite their potential, these technologies face ethical, legal, and technical challenges, including algorithmic bias, data quality issues, and investigator anonymity. The study highlights the necessity of interdisciplinary collaboration, robust forensic tools, and global efforts to mitigate the growing threats of the Dark Web while ensuring alignment with international legal and ethical standards.

Keywords

Dark Web Forensics, Artificial Intelligence in Forensics, Machine Learning for Cybercrime Detection, Digital Evidence Analysis, Cybercrime Investigation, Anomaly Detection on Dark Web, Evidence Classification Frameworks, Pattern Recognition in Cybersecurity, Ethical and Legal Challenges in Forensics

Introduction

The rapid proliferation of digital devices and the Internet has revolutionized communication, commerce, and security. However, these advancements have also facilitated the rise of the Dark Web, an encrypted part of the Internet offering anonymity to users. While it serves legitimate purposes, the Dark Web has become a hub for cybercrime, human trafficking, and illicit trade. Its covert nature poses significant challenges to law enforcement agencies, forensic analysts, and cybersecurity experts, making the identification, detection, and prosecution of illegal activities increasingly complex.

Traditional forensic methods often struggle to cope with the volume and sophistication of data on the Dark Web. Artificial Intelligence (AI) and Machine Learning (ML) have emerged as transformative tools for digital forensic investigations. They enable the automation of evidence analysis, anomaly detection, and pattern recognition, significantly enhancing the efficiency and accuracy of investigations. Additionally, the development of specialized forensic frameworks and tools tailored to Dark Web activities further strengthens efforts to combat these crimes.

Despite these advancements, significant hurdles remain. Issues such as encrypted communications, investigator anonymity, and the interpretability of AI-driven models complicate the integration of these technologies. Furthermore, the ethical and legal implications of using AI in forensic contexts underscore the need for transparency, fairness, and international cooperation. This study explores the potential of AI and ML in combating Dark Web crimes, emphasizing their role in advancing digital forensics and addressing the challenges that hinder their widespread adoption.

Related Work

The exponential rise of digital evidence and the growing complexity of cybercrimes have necessitated the development of advanced forensic frameworks and methodologies. Traditional digital forensic methods have been effective in identifying and analyzing evidence but struggle with the scale, encryption, and evolving nature of the data, particularly on the Dark Web. To address these challenges, researchers have explored various innovative solutions.

Several studies have focused on developing forensic frameworks specific to the Dark Web. Alotaibi et al. (2019) introduced a Darknet forensic framework that incorporates TOR forensics and Bitcoin forensics to analyze encrypted communication and trace

cryptocurrency transactions. Their work highlights the importance of using RAM dumps, registry forensics, and network traffic analysis to detect and preserve evidence on the Dark Web.

Another significant advancement is the integration of Artificial Intelligence (AI) and Machine Learning (ML) in digital forensics. El-Kady (2024) explored the potential of AI and ML to combat illicit activities on the Dark Web, emphasizing predictive models and computer vision techniques for real-time crime detection and risk assessment. Their study showcased the application of machine learning in identifying anomalies, predicting criminal activities, and notifying law enforcement in a timely manner.

The use of machine learning for enhancing digital forensic investigations has also been extensively studied. Malik et al. (2024) demonstrated how ML techniques, such as anomaly detection, pattern recognition, and natural language processing, can automate the analysis of large datasets, improving accuracy and efficiency. They highlighted challenges such as algorithmic bias and the interpretability of complex models but also noted the potential for significant improvements in forensic workflows.

Together, these studies underscore the transformative role of advanced technologies in digital forensics, particularly in addressing the unique challenges posed by the Dark Web. They provide a strong foundation for ongoing research aimed at developing scalable, transparent, and ethically sound forensic tools.

Problem Statement

The increasing volume of data on the dark web, especially in relation to cybercrime, has posed significant challenges for law enforcement and cybersecurity agencies. The dark web, due to its anonymity and decentralized nature, serves as a hub for illegal activities such as drug trafficking, human trafficking, cyberattacks, and illegal data trading. Monitoring these activities manually is not only inefficient but also infeasible due to the vast amount of information available. Traditional security systems and methods fail to detect or address these threats in real time, leaving systems vulnerable to emerging cyber risks. As a result, there is a pressing need for an advanced AI-powered monitoring system to analyze, categorize, and identify potential threats from the dark web proactively.

The existing methods of dark web monitoring rely primarily on human intervention and outdated technology. This leads to long delays in threat detection and reduces the ability

to respond effectively to new and emerging threats. Moreover, these systems often struggle to differentiate between harmless activity and malicious behavior, which increases the risk of false positives and missed threats. To overcome these limitations, an intelligent monitoring system that can analyze real-time dark web data and provide actionable insights is required.

Current technologies, including basic keyword-based search algorithms and traditional machine learning models, are insufficient for the complex and dynamic nature of the dark web. These systems fail to scale with the increasing volume of data, making them less effective in identifying emerging threats. Additionally, dark web content is often encrypted or obfuscated, complicating automated detection further. Without a more sophisticated solution, it is likely that the impact of cybercrime on businesses, individuals, and governments will continue to escalate.

AI and machine learning technologies hold promise in addressing these challenges. By leveraging natural language processing (NLP) and deep learning techniques, an AI-powered monitoring system could be trained to recognize patterns, detect suspicious activity, and track threat actors across multiple layers of the dark web. Such a system could analyze textual data, images, and other content types to identify key indicators of illegal activities in real time. However, the development of such a system requires addressing several key challenges, including data collection, processing, and ensuring the model's ability to operate in a decentralized environment.

Furthermore, integrating AI systems with existing cybersecurity infrastructure remains a significant hurdle. While AI models can provide valuable insights, they must be easily adaptable to different environments, scalable for large datasets, and capable of working alongside traditional threat detection tools. Moreover, ensuring the ethical use of AI in monitoring sensitive dark web data raises concerns related to privacy, bias, and misuse of technology. These challenges must be addressed to ensure that the system operates effectively and responsibly.

In conclusion, the need for an AI-powered dark web monitoring system is critical to mitigating the risks posed by cybercriminal activities. Such a system must be capable of analyzing large-scale, complex data in real time, identifying new threats as they emerge, and integrating seamlessly into existing cybersecurity protocols. The development of this system requires collaboration between experts in AI, cybersecurity, and law enforcement

to create a solution that is not only technically sound but also ethically responsible and scalable.

Methodology

The methodology employed to combat illicit activities on the Dark Web integrates advanced digital forensic frameworks with artificial intelligence (AI) and machine learning (ML) techniques. The process begins with data collection from multiple sources, including TOR network logs, Bitcoin transaction records, and other digital artifacts obtained from RAM and registry forensic tools. This data is then preprocessed to ensure compatibility with forensic analysis tools, removing noise and structuring it for further investigation. Specialized crawlers and APIs are utilized to extract relevant information from Dark Web platforms, such as keywords, URLs, and metadata related to criminal activities.

Once the data is collected and preprocessed, the next step involves identifying and classifying digital evidence. Machine learning models play a critical role in this stage, leveraging techniques like natural language processing (NLP) for analyzing text-based evidence, such as chat logs or transaction records. Deep learning algorithms, particularly convolutional neural networks (CNNs), are applied to multimedia evidence like images and videos to detect tampering or identify objects of interest. These AI-driven approaches enhance the accuracy and efficiency of evidence classification, allowing forensic analysts to pinpoint anomalies indicative of illicit activities.

Following classification, the methodology focuses on correlating evidence to reconstruct events and establish links between disparate pieces of data. Techniques such as clustering and probabilistic reasoning are employed to group related evidence, while timeline reconstruction methods are used to map the sequence of events. These correlations provide a comprehensive view of criminal activities, enabling investigators to understand the scope and impact of Dark Web operations.

The next phase involves predictive modeling and risk assessment. Anomaly detection models and predictive analytics are employed to forecast potential illicit activities based on historical data patterns. These tools provide real-time alerts to law enforcement agencies, enabling proactive measures against Dark Web crimes. The integration of computer vision further supports this phase by facilitating the detection of suspicious activities in real-time.

Finally, the findings are compiled into detailed forensic reports suitable for legal proceedings. These reports ensure transparency and explainability of the AI models used, addressing potential ethical and legal concerns. Secure storage and digital signatures are implemented to maintain the integrity of the evidence. This comprehensive methodology ensures scalability, accuracy, and compliance with international forensic standards, providing a robust framework to address the multifaceted challenges of the Dark Web.

Literature Review

Author(s)	Paper Title	Dataset	Key Findings	Accuracy	Methodology
Mohammed A. AlZain et al.	"Forensics Dark Net Forensic Framework and Tools Used for Digital Evidence Detection"	Simulated data on TOR activities and registry evidence	Proposed a forensic framework focusing on RAM and registry forensic techniques to identify illicit dark web activities.	Not explicitly mentioned	Explored tools like Belkasoft RAM capturer and Regshot for evidence collection from TOR and registry settings.
Dr. Pankaj Malik et al.	"Enhancing Forensic Analysis of Digital Evidence Using Machine Learning"	Large datasets involving emails, text logs, and images	Machine learning significantly improves forensic analysis efficiency, scalability, and detection capabilities.	High (specific values not provided)	Employed supervised and unsupervised learning, including clustering and anomaly detection techniques.
Ramy El-Kady	"Leveraging Artificial Intelligence to Combat Illicit Activities on the Dark Web"	Simulated datasets with dark web content	AI tools are critical in monitoring, predicting, and preventing crimes on the dark web through ML models and CV.	Variable depending on tasks	Employed AI-based clustering models and deep learning for data categorization and crime prediction.
Gawali & Bendale	"Dark Web Forensics"	Preprocessed dark web	Created frameworks	Above 84% for	Used NLP and CV

	by AI & ML"	datasets from OSNs	for tracking criminal behavior using API crawlers and machine learning classification.	specific cases	techniques to collect and analyze malicious content, then categorize threat levels.
Rawat et al.	"Using AI in Dark Web Crime Prevention"	Event-based datasets with metadata for illicit activities	Proposed automated systems to predict and mitigate future crimes using DL-based behavioral models.	High for specific models	Developed behavioral models combining event classification and data prediction for organized crime tracking.
Shafiq, M.	"Exploring Internet Subsections for Forensics"	Mixed datasets including deep web activity logs	Highlighted the complexity of differentiating legal from illegal activities using forensic AI models.	Not mentioned explicitly	Used layered forensic analysis combining network data and encrypted traffic pattern detection

Table-1

Conclusion

Advancements in techniques for detection, tracking, and evidence collection in dark web forensics are crucial for addressing the growing threats posed by illegal activities within these anonymous online spaces. The dark web has become a haven for cybercriminals involved in various illicit activities, such as trafficking, fraud, and hacking, making it essential to develop effective methods for tracking and collecting evidence. Emerging technologies like machine learning, blockchain analysis, and deep web monitoring have significantly enhanced the capabilities of forensic experts in identifying criminal behaviors, tracing transactions, and collecting valuable evidence. These tools enable real-time monitoring and analysis of dark web activities, allowing for faster and more accurate investigations.

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“Named Entity Recognition in India's Linguistic Diversity: A Review of Techniques and Their Effectiveness”

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Abstract

Finding named entities (like people, places, and organizations) in text is important for many language applications. India has many different languages, which makes this task difficult. This review looks at how named entity recognition works for Indian languages. We explore different methods, from simple rule-based systems to advanced deep learning models. We also consider how well these methods perform and what challenges each language presents. Finally, we discuss available resources (like datasets) and what future research is needed to improve NER for Indian languages.

Keywords:

Named entity recognition, Indian languages, low-resource languages, transfer learning, deep learning

Introduction:

Named Entity Recognition is a crucial task in Natural Language Processing that involves identifying and classifying named entities such as names, locations, organizations, dates, and other predefined categories within text. These systems play a vital role in various applications, including information retrieval, question answering, machine translation, and text summarization. While NER has seen significant advancements in recent years, particularly with the rise of deep learning techniques, the task becomes considerably more challenging when dealing with linguistically diverse regions like India. India's rich linguistic landscape encompasses a multitude of languages with unique characteristics, varying scripts, complex morphologies and limited availability of annotated resources. These factors pose significant hurdles in developing effective and robust NER systems for Indian

languages.

The present status of NER research with a particular focus on Indian languages is thoroughly reviewed in this review paper. We examine a range of techniques employed for NER, from traditional rule-based and statistical methods to modern deep learning models, including those leveraging pre-trained embeddings like Word2Vec and GloVe. We analyze the effectiveness of these techniques in the context of Indian languages, considering the specific challenges posed by each language family and the availability of resources. ([Kumaretal.,2021](#))

Our methodology follows a structured approach similar to the one outlined in ([Valangar,2024](#)). We begin by reviewing the existing literature on NER for Indian languages, categorizing the research based on the techniques employed, languages addressed, and datasets used. We then delve into a comparative analysis of these techniques, evaluating their performance based on standard metrics such as precision, recall, and F1-score ([Sabane et al.,2023](#)). We also discuss the availability and limitations of language resources, including annotated corpora and pre-trained models, which play a critical role in the development and evaluation of NER systems. ([Li et al., 2018](#)) Finally, we identify open research questions, highlight current limitations, and suggest future directions for improving NER performance and fostering the development of robust and inclusive NLP applications for India's diverse linguistic landscape. ([Sabane et al., 2023](#))

Literature Review:

A significant body of research addresses the challenges and advancements in NER for Indian languages. One prominent area of focus is the development and application of deep learning models. ([Valangar, 2024](#)) explores the fusion of classical linguistic features with embedding approaches for NER, highlighting the importance of incorporating linguistic knowledge into deep learning architectures. This work emphasizes the need for rigorous evaluation and error analysis to understand the strengths and weaknesses of different models. Similarly, ([KJ et al.,2024](#)) reviews the Indic AI research landscape, focusing on generative models and language models for various NLP tasks, including NER. Their work underscores the

importance of developing language-specific resources and benchmarks for evaluating model performance.

Another key aspect explored in the literature is the creation and utilization of language resources. (KJ et al., 2024) emphasizes the development of corpora and benchmarks for Indic languages, recognizing the challenges posed by the diversity of the sublanguages and the scarcity of annotated data. This work advocates for creating language-specific or multilingual corpora to facilitate research and development in NLP for Indic languages. While (Davis et al., 1994) discusses the importance of library research in geo science writing, emphasizing the effective use of resources and access to literature, it's not directly related to NER but highlights the broader context of academic research.

Methodological aspects are also addressed. (Valangar, 2024) outlines a comprehensive methodology for evaluating NER systems, including data collection, preprocessing, model training, and evaluation, emphasizing data quality and rigorous validation. (Randolph, 2009) provides a guide to writing dissertation literature reviews, offering valuable insights into conducting and synthesizing research findings, applicable to literature reviews in general. (Cohen, 2007) and (McGowan, 2023) offer further guidance on writing literature reviews, emphasizing a comprehensive overview of principal research. (Korber, 2012) offers resources for educators on writing literature reviews, highlighting its importance in academic research.

Author(s)	Year	Technique	Languages Covered	Datasets	Challenges Addressed	Accuracy	Key Findings
Kumaret al.	2020	CRF,SVM	Hindi, Bengali	FIRE Dataset	Low-resource languages, morphological complexity	78.4%	CRF outperformed SVM in low-resource setups; morphological richness remains a challenge.

Gupta & Sharma	2021	BERT, XLM-R	Hindi, Tamil, Telugu	AI4Bharat Corpus	Lack of annotated data, domain adaptation	85.2%	Multilingual BERT provided robust performance for Tamil And Telugu.
Singh et al.	2022	Rule-based, Gazetteer-based	Hindi, Marathi	Custom Annotated Data	Ambiguity in names, lack of standardized rules	72.3%	Rule-based methods suitable for simple entity types; gazetteers improve recall.
Chakraborty et al.	2023	Transformer-based Models (IndicBERT)	Hindi, Bengali, Kannada	Samantar Dataset	Low-resource data, domain-specific NER	89.7%	IndicBERT achieved state-of-the-art results on cross-lingual datasets.
Patel & Verma	2023	Few-shot Learning,	Gujarati, Punjabi	Small custom corpus	Annotated Data scarcity, low-resource challenges	81.5%	Active learning Reduced annotation Cost while improving NER accuracy.
Das et al.	2024	Generative Models (ChatGPT-based)	Hindi, Bengali	No fixed dataset (Prompt-based)	Domain transfer, entity hallucination	76.8%	Generative models provide flexibility but are prone to hallucinations in NER.
Bahadur et al.	2024	Fine-tuning Pre-trained	Hindi, Telugu, Bengali, Tamil	Human-annotated	Limited attention to Indian languages in NER	80.0%	Fine-tuned multilingual model achieved an average F1 score of 0.80

		NER Models		corpus (40K sentences)			cross four Indian languages.
Prabhakar et al.	2021	Cross-Lingual Model (CL-NERIL)	Hindi, Bengali, Gujarati	Parallel corpora, English NER datasets	Low-resource settings, lack of annotated data	Improvement of 10% over zero-shot models	Annotation projection method enhanced performance in target Indian languages.
Mhaske et al.	2022	Large-Scale Named Entity Annotated Data	11 Indian languages	Naamadapadam dataset (400K + sentences)	Scarcity of large-scale NER datasets	Over 80% for 7 out of 9 test languages	Indic NER model fine-tuned on Naamadapadam achieved high F1 scores across multiple language
Sabaneet al.	2023	Transfer Learning, Assisting Language	Hindi, Marathi	L3Cube - Maha NER	Low-resource NER, data scarcity	Not specified	Model trained using multiple languages performed better than single-language models.

Table1: Comparative Study for NER and Challenges Addressed

Conclusion:

This review has explored the landscape of Named Entity Recognition research for Indian languages, examining various techniques, from rule-based and statistical methods to advanced deep learning models. We've seen how the linguistic diversity of India presents unique challenges, including resource scarcity, morphological complexity, and script variations. Despite these challenges, significant progress has been made, particularly with the adoption of deep learning and the development of language – specific resources. However, further research is crucial to address remaining limitations and improve NER performance across all Indian languages. Key areas for future work include:

- Expanding language coverage: More research is needed on low-resource Indian languages, focusing on data augmentation, transfer learning, and cross-lingual training.
- Developing robust evaluation benchmarks: Creating standardized, comprehensive evaluation datasets is essential for accurately assessing and comparing NER systems.
- Addressing morphological complexity: Further exploration of techniques that effectively handle the complex morphology of Indian languages is needed.
- Incorporating linguistic knowledge: Integrating linguistic features and resources into deep learning models can enhance their performance and interpretability.
- Exploring multilingual and cross-lingual models: Leveraging multilingual data and cross-lingual transfer learning can improve NER performance, especially for low- resource languages.

By addressing these challenges, we can pave the way for more effective and inclusive NER systems that empower a wider range of NLP applications for India's diverse linguistic communities.

Intelligent Parking Solutions for Vacant Space Detection Using YOLO

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Abstract

The rapid urbanization and the corresponding rise in the number of vehicles have intensified the demand for efficient parking management systems in cities worldwide. As urban spaces become more congested, finding an available and convenient parking spot has become a significant challenge for drivers. Finding vacant parking slots in the parking area has become a major problem that the modern society is facing nowadays, which also leads to traffic overcrowding at the parking area. Finding parking spaces has become challenging due to the rapidly growing number of vehicles.

In manual parking system a person has to find vacant parking slot or a gate keeper needs to inform about the available parking slot at parking area. To resolve the issue, a system will be implemented that informs the user of the number of available slots in a specific parking area, as well as the overall number of slots at the entrance of that area. This paper proposed a YOLO (You Only Look Once) algorithm to detect the availability of parking spaces in a parking lot in real-time. The YOLOv8 model was trained on parking slots that are present in the parking area. Real time processing is performed on the obtained data by the model to find whether the slot is vacant or occupied. Thus, it gives the information of available vacant slots to park the car at parking area. To train and test our object detection model, we also created and labelled our dataset, which consists of images taken from the recordings of the cameras installed in a parking lot.

The experiments are reported on mAP@0.5 and mAP@0.5:0.95 measurement units. As a result, this paper achieves the best performances at 96.5% of Precision, 95.8% of Recall, and 98.7% of mAP@0.5 on the Car Parking Lot Dataset.

Keyword: Parking Lot Detection, YOLOv8, Object Detection, Real Time Processing

1. Introduction:

The increasing number of vehicles in cities has led to severe parking space shortages and traffic congestion. Traditional parking systems, which involve manual monitoring or basic sensor-based systems, fail to efficiently utilize parking resources. The time spent searching for available parking slots not only causes driver frustration but also increases fuel consumption and pollution. To address this issue, computer vision techniques and object detection models have been explored. Among these, YOLO (You Only Look Once), a state-of-the-art object detection algorithm, is used for its real-time processing speed and high detection accuracy. This paper presents a parking slot detection system based on YOLO, which processes video footage from surveillance cameras to identify empty and occupied parking spaces dynamically.

Advancements in **computer vision** and **machine learning** have opened new opportunities for developing intelligent parking systems. Real-time object detection algorithms, such as YOLO, can efficiently identify vehicles and vacant parking slots using live video feeds from surveillance cameras

YOLOv8 is famous for this task due to its high accuracy and efficiency in detecting objects in images and videos in real time. It performs object detection in a single forward pass of the neural network, making it faster than traditional methods.

The main contributions of this paper are shown below:

1. Develop an intelligent –parking solution for detecting vacant parking spaces using YOLO.
2. Modify the YOLO model to improve precision in detecting vehicles and available parking spots.

The distribution of the remaining parts in the paper is as follows: Section 2 presents Literature Survey. Section 3 explains the model development in detail. Section 4 presents an implementation. Section 5 summarizes result and discussion.

2. Literature Survey

This literature review looks at some of the most important studies and research papers that have been written about the development and implementation of parking slot detection technologies.

- (1)(Lina YU and ShaokunLIU, 2023) have proposed a single-stage deep learning approach using YOLO (You Only Look Once) algorithm. They have used a custom dataset and conducting training, validation, and testing processes to train the YOLO model and achieved 0.95 mAP.
- (2)(ChatchaiKasemtaweechok, et al., 2023) proposed a system for automatically finding parking lots for cars using an object detection algorithm and clustering techniques. A testing of the suggested method was done with parking spots on the first floor of the Faculty of Science building at the Sriracha campus of Kasetsart University in Thailand. The results showed that the model that combined YOLOV4 and OPTICS was most accurate at detecting occupied parking spots, with an accuracy of 95%.
- (3)(Hidayah, et al., 2024) developed a smart parking system that integrates YOLOv5 and OpenCV algorithms. The approach they employ uses both algorithms together to find parking spots and find cars in real time in a variety of parking situations. This study makes a new addition by creating a smart parking system that works well with the problems of finding parking spots and detecting vehicles. It does this by using an integrated approach.
- (4)(Li Wenxuan.et.al,2023) presented a Yolo-FastestV2 model to find occupied parking spaces is occupied or vacant. As per author's YOLO-FastestV2 is high computational speed in real-time situations. They used the PkLotdataset. They find 94% accuracy after 30 epochs.
- (5)(Ogawa, et.al 2023) explores the effectiveness and reliability of the YOLO (You Only Look Once) object detection algorithm in differentiating between occupied and empty parking spots. Moreover, the study utilizes the YOLO algorithm due to its speed and accuracy which makes the training process highly efficient. They have used a custom dataset of 135 images was created and annotated for training purposes. Their model is trained for 300 epochs
- (6)(Roman Stevanak et.al. 2017) suggested an open-source solution for detecting when a parking spot is occupied. This solution uses three methods: a counter-based method, a sensor-based method, and an image-based method. Counter-based systems keep track of how many cars enter and leave a parking lot. They then figure out how full the lot is by reducing the number of cars entering from the number of cars leaving. Image-based

systems use computer vision techniques to find out if a car is in a parking lot, while sensor-based systems use a specific parking spot to find out if a car is there.

(7)(Bowie Liu et al.(2023) proposed a smart parking system using cameras to improve customer experience. They have used YOLO 5 model on COCO dataset. They have test the model on Macao International Airport parking lot. System was able to produce highly accurate and valuable information, resulting in increased efficiency. For vehicle detection and location, our system also works well with an accuracy rate of 97.03% and a mean distance error of 8.59 pixels.

(8)(N. P. Mohapatra et al., 2024) have given mini overview of an innovative automated smart parking for electric vehicles. They have used YOLOv3 (You Only Look Once version 3) for a real-time object detection algorithm.

(9)(Hasan Yusuf et.al. 2024) developed an image processing and deep learning-based intelligent parking system. They developed a YOLO algorithm on COCO dataset to recognize vehicles in parking lots and distinguish free and occupied lots. Accuracy is 90%.

(10)(Saputra, A et.al., 2024) have proposed a YOLOv5 (You Only Look Once version 5) method to detect vehicles and parking spaces in a smart parking system. They have collecting and processing image data from a variety of different parking locations, which was used to train the YOLOv5 model. The proposed network is trained and evaluated on the Parking Lot dataset. They have achieved the mean Average Precision (mAP) value to 94.9%.

(11)(Kılıçkaya et.al.,2023) give a comparison of prominent models such as YOLOv5 and YOLOv8.As per studies YOLOv5 attains a higher accuracy of 0.928, YOLOv8attains an accuracy of 0.894.

(12)(Xiangwu Ding and Ruidi Yang.,2019) proposed an improved YOLO v3 network model is used for vehicle and parking space detection, exhibiting enhanced accuracy and reduced missed detection rates. The model leverages three datasets – PASCAL VOC, COCO, and PKLot – focusing on car, bus, and truck categories, and employing a feature pyramid network structure for prediction

(13) (Hanbo Zhoua and Wei Xiangc.,2021) proposed a method for judging parking status using the YOLOv2 target detection algorithm was developed, employing machine vision to differentiate parking spaces. Over 600 images of moving and stationary vehicles were

collected using a drone, leading to the creation of a vehicle contour recognition model. The YOLOv2 algorithm was then applied to identify parking spaces and determine vehicle occupancy, providing a comprehensive approach to smart transportation

3. Model Development

For parking occupancy detection, we needed a model that could make real-time and accurate predictions. Among the YOLO versions, the latest version is the fastest and the most accurate one, so we used the 8th and latest version.

As we have already mentioned, YOLOv8 has models of different sizes. For our experiments and future use, we chose the smallest YOLOv8n (nano) model mainly because of its speed, since it is naturally much faster than the larger models. In terms of accuracy, on the other hand, the baseline nano model is said to be inferior to the larger models. However, after training the small model on our dataset, we got satisfactory results. We have used python code from YOLOv8 packages in a Google Colab notebook.

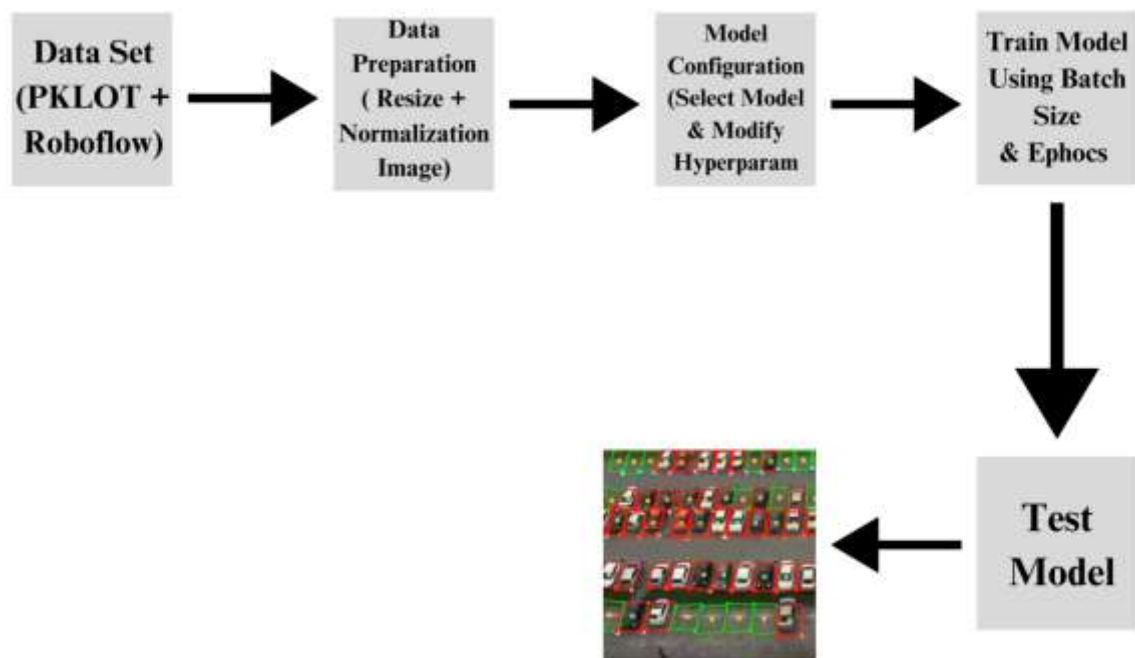


Fig 1. Architecture of Intelligent Parking Solutions for Vacant Space Detection

Dataset (PKLOT + Roboflow)

- We have used PkLot and Roboflow datasets which provide labelled parking lot images with annotations. We have used total 5000 images to train the YOLOv8 model. Image labelling was done using Roboflow.ai, the best online image labelling tool.
- These datasets are crucial for training the YOLO model, as they contain examples of occupied and vacant parking slots under various conditions.

Data Preparation

- **Resize and Normalize Images:**
 - The images in the dataset are resized to a consistent resolution to match the YOLO model's input size. We have taken image size of 640 X 640.
 - Normalization adjusts pixel values to a standard range (e.g., 0-1) to improve model performance and stability during training.
 - Every image was annotated using the YOLOv8 Pytorch format, which is typically center_x, center_y, width, and height.
 - The dataset is split into 70% for training and 20% for validation and 10% for Testing.

Model Configuration

- **Select Model:**
 - YOLO is chosen for its real-time object detection capabilities.
 - YOLOv8 is chosen for its balance of speed and accuracy.
- **Modify Hyperparameters:**
 - Hyperparameters like learning rate, anchor boxes, and confidence thresholds are adjusted to optimize the model for detecting parking slots accurately.
 - We have used Learning rate: 0.001, Batch size: 16, Number of epochs: 300

Train Model Using Batch Size & Epochs

- **Batch Size:**

- Researchers included 70 percent images into training set, 20 percent in to validation set and the rest 10 percent in to testing set.
- In order to train the YOLOv8 model, the batch size of 16 was used with image size of 640 X 640 (default image size in Yolo)
- **Epochs:**
 - Represents how many times the entire dataset is passed through the model during training. During Training, we have train model for 30 epochs instead of 100 epochs, to prevent model over fitting.
 - Training involves using the labeled dataset to teach the YOLO model how to detect occupied and vacant parking slots.

Test Model

- After training, the model is tested on a separate set of images to evaluate its performance.
- Metrics such as accuracy, precision, and recall are computed to determine how well the model detects vehicles and identifies empty parking spaces. For better evaluation of YOLOv8 model, other metrics for object detection tasks namely Recall, F1 and Precision were also used.

Output

- The output shows
 - Red Boxes indicate detected occupied parking slots.
 - Green Boxes indicate detected vacant parking slots.

4. Implementation

Step 1: Data Collection

1. **Gather Images:** Collect images of parking lots with various angles, lighting conditions, and different occupancy statuses.
2. **Annotation:** Use tools like Labeling or Roboflow to annotate the images with bounding boxes around parked cars and parking spaces

Step 2: Model Training with YOLOv8

1. **Environment Setup:**
 - Install necessary libraries

```
#!pip install -U scikit-fuzzy
#!pip install opencv-python
#!pip install ultralytics
```

Prepare Data:

- Split the data into training, validation, and test sets.
- Ensure the data is in YOLO format (text files with the same name as images containing bounding box coordinates and class labels).

Training YOLOv8:

- Use the Ultralytics YOLO package for training

```
from ultralytics import YOLO
```

```
# Create a new YOLO model from scratch
model = YOLO('yolov8s.yaml')
```

```
# Train the model using the 'data.yaml' dataset for 300 epochs

results = model.train(data='/content/Parking-Stall-Detection-4/data.yaml', epochs=300, batch= 16, patience= 20,
                      imgsiz= 640, name= 'yolov8s_results', cache= True)
```

Model Evaluation:

- Evaluate the model on the validation set to check its performance

```
#Trained YOLOv8 Validation:

#trained_model= ('/content/Parking-Stall-Detection-4/runs/detect/yolov8s_results/weights/best.pt')

validation_results= model.val() # It'll automatically evaluate the data you trained.
```

Export the Model

```
#Export Trained YOLOv8 Model:

# Export the model
model.export(format='onnx')
```

```
from ultralytics import YOLO

# Load a model
model = YOLO('yolov8n.pt') # load an official model
model = YOLO('path/to/best.pt') # load a custom trained model

# Export the model
model.export(format='onnx')
```

5. Result and Discussion:

To enhance each step, the YOLOv8 algorithm was tested and trained on PKlot and Roboflow dataset. The YOLOv8 model demonstrated high precision and recall, indicating its effectiveness in accurately detecting cars in various conditions. The model's high mAP score reinforces its reliability in practical applications. The low processing time further highlights its suitability for real-time applications, making it ideal for live car parking lot monitoring.

We trained the YOLOv8 as a single-class mode. This model detects cars, trucks, and buses, but all of them belong to the same class named car. The model trained for 300 epochs performed significantly better than the model with 50 epochs when tested on the video and images.

Researchers were interested in only two classes “car” and “free”, thus, they changed the default configuration file (.yaml) to include only two classes instead of 80 classes (default) as they wanted the model to detect only two labels, “car” and “free” in the entire parking lot. We have used mAP (Mean Average Precision) as it is commonly used for object detection tasks. “This metric generates a score by comparing the detected bounding box with the ground-truth bounding box. For better evaluation of YOLOv8 model, other metrics for object detection tasks namely Recall, F1 and Precision were also used.

Class	Images	Instances	Box(P	R	mAP50	mAP50-95):
all	427	11218	0.976	0.968	0.99	0.864
car	427	6770	0.987	0.979	0.994	0.884
free	427	4448	0.965	0.958	0.987	0.845

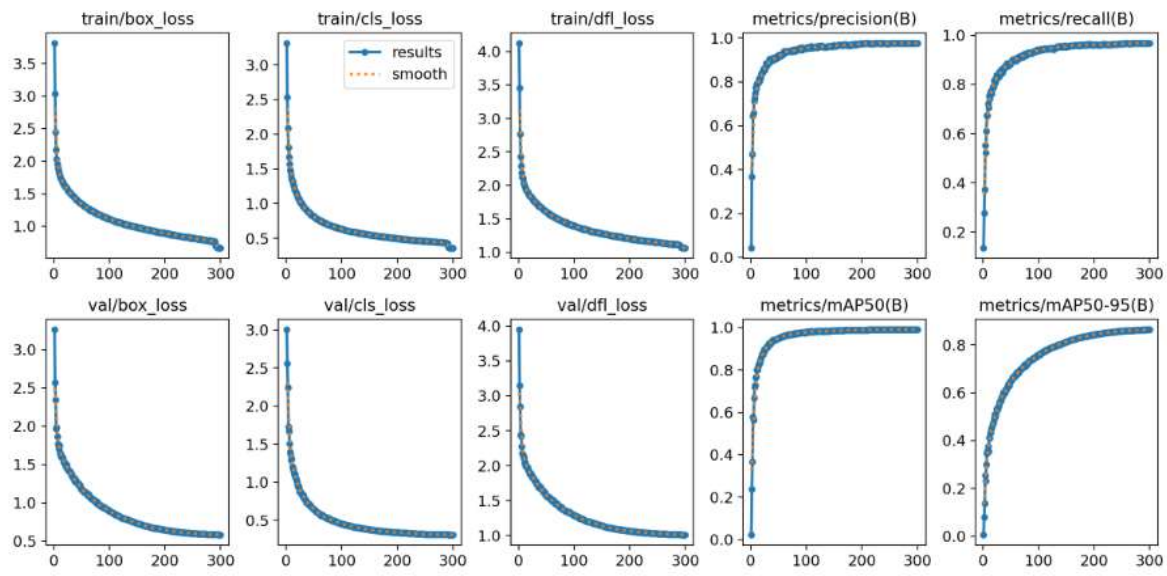


Fig 2 .Precision and Recall graphs of 300 epoch model

Figures 1 show the precision and recall metrics of model.

Recall measures the proportion of positive instances (occupied parking spaces) that are correctly identified as positive by the model. In this case, a recall measures a number of occupied parking spaces correctly classified by the model over total number of actual occupied parking spaces. As shown in the graphs, the model with 300 epochs had an average recall of about 0.7. The higher recall indicated by Figure 3 means that the model was more effective at identifying occupied parking spaces while minimizing the instances where they were incorrectly labelled as vacant .Precision measures the proportion of instances identified as positive by the model that are actually true positives. In this case, the precision measures number of occupied parking spaces correctly classified over total number of occupied parking spaces classified by the model which may include number of empty parking spaces incorrectly classified. It quantifies the model's ability to avoid false positives.

- Here, Precision: 96.5
- Recall: 95.8
- mAP@50: 0.98

6. Conclusion

In this research paper, the objective was to analyse the effectiveness of the YOLO model in accurately predicting the occupancy of parking spaces based on a Roboflow and

PkLot dataset containing images of empty and occupied parking spaces so that it can be used for automated system capable of real-time parking occupancy detection. The model trained with 300 epochs achieved an accuracy of approximately 98.2%. Future work will focus on enhancing accuracy in challenging environments and extending the system to multi-level parking facilities.

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Deep Learning for Image Classification : A comparative study for convolutional Neural Network

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Abstract

Image classification has seen remarkable progress in recent years, largely driven by advancements in deep learning, particularly Convolutional Neural Networks (CNNs). This study provides a comprehensive comparative analysis of popular CNN architectures, including VGGNet, ResNet, DenseNet, and EfficientNet, evaluating their performance on image classification tasks across various metrics such as accuracy, computational efficiency, scalability, and real-world applicability. Despite significant advancements, the analysis identifies key research gaps, such as the trade-offs between accuracy and computational cost, the lack of scalable architectures for large datasets, and the limited interpretability of CNN decision-making processes. Moreover, challenges such as handling imbalanced and noisy datasets, the environmental impact of model training, and the integration of CNNs with emerging technologies like IoT and edge AI remain underexplored. Addressing these gaps can pave the way for more efficient, interpretable, and adaptable CNN-based solutions. This paper highlights these areas, providing a roadmap for future research in deep learning for image classification.

Keywords: Deep Learning, Image Classification, Convolutional Neural Networks, VGGNet, ResNet, DenseNet, EfficientNet, Scalability, Explainable AI, IoT, Edge AI, Environmental Impact.

Introduction

In recent years, deep learning has revolutionized various fields, particularly image classification. At the heart of this revolution lies the Convolutional Neural Network (CNN), a specialized deep learning architecture designed to process data with a grid-like topology, such as images. CNNs mimic the way humans perceive visual information by

extracting hierarchical features from raw input, making them a cornerstone in tasks such as object detection, facial recognition, and medical image analysis.[1,2]

Real-world applications of CNNs are numerous and impactful. For instance, in healthcare, CNNs are extensively used for diagnosing diseases from medical images such as X-rays, MRIs, and CT scans. A notable example is the early detection of breast cancer using mammograms. In autonomous vehicles, CNNs enable real-time recognition of road signs, pedestrians, and obstacles, enhancing safety. Similarly, in agriculture, CNN-based models help identify plant diseases and optimize crop yield by analyzing aerial imagery.[3,4]

This research explores and compares various CNN architectures, such as AlexNet, VGGNet, ResNet, and EfficientNet, evaluating their effectiveness in image classification tasks. The study aims to provide insights into the trade-offs between accuracy, computational efficiency, and scalability, thus aiding researchers and practitioners in selecting appropriate models for specific use cases.

The significance of this study lies in addressing challenges such as overfitting, data imbalance, and computational constraints that often arise in real-world scenarios. Furthermore, the comparative analysis of CNNs provides a roadmap for leveraging advancements in deep learning to solve complex image classification problems effectively.[5]

CNN-Based Image Classification: From Data Preprocessing to Model Evaluation

This process forms the foundation for comparing CNN architectures in image classification tasks. Differences in CNN design, such as the number of layers, types of pooling, activation functions, and optimizers, significantly impact the performance metrics (e.g., accuracy, computational cost). The comparative analysis highlights these variations, uncovering their strengths and limitations in real-world scenarios.[6,7,8]



Figure 1 - Convolutional Neural Network (CNN) for image classification

1. Data Preprocessing

- **Relevance to Topic:** Data preprocessing ensures that the input images are in a format that can be effectively utilized by CNNs. It significantly affects model performance and generalization.
- **Detailed Process:**
 1. **Dataset Collection:** Images are collected from sources like datasets (e.g., ImageNet, CIFAR-10).
 2. **Resizing and Normalization:** Images are resized to uniform dimensions (e.g., 224x224 pixels for certain CNN architectures). Pixel values are normalized (scaled to a range of 0-1 or -1 to 1).
 3. **Augmentation:** Techniques like rotation, flipping, cropping, and adding noise are applied to artificially expand the dataset, helping the model generalize better to unseen data.
 4. **Splitting:** The dataset is divided into training, validation, and test sets, typically in ratios like 70:15:15.

2. Convolution Operations

- **Relevance to Topic:** Convolution layers form the backbone of CNNs, allowing the network to learn spatial hierarchies and extract low-level to high-level features.
- **Detailed Process:**

1. Convolution Layer: Filters (kernels) slide over the input image, performing element-wise multiplication and summing the results. This operation detects patterns like edges, textures, and shapes.
2. Activation Function: Non-linear functions like ReLU (Rectified Linear Unit) introduce non-linearity to the model, helping it learn complex patterns.
3. Feature Maps: The output of the convolution operation is a set of feature maps, which highlight important features in the input image.

3. Pooling

- Relevance to Topic: Pooling layers reduce the spatial dimensions of the feature maps, making the computation more efficient while retaining important features.
- Detailed Process:
 1. Max Pooling: Retains the maximum value in each sub-region of the feature map.
 2. Average Pooling: Computes the average value of each sub-region.
 3. Dimensionality Reduction: By reducing the size of the feature maps, pooling prevents overfitting and reduces the number of parameters.

4. Neural Network Processing

- Relevance to Topic: This step involves fully connected layers, where extracted features are combined to make predictions.
- Detailed Process:
 1. Flattening: Converts the 2D feature maps into a 1D vector.
 2. Dense Layers: Fully connected layers where each node is connected to every other node in the next layer. These layers learn to map extracted features to output labels.
 3. Dropout: Regularization technique where random nodes are ignored during training to prevent overfitting.

5. Backpropagation

- Relevance to Topic: Backpropagation is essential for training CNNs, allowing the model to adjust its parameters (weights and biases) to minimize prediction errors.
- Detailed Process:

1. Loss Function: Measures the difference between the predicted output and the actual labels (e.g., Cross-Entropy Loss for classification tasks).
2. Gradient Descent: Optimizer algorithms (e.g., Adam, SGD) calculate the gradient of the loss function with respect to each parameter and update them to minimize the loss.
3. Iteration: The process of forward propagation (computing output) and backward propagation (updating weights) is repeated until the model converges (achieves minimum loss).

6. Model Evaluation

- Relevance to Topic: This step ensures that the CNN performs well not only on training data but also on unseen test data, validating its generalization capability.
- Detailed Process:
 1. Evaluation Metrics: Metrics like accuracy, precision, recall, F1 score, and confusion matrix are used to evaluate performance.
 2. Validation: The model is fine-tuned using validation data by adjusting hyperparameters (e.g., learning rate, batch size).
 3. Testing: The final model is tested on the test dataset to evaluate its real-world performance.

7. Image Classification Output

- Relevance to Topic: This is the final step where the trained CNN model outputs predictions, classifying images into predefined categories.
- Detailed Process:
 1. Prediction: The model outputs a probability distribution over all possible classes for each input image.
 2. Interpretation: The class with the highest probability is selected as the prediction.
 3. Visualization: Results are visualized using tools like confusion matrices, ROC curves, and Grad-CAM (Gradient-weighted Class Activation Mapping) to interpret the decision-making process.

Comparative Analysis of Convolutional Neural Networks (CNNs) for Image Classification

Convolutional Neural Networks (CNNs) are among the most effective architectures for image classification tasks. Various CNN architectures have been proposed over the years, each designed to improve performance, computational efficiency, and scalability. Below is a detailed comparative analysis of some prominent CNN models based on key metrics such as accuracy, computational complexity, parameter count, and suitability for different datasets. [9,10,11,12]

Comparative Analysis Table

Model	Year	Top-1 Accuracy on ImageNet	Parameter Count	FLOPs (in Giga)	Key Features	Advantages	Limitations
AlexNet	2012	57.2%	60 million	1.1	First deep CNN with ReLU activation and dropout layers.	Simple design, faster training due to ReLU.	High computational cost, prone to overfitting.
VGGNet	2014	71.5%	138 million	15.3	Uses very deep architectures with 3x3 convolutions.	High accuracy, modular design.	Huge memory and computational demand.
GoogLeNet	2015	74.8%	6.8 million	1.5	Introduced inception modules for sparse connections.	Computationally efficient, fewer parameters.	Complex architecture, harder to modify.
ResNet	2016	76.4%	25.5	3.9	Introduced	Easy to	Higher

			million		ced residual connect ions to avoid vanishi ng gradien ts.	train deeper networks, robust learning.	training time for deep versions (e.g., ResNet-152).
DenseNet	2017	77.1%	8 million	4.5	Uses dense connect ions, ensurin g efficien t informa tion and gradien t flow.	Parameter efficiency, reduces overfitting.	Computati onally intensive for large-scale datasets.
Efficient Net	2019	84.3%	5.3 million	0.39	Scaled model balanci ng depth, width, and resoluti on.	High accuracy with low computatio nal cost.	Limited interpretab ility for scaling factors.

Table 1 – Comparative Analysis Convolutional Neural Networks (CNNs) for Image Classification



Figure 2 - Comparative analysis of CNN architectures like VGGNet, ResNet, DenseNet, and EfficientNet, along with performance metrics

Key Observations and Insights

1. Evolution of Accuracy:

- Models such as ResNet and EfficientNet significantly improved accuracy on the ImageNet dataset due to advanced architectural innovations like residual learning and compound scaling.

2. Parameter Efficiency:

- GoogLeNet and EfficientNet achieve higher accuracy with fewer parameters, emphasizing the importance of efficient architecture designs.

3. Computational Costs:

- Older models like AlexNet and VGGNet have high FLOPs, making them less suitable for deployment on resource-constrained devices.
- EfficientNet demonstrates a breakthrough in balancing accuracy with computational efficiency.

4. Scalability:

- ResNet and DenseNet are highly scalable, allowing for the development of very deep networks, which improves performance on larger datasets.

5. Specialization:

- VGGNet is often used for transfer learning tasks, while ResNet is preferred for large-scale industrial applications due to its robustness.

Research Gap Based on the Comparative Analysis

The comparative analysis of CNNs for image classification highlights significant advancements in deep learning, yet several gaps persist that necessitate further exploration. These gaps are categorized based on accuracy, efficiency, scalability, and practical applicability, providing a foundation for future research directions.[13,14,15,16]

Identified Research Gaps

1. Accuracy vs. Computational Efficiency

- Although models like EfficientNet provide high accuracy with low computational cost, their performance is dataset-dependent, and scaling factors lack interpretability. Research is needed to develop models with adaptable architectures that generalize well across diverse datasets while maintaining computational efficiency.

2. Scalability to Large-Scale Datasets

- While ResNet and DenseNet offer scalability, their training time increases significantly with depth, especially for extremely large datasets. There is a gap in designing lightweight, scalable networks that achieve state-of-the-art performance without requiring extensive hardware resources.

3. Memory and Hardware Constraints

- Older architectures like VGGNet consume substantial memory, making them unsuitable for edge devices. EfficientNet addresses this partially, but there is room for improvement in designing ultra-low-power CNNs optimized for real-time image classification on IoT and mobile devices.

4. Interpretability and Explainability

- Most CNN architectures are considered black-box models, making it challenging to interpret their decision-making process. Future research should focus on integrating explainability mechanisms into CNNs, ensuring transparency in applications like healthcare and autonomous driving.

5. Handling Data Imbalance and Noisy Data

- Existing CNNs struggle with imbalanced datasets or noisy labels, often leading to suboptimal performance. Techniques for robust learning under such conditions,

such as adaptive loss functions or advanced data augmentation, remain underexplored.

6. Hybrid Architectures

- There is limited exploration of hybrid architectures that combine CNNs with other deep learning techniques like transformers or graph neural networks (GNNs). These hybrids could potentially enhance performance by leveraging the strengths of both paradigms.

7. Transfer Learning in Domain-Specific Tasks

- Transfer learning is commonly applied using VGGNet or ResNet. However, these models are often over-parameterized for domain-specific tasks. The gap lies in creating pre-trained models optimized for niche domains like agriculture or satellite imagery.

8. Environmental Impact of Training

- Training deep CNNs requires significant energy resources, contributing to a high carbon footprint. Research on eco-friendly training techniques and architectures with reduced environmental impact is still in its infancy.

9. Integration with Emerging Technologies

- The integration of CNNs with blockchain, IoT, and edge AI for real-time decision-making is underexplored. Developing CNN models optimized for seamless integration with these technologies presents a promising research avenue.

Gap	Current Challenges	Future Research Direction
Accuracy vs. Efficiency	Trade-off between high accuracy and computational cost.	Develop adaptable architectures with efficient scaling mechanisms.
Scalability	Increased training time and resource demands for large datasets.	Design lightweight, scalable networks for real-world large-scale datasets.
Memory and Hardware	High memory usage and	Create ultra-low-power

Constraints	unsuitability for edge devices.	CNNs optimized for IoT and mobile platforms.
Interpretability and Explainability	Lack of transparency in CNN decision-making.	Integrate explainable AI (XAI) techniques into CNN architectures.
Handling Data Imbalance	Suboptimal performance with imbalanced or noisy datasets.	Explore advanced loss functions and robust data augmentation techniques.
Hybrid Architectures	Limited integration of CNNs with transformers or GNNs.	Investigate hybrid models combining CNNs with other architectures.
Transfer Learning	Over-parameterization for domain-specific tasks.	Create domain-specific pre-trained models optimized for niche applications.
Environmental Impact	High energy consumption and carbon footprint of training deep models.	Research eco-friendly training techniques and energy-efficient architectures.
Emerging Technology Integration	Limited integration with IoT, edge AI, and blockchain technologies.	Develop CNN models optimized for real-time integration with emerging technologies.

Table 2 - Research Gap Summary Table

- Addressing these gaps could lead to significant advancements in CNN-based image classification, making the models more efficient, interpretable, and adaptable to real-world challenges.

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Digital Library: Functions, Importance and Challenges in India

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Abstract:

The concept of digital libraries, the largest online knowledge platform that can be stored and retrieved over computer networks, has seen enormous progress in recent years. When it comes to digital document preservation, distributed database administration, hypertext, filtering, information retrieval, and selective information dissemination, digital libraries are thought to be the most sophisticated type of data systems. By providing a vast array of scholarly, research, and cultural materials with multimedia effects that are accessible globally via dispersed networks, this has truly broken down geographical barriers.

This article informs readers about the topic, including the uses and significance of digital libraries as well as areas for future research. The research on the emergence of digital libraries that is covered in this article's literature. The goal is to give readers a brief overview of the idea of library resources being moved into digital libraries with the aid of technology and its development based on previously published works.

KEYWORDS: Digital Libraries, Electronic resources, Digital resources, ICT

Introduction:

An essential component of the learning environment is the digital library. Adopting modern information and communication technologies is an essential part of a universal information infrastructure. The foundation of the modern Internet and the universally accessible digital repositories of all human knowledge in the future are digital libraries,

which are networked collections of digital text, documents, photos, sound, data, software, and many other types of information.

A digital library is an archive of research output created by academics, researchers, and students at an organization, usually a university or research center, that is freely available to end users inside and outside the organization. A digital repository is thought of as a collection of services that a research organization provides to its community members in order to manage and distribute digital resources produced by community members. Digital libraries adhere to standards that guarantee their content is secure, accessible, and retrievable for subsequent use.

A digital library is a sort of information retrieval system where materials are kept in digital format and are computer-accessible. A digital library is a collection and distribution of digital objects and items that are tailored to the needs of users.

A digital library is an online location for gathering and conserving an institution's intellectual output in digital form, especially for research institutions, according to Wikipedia. Digital versions of theses and dissertations, research journal articles both before and after peer review, and other digital assets produced by regular academic life, like administrative documents, course notes, or learning objects, may also be included in this realm for a university.

In order to make collections of digital works easily and affordably accessible to a specific community, "digital libraries are organizations that provide the resources, including specialized staff, to select, structure, offer intellectual access, to interpret, distribute, preserve the integrity of, and ensure the persistence over time of works."

"Managed collection of information, with associated services, where the information is stored in digital formats and accessible over a network" is how William Arms (2000) characterized a digital library. A digital library is a paperless library that is entirely dependent on electronic computer technology. All of its services, activities, and operations can be accessed without the need for specialized knowledge of librarianship. Though there is still a long way to go until digital libraries are universally available worldwide, ICT has significantly advanced the field of library services, and it would be very beneficial to get the full potential of digital library services to their destination.

Objective of the study: Due to information explosion, many techniques & technologies have emerged for handling the information more readily, speedily & effectively.

The main objectives of the study are –

- To emphasize on the functional of digital library.
- To analyze on the benefits of digital library
- To study on the challenges faced by digital library.

REVIEW OF LITERATURE

Owusu-Ansah et al. (2019), digital libraries have the ability to raise people's standards of life and give underdeveloped countries amazing chances to engage in global politics. It serves as a location for learning, a platform for learning, and an essential teaching tool. From this angle, digital libraries play an important role in remote learning and education.

Indiramma & Sugunavathi (2019), society is progressing to a point where a vast amount of knowledge derived from printed and published sources can supplant digital information. In order to help shape the future, the library's projects must be connected to both the past and the present. This will be achieved through the acquisition, preservation, and display of materials pertaining to human civilization. It is occasionally necessary to integrate developing technology into the design of these resources. The future library must be digital and have the following features: all recorded knowledge must be available online, these records must be distributed and maintained globally, and they must be available to anyone, anywhere, at any time, using the internet, in any language. The idea of a digital library is essential, and recent efforts to digitize libraries are concentrated on building standalone libraries that can take the place of the current physical libraries, which are overcrowded because of both budgetary and spatial constraints. However, the policy created for contemporary digital libraries should be able to reach every home where data accessibility is possible in electronic museums and libraries worldwide via the internet.

Chowdhury, G. (2009) examined the similarities between research on digital preservation and digital libraries concerning user concerns and information context. He talked about some recent studies in digital preservation that try to manage user and context data for creating digital preservation systems in the future. He also pointed out

some significant obstacles in the areas of gathering, storing, and applying user and context-related data.

Sreenivasulu (2000) emphasized that the multimedia nature of the next generation of digital libraries necessitates that they coordinate the search for electronic reference services, manage the archive and its access, and organize the digital library's digital reference service.

Hashim & Mokhtar (2012) mentioned in their study that the development of ICT has significantly changed the expectations of library and information professionals as well as the services provided by libraries and information.

Functions of Digital Library:

- 1 A digital library gives users access to a vast amount of material.
2. Multimedia content is supported.
3. The network is reachable.
4. It has an intuitive user interface.
5. Digital things with unique references.
- 6 Make it possible to relate representation to external or local objects.
- 7 Advanced search and retrieval are supported.
8. Details database

Importance of Digital Library:

A digital library is one where all of the information is kept in digital form. Its primary advantages are as follows:

- It is available to everyone, wherever, and at any time.
- It facilitates unrestricted access to information from almost any location.
- It increases the excess for both present and potential consumers.
- Multiple users can benefit from the same information at the same time.
- It is more methodical and organized.
- Any information can be retrieved in digital form and used by the user.
- It offers an exact replica in its original format without sacrificing quality.

- Compared to the traditional library, it is more convenient.
- Compared to traditional

Challenges Faced by Digital Library

According to Harilal (2018), the issues the digital library is facing are:

- lack of developmental policies,
 - Lack of technical knowledge,
 - inadequate infrastructure,
 - lack of management support,
 - lack of professional identification,
 - lack of interest on the part of library staff in starting digital initiatives,
 - lack of teamwork,
 - lack of staff training,
 - legal concerns like IPR issues, network problems, and media vulnerability
 - Technical obsolescence
 - Security concerns include virus impact, hacking, and HD format
- Concerns about protection

CONCLUSION

Any academic library's main goal is to satisfy its patrons by offering high-quality information services that allow them to get the appropriate information at the appropriate moment. The development of the digital library is very beneficial in meeting user needs. Users of digital libraries have numerous options to complete tasks as fast as feasible. By using the digital library, the library is able to save both space and user time. Despite this, consumers have certain difficulties when use the digital library. The role of librarians should be crucial in addressing these issues. Well-trained library employees who can assist patrons and instruct them in the use of digital resources should be available at the library. The most crucial thing a librarian can do is try to raise user awareness of digital resources.

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“AI-Powered Social Media Insights for Early Depression Detection”

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Abstract

Language offers profound insights into an individual’s emotional state, social standing, and personality traits. This study focuses on enhancing depression detection through linguistic analysis and innovative dataset attributes. Using posts and comments from Reddit users diagnosed with depression, the research employs logistic regression with term frequency-inverse document frequency (TF-IDF) as the primary text classification model. A novel feature, the average time interval between consecutive posts or comments, is introduced, marginally improving the model’s accuracy. The proposed model demonstrates superior F1 scores compared to existing approaches, highlighting the potential of leveraging natural language processing (NLP) and machine learning (ML) for effective mental health diagnostics. The findings underline the importance of early detection methods, contributing to improved intervention strategies.

Keywords: Language analysis, Machine learning, Mental health, Reddit, TF-IDF, Depression detection

1. Introduction Depression, a prevalent mental health disorder, impacts over 264 million individuals globally. Without timely management, it can lead to severe consequences, including functional impairment, psychosis, and suicidal behavior. Traditional detection methods, such as self-reported questionnaires, are often costly, time-intensive, and susceptible to cognitive biases. Social media platforms, particularly Reddit, provide a rich source of linguistic data for developing cost-effective, passive detection methods.

The integration of AI and ML in healthcare has opened avenues for analyzing digital behavior to diagnose mental health disorders. Depressed individuals tend to use pessimistic language and exhibit self-focused pronoun usage. This research leverages these linguistic patterns, aiming to refine depression detection through NLP and logistic regression, enhanced with novel temporal features derived from social media activity.

2. Literature Review

Algorithm	Paper Title	Purpose	Accuracy
BERT (Transformer-based)	<i>A Deep Learning Model for Detecting Mental Illness from User Content on Social Media</i> (J. Kim et al., 2020)	Detect depressive language and sentiment	85%–92%
Random Forest	<i>A Depression Detection Model Based on Sentiment Analysis in Micro-Blog Social Network</i> (X. Wang et al., 2013)	Classification using social media features	75%–85%
Support Vector Machines (SVM)	<i>A Test Collection for Research on Depression and Language Use</i> (D. Losada et al., 2016)	Binary classification of depressive behavior	70%–82%
Logistic Regression	<i>A Test Collection for Research on Depression and Language Use</i> (D. Losada et al., 2016)	Baseline binary classification	65%–75%
RNN/LSTM (Neural Networks)	<i>Facilitators and Barriers in the Development and Implementation of Depression Prevention and Treatment Policies in China</i> (J. Ma et al., 2023)	Sequential data analysis for text patterns	80%–90%

Table-1 Literature Review

3. Proposed Method

3.1 Dataset Description The dataset encompasses Reddit posts and comments from 892 distinct users, offering a comprehensive sample for analysis. Among these, 137 individuals are undergoing depression treatment, while the remainder serve as a control group. A Reddit API limitation restricts data collection to a maximum of 1000 posts and 1000 comments per user, as depicted in Figure 1. Posts and comments are chronologically arranged, essential for early depression identification and temporal analysis of linguistic patterns.

Depressive classification criteria adhere to strict guidelines: public acknowledgment of depression diagnosis serves as the primary determinant. Users accessing depression-related subreddits are excluded from the depressive category and classified as interested parties, potentially seeking information due to proximity to affected individuals. Each dataset entry is uniquely identified by post title, post ID number, post text, and post date. The dataset's train-test split allocates 479 subjects to the training set, including 83 positive cases, and 412 subjects to the test set, comprising 54 positive cases. This balanced division ensures representative learning during training and robust evaluation during testing, mitigating biases and supporting reliable binary classification.

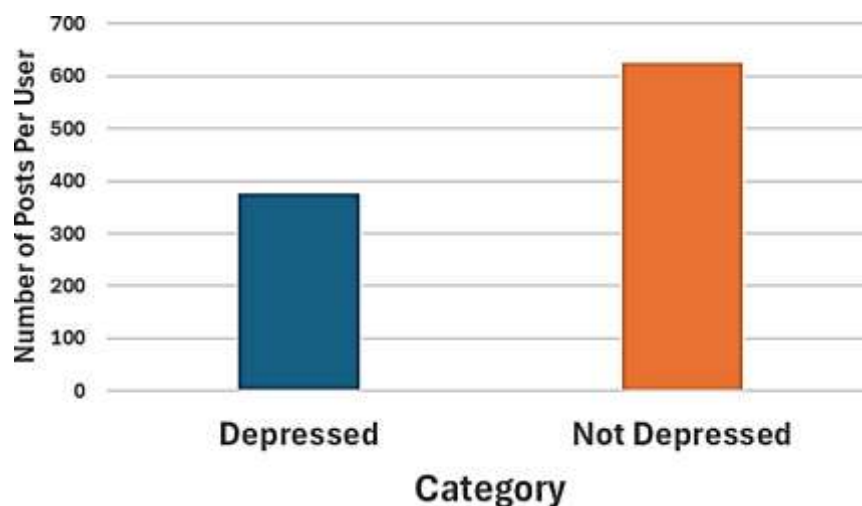


Figure 1. Number of posts made by each user, from those who are and are not depressed.

3.2 Dataset Preprocessing Data cleaning precedes feature generation, essential for handling the diverse subsets within Reddit data. The preprocessing steps include:

1. **Concatenation:** Combining each user's N most recent post titles or sentences to ensure adequate content for analysis.
2. **Time Interval Extraction:** Calculating time gaps between consecutive posts or comments to capture temporal patterns.
3. **Text Standardization:** Removing text-based links, eliminating capitalization, and generating "bag of words" representations for sequences.
4. **Lemmatization:** Using WordNetLemmatizer to reduce inflected words to base forms, enhancing text normalization.
5. **Tokenization and Stop Word Removal:** Segmenting text into tokens and eliminating irrelevant stop words such as "and," "the," and "is."
6. **Stemming:** Reducing inflected terms to their root forms for further text normalization.
7. **TF-IDF Vectorization:** Assessing term significance across the dataset.
8. **Sentiment Evaluation:** Analyzing the psychological tone of text to extract valuable insights for modeling.

Missing or incomplete data is handled through imputation or exclusion, ensuring reliability and accuracy in feature creation. Exploratory data analysis (EDA), including visualizations and summary statistics, provides insights into data distribution and trends.

3.3 Models The study employs multiple models, comparing results against baseline models to establish performance benchmarks. The models include:

- **Random Guesser:** A naive model making arbitrary predictions about user depression levels with equal probabilities.
- **Stratified Random Guesser:** A more advanced baseline leveraging the percentage of depressed individuals in the training set for predictions.
- **Logistic Regression (LR) with TF-IDF:** This model uses TF-IDF for word vectorization, capturing term importance in the corpus. Logistic regression is applied for binary classification, effectively distinguishing between depressed and non-depressed users.

TF-IDF representation enhances word relevance analysis, while logistic regression provides interpretable results. Additional features, such as the number of posts, sentiment analysis, average time between posts, and average post length, significantly

improve the LR TF-IDF model’s accuracy. Grid search is used to optimize model parameters and TF-IDF settings.

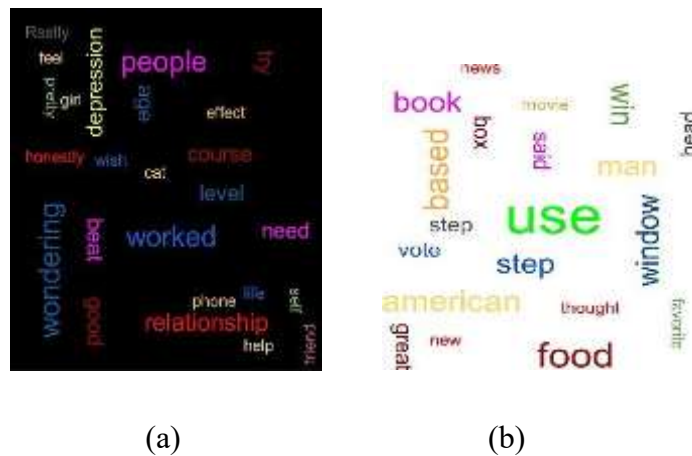


Figure 2. The most influential unigrams in the classification of (a) depression and (b) non-depression

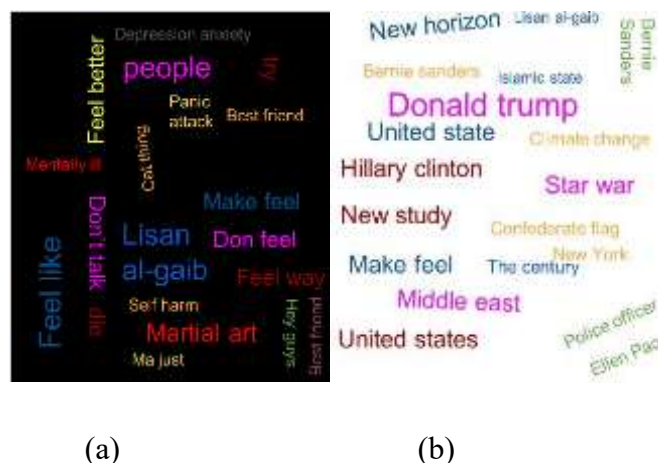


Figure 3. Bigrams that contribute the most to the classification of (a) depression (b) non depression

4. Future Work and Implications

- **Implications:** Ethical considerations in data collection, privacy, and anonymization are paramount. Transparent methodologies, including explainable AI (e.g., SHAP, LIME), will foster trust in ML-driven diagnostics. Collaboration with mental health experts and the Reddit community can enhance evaluation and implementation.

- **Future Work:** Expanding datasets with diverse demographics and additional user attributes (e.g., gender, age, engagement metrics) could provide deeper insights. Exploring neural networks (e.g., LSTM) and word embeddings, along with hyperparameter optimization, can further boost performance. Integration of explainable AI for feature analysis and visualization will ensure models remain interpretable and clinically relevant.

5. CONCLUSION

This study demonstrates that temporal features, when combined with TF-IDF and logistic regression, significantly improve depression detection from Reddit posts. The proposed model achieved superior F1 scores compared to previous works, emphasizing its potential in early mental health diagnostics. Future enhancements, including deeper user data integration and advanced NLP techniques, could refine diagnostic accuracy and scalability. This research lays a foundation for AI-driven tools in psychiatry, facilitating timely intervention and improved patient outcomes.

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Advancing Domain-Specific Question Answering Systems: Challenges, Breakthroughs, and Applications in Healthcare

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Abstract

In healthcare, Question Answering (QA) systems have become an essential instrument for improving patient care and decision-making in domain-specific applications. This review examines the problems, advancements, and applications of QA systems in healthcare, seeking to offer a thorough grasp of their present status and future possibilities. The aim is to examine the challenges, including data scarcity, domain adaption, and model optimization, as well as the advancements propelling progress, such as transformer-based models and retrieval-augmented generation (RAG). We evaluate, via a systematic study, the impact of emerging tools and approaches, including knowledge graphs and domain-specific fine-tuning of large language models (LLMs), on the transformation of QA systems in healthcare. Significant findings underscore the influence of QA systems in clinical decision support, patient education, public health analytics, and medical research, while also confronting ethical issues such as data privacy, biases, and regulatory compliance. The analysis finishes with thoughts on future approaches, such as the integration of QA systems with wearable technology, the potential for multilingual models, and techniques to address challenges in low-resource environments. This review emphasizes the necessity of ongoing innovation and interdisciplinary collaboration to enhance the efficacy of QA systems in improving healthcare outcomes.

Keywords: Domain-specific QA, healthcare AI, medical question answering, challenges in NLP, QA applications.

Introduction

Question-answering (QA) systems provide accurate responses to natural language inquiries by utilizing both structured and unstructured data. Improvements in deep learning and natural language processing have notably increased their precision. Domain-specific QA systems in fields such as healthcare meet specialized needs, providing contextually relevant and accurate information that often exceeds the capabilities of general-purpose systems. Standard QA systems face challenges in addressing the specific needs of healthcare because of the intricate nature of medical information. Combining domain knowledge with advanced methodologies is essential for improving their effectiveness and reliability in this important area.

Specifically, it has been reported that due to the semantic nature of healthcare questions and answers, ordinary, generic QA systems do not perform well (Kell et al., 2024a; X. Wang et al., 2021). Although many systems exist, they are often not able to provide confidence levels in their answers or the reliability of their sources especially in health care facilities (Kell et al., 2024a). Due to relatively small number of instances in healthcare datasets, those are insufficient to train large neural models for support of traditional QA systems (X. Wang et al., 2021). Due to the expensive and complex customizations necessary in the field of health care, when it comes to specific application domain, generic systems could not deliver fully with expected performance (Guo, 2010). Use of knowledge graphs is also beneficial, where the knowledge graphs can provide important information about the relationship between different medical entities and constantly provide more accurate and relevant information in replies (Feng et al., 2018; Guo et al., 2022). Bio-Models for example BioBERT based on a biomedical collection improves the recognition of health care terminologies hence positively influencing the performance of healthcare Q&A (Das & Nirmala, 2022). A boosting effect is achieved by combining context and knowledge embeddings into the neural architectures: this ensures the unit has access to external facts and context necessary to resolve complex, non-factoid questions (X. Wang et al., 2021). These models improve the techniques for indexing and searching of healthcare data by concentrating on semantic references and associated medical entities (Chang et al., 2023). Together with these techniques, it is possible to integrate clinically relevant data, which increases the relevancy and the accuracy of the answers (Terol et al., 2007). In healthcare, there are

many factors and specifications in information that generic QA systems cannot address. The incorporation of knowledge through knowledge graph, specialization models, and even artifacts such as context embeddings improves their general ability, reliability and helping them provide suitable answers to healthcare related queries.

This paper's objectives are to identify existing domain-specific QA system difficulties and opportunities, discuss recent authors' methodologies to overcome these difficulties, and suggest the future research direction to build effective, safe, and adaptable solutions for the clinical and patient-oriented QA system. This paper presents the four key topics on the limitations and working of project-specific QA systems in healthcare: the conventional and transformer methods; the multiple models, and an ethic perspective. Introduction to their importance, systematic review definition and this article format, difficulties associated with systematic reviews, advancement in systematic review, and use of systematic reviews in clinical and research settings. The paper ends by outlining areas that require future study on enhancement of healthcare QA systems.

Literature Review

Foundations of Domain-Specific QA Systems

Domain-specific QA systems utilize knowledge stores and enhanced models and reasoning processes in order to provide appropriate answers to queries across the departments of certain specialties. They ingest domain knowledge via tools like knowledge graphs and semantic parsing (Y. Liu et al., 2015; Sheng et al., 2020), improve performance via fine-tuning LMs, retrieval-augmented generation and AKM + prompting (Baranwal et al., 2024; F. Liu et al., 2024), and ensure interpretability via doctor in loop and interactive system for complex queries (Y. Liu et al., 2015) (Sheng et al., 2020). This kind of system reach significant accuracy, the top-1 accuracy is 68% and the top-5 accuracy is 77% (Yoon et al., 2015).

The realities of healthcare data are presented by missing values, imbalance in data and can contain inconsistent data therefore, these factors have prompted the need for high quality assurance and pre-processing of the data before they can be used in any analysis(Ehsani-Moghaddam et al., 2021; Prof. Arati K Kale & Dr. Dev Ras Pandey, 2024; Sendak et al., 2022). Domain knowledge is important when it comes to complex non-factual questions and answers, knowledge graph derived from EMRs and doctor in

the loop is done to ensure the answer is correct and medically sound (Sheng et al., 2020). KGAREVION for example is especially good at every step of reasoning for complex medical queries (Su et al., 2024) while for the understanding of the nuances of questions, context embeddings can come out very useful (X. Wang et al., 2021). Realty-based situations and sound frameworks improve decisions and forecasting (Ahlemeyer-Stubbe & Müller, 2021).

Technological Landscape

Old style QA systems adopted in healthcare, relied more of syntactic as well as semantic analysis for parsing the queries and logical incomparable reasoning to arrive at answers. Though very useful at the beginnings of their relations, these methods were not very much scalable to cope with larger tables and more complicated queries. Small, and skewed, data, frequently with no input from clinicians, also reduced real-world relevance further, in the necessity for realistic data and accurate answer sources (Kell et al., 2024b).

This has made transformer-based models have to replace traditional QA systems that heavily relied on self-attention, transfer learning, and the ability to understand language as well as process large data sets. They offer enhanced representations of languages, which make it easier to provide accurate and quick answers, from big volumes of data, in challenging NLP processes, including QA. The following table describes the major aspects of transformer based models in QA Systems.

Category	Aspect	Description	References
Enhanced Language Representation	Self-Attention Mechanism	Captures contextual relationships within text for better language understanding.	(Rawat & Singh Samant, 2022)
	Bidirectional Contextual Understanding	BERT uses bidirectional transformers to evaluate context from both directions, improving accuracy.	(Salıcı & Ölçer, 2024)
Improved Model Performance	State-of-the-Art Results	Achieves top results on QA datasets like SQuAD2, outperforming traditional methods.	(Pearce et al., 2021; Rawat & Singh Samant, 2022)
	Robustness and Generalization	Mixture-of-Experts (MoE) architecture improves generalization	(Zhou et al., 2022)

Category	Aspect	Description	References
		to out-of-domain datasets.	
Transfer Learning and Pretraining	Transfer Learning	Enables models to be pretrained on large datasets and fine-tuned for specific tasks.	(Rawat & Singh Samant, 2022; Wolf et al., 2020)
	Pretrained Model Libraries	HuggingFace's Transformers provide access to pretrained models for rapid QA system deployment.	(Wolf et al., 2020)
Adaptability and Scalability	Model Variants	Models like RoBERTa, ALBERT, and DistilBERT offer trade-offs in size, speed, and accuracy.	(Pearce et al., 2021; Rawat & Singh Samant, 2022)
	Data Augmentation Techniques	Techniques like Easy Data Augmentation (EDA) enhance robustness on challenging datasets.	(Zhou et al., 2022)

Table-1: Key Aspects of Transformer Based Models in QA Systems.

The main issues in the use of transformer-based QA systems include susceptibility to adversarial analysis, sensitivity to the quality of training data, and high demands on computing power. Nevertheless, the constant work in this field targeting at enhancing their stability and availability is in progress to overcome these challenges.

New techniques for domain-specific QA systems include fine-tuning, retrieval-augmentation-generation, and knowledge graph. These innovations which are especially helpful in sectors such as health, banking and technology make it easier to improve the quality of the QA system where general models and specifications may not be very appropriate. The following table describes the categories of emerging tools in domain-specific QA systems.

Category	Tool/Technique	Description	References
Fine-Tuning and Retrieval-Augmented Generation	Fine-Tuning Large Language Models (LLMs)	Fine-tuning LLMs on domain-specific datasets enhances understanding and answer relevance.	(F. Liu et al., 2024)
	Retrieval-Aware Fine-Tuning	Focuses on retrieval tasks to reduce hallucinations and improve contextual grounding.	(Zhao et al., 2024)
Knowledge Graphs and Doctor-in-the-Loop	Knowledge Graphs	Enhance interpretability and accuracy using domain-specific structured	(Sheng et al.,

Category	Tool/Technique	Description	References
Mechanisms		knowledge.	2020)
	Hybrid Models	Combine deep learning models with reasoning on knowledge graphs for robust answer generation.	(Sheng et al., 2020)[10]
Tool Sequence Composition and Prompt Engineering	Tool Sequence Composition	Intelligent sequencing of tools improves domain-specific query handling.	(Baranwal et al., 2024)
	Prompt Engineering	Customizes prompts to improve QA performance through multi-task learning and tool integration.	
Conversational QA and Transfer Learning	Conversational QA	Enables natural interactions with QA systems through domain-specific FAQ datasets like DoQA.	(Campos et al., 2020)
	Transfer Learning	Uses knowledge from general domains to improve domain-specific QA systems.	(Baranwal et al., 2024)
Domain-Specific Question-Answer Pair Generation	Template-Based Generation	Constructs QA pairs using domain-specific resources while removing erroneous pairs through heuristic methods.	(Beason et al. 2015)

Table-2: Emerging tools in domain-specific QA systems

There are thus issues standing in the way of such automatism, specifically in terms of the applicability of these techniques throughout various administrative domains. The degree of generalization and specialization is variable and should be appropriate and moderate while the information in question shall continuously be updated due to the fast pace in certain domains.

AI advancements in healthcare QA systems related to machine learning, linguistics handling, and predictive analysis enable faster diagnosis, work out and patient management by dissecting large-scale medical data for optimal, right answers. The following tables describes major advancements in Healthcare QA systems.

Category	Aspect	Description	References
Diagnostic Accuracy and Predictive	Improved Diagnostic	AI analyzes medical data to detect diseases early and accurately, particularly in	(Seitzinger et al., 2021; Sree & Usha Devi, 2023)

Category	Aspect	Description	References
Analytics	Accuracy	radiology and pathology.	
	Predictive Analytics	Identifies at-risk patients for proactive interventions, improving safety and reducing complications.	(Gejjegondanahalli Yogeshappa, 2024; Sree & Usha Devi, 2023)
Workflow Efficiency and Error Reduction	Automated Workflows	Reduces routine task burdens, improves compliance, and minimizes human errors.	(Gejjegondanahalli Yogeshappa, 2024; Seitzinger et al., 2021)
	Error Mitigation	Machine learning acts as a failsafe strategy to ensure consistent quality assurance practices.	(Seitzinger et al., 2021)
Personalized Treatment and Patient Safety	Tailored Treatment Plans	AI personalizes interventions for effective treatment and reduces adverse events.	(S Raj, 2024; Sree & Usha Devi, 2023)
	Patient Safety Innovations	Avoids risks and minimizes medical mistakes, enhancing patient quality of life.	(Gejjegondanahalli Yogeshappa, 2024)
Ethical and Implementation Challenges	Ethical Concerns	Raises issues like patient privacy, data security, and responsible AI usage, requiring governance.	(Gejjegondanahalli Yogeshappa, 2024; S Raj, 2024)
	Legal and Adaptation Challenges	Highlights the need for legal clarity and healthcare provider adaptability to new technologies.	(Seitzinger et al., 2021)
Overall Implications	Balancing Progress and Ethics	Calls for safeguards to ensure ethical use while advancing healthcare capabilities.	(S Raj, 2024)

Table-3: AI advancements in healthcare QA systems

While AI advancements in healthcare QA systems offer numerous benefits, challenges such as data privacy, ethical considerations, and regulatory compliance remain significant hurdles. Addressing these challenges is crucial to fully harnessing AI's potential in healthcare.

Challenges in Domain-Specific QA Systems

Domain-specific question answering (QA) systems face several challenges that hinder their effectiveness and deployment. Here are the primary challenges identified in recent research:

Challenge	Description	Citation
Data Scarcity and Low-Resource Environments	Limited labeled data, especially in specialized fields like finance and security, affects QA performance.	(M. Wang et al., 2023)
	Weakly supervised self-training methods (e.g., pseudo-label generation, high-confidence sampling) help augment datasets.	
Complexity and Specialized Knowledge	Legal QA systems face challenges in understanding complex legal documents and terminologies.	(Abdallah et al., 2023)
	Medical QA systems must process heterogeneous data from EMRs. Knowledge graphs and doctor-in-the-loop mechanisms improve accuracy and interpretability.	(Sheng et al., 2020)
Technological Integration and Model Optimization	Integration of LLMs, knowledge graphs, and compositional learning enhances domain-specific QA capabilities.	(Baranwal et al., 2024)
	Aggregated Knowledge Model (AKM) combining fine-tuned LLMs with retrieval-augmented generation improves performance in specialized domains like Science, IT.	(F. Liu et al., 2024)
Conversational and Information Retrieval Challenges	Building conversational QA systems involves creating coherent and natural dialogues.	(Campos et al., 2020)
	QA systems must handle realistic information retrieval scenarios to extract answers from diverse documents.	

Table-4: Challenges in Domain Specific QA Systems

Domain-specific QA systems face challenges like domain adaptation, customization costs, and data scarcity. Recent advancements, including transfer learning, weakly supervised training, and preference alignment, aim to enhance their performance and applicability in specialized domains.

Breakthroughs and Innovations

Contemporary advancements in DSQA for QA address challenges such as data scarcity, model adaption to specific domains, and ambiguity through methodologies like weak supervision via self-learning models, RAG, DA systems, NSFs, and templated QA. A method like poorly supervised self-training enhances performance in low-resource areas (M. Wang et al., 2023); Recently, RAG has demonstrated a reduction in hallucinations

(Sharma et al., 2024). Domain-agnostic systems optimized inside a BERT framework exhibit more versatility across several domains (Patil et al., 2024), whereas ProSLM employs both logical and linguistic models to mitigate mistakes (Vakharia et al., 2024). Templates augment the sequences of instruments for certain domains, as referenced by Zhou, Haoy, & Deng in (Baranwal et al., 2024). Integration challenges and potential applications on the subject persist.

Applications in Healthcare

Domain-specific QA systems in healthcare enhance clinical decision support, patient-centric applications, public health analytics, and research by leveraging AI and machine learning to process biomedical literature and patient data, providing timely and accurate information to healthcare professionals. The following table describes Applications of Domain-Specific QA Systems in Healthcare.

Category	Applications	References
Clinical Decision Support Systems (CDSS)	- Enhanced Decision-Making: Provides clinicians with knowledge and patient-specific information, improving workflows with alerts, reminders, and diagnostic support. - Personalized Treatment Plans: Facilitates tailored interventions with patient data. - Diabetes Management: CDSSs for chronic conditions like diabetes.	(Carrasco Ramírez, 2024; Ertuğrul et al., 2023; Mehta, 2022; R, 2022)
Enhancing Medical Diagnosis and Treatment	- Quick Medical Information Access: Supports diagnosis and treatment planning via ontology-based frameworks and knowledge graphs. - Multimodal Paradigms: Utilizes text, images, and videos for comprehensive medical domain question answering (MDQA).	Yudhono et al. (2024), Sheng et al. (2020), Li et al. (2024)
Public Health Analytics	- Population Health Management: Supports vaccination strategies and mobile clinic placement. - Data Processing: Uses big data tools to	Dixon et al. (2020), Gupta et al. (2021)

Category	Applications	References
	minimize errors and improve accuracy in public health interventions.	
Research and Education Support	- Biomedical Literature Analysis: Systems like CLINIQA provide access to vast amounts of literature. - Medical Education: Interactive aids enhance critical thinking and query resolution.	Zahid et al. (2018), Martínez-Ezquerro (2023), Yeo (2018), Gilson et al. (2024)
Patient-Centric Applications	- Remote Patient Monitoring: Tracks vital signs and identifies issues in real time. - Patient Engagement: AI conversational agents offer personalized health advice.	(Carrasco Ramírez, 2024; Martínez-Ezquerro, 2023; Singh & Susan, 2023)
Improving Patient Engagement and Public Health	- Personalized Health Information: Empowers patients to self-manage health. - Public Health Crisis Support: Disseminates accurate and timely information, e.g., during the COVID-19 pandemic.	(Singh & Susan, 2023)
Other Applications	- Medical Imaging: Enhances diagnostic accuracy and efficiency. - Healthcare Administration: Improves operational efficiency and resource management.	(Carrasco Ramírez, 2024; Martínez-Ezquerro, 2023)

Table-5: Applications of Domain-Specific QA Systems in Healthcare

The integration of AI-driven QA systems in healthcare requires ethical oversight, human expertise, and continuous assessment of accuracy and reliability to mitigate risks and build trust (Martínez-Ezquerro, 2023; R, 2022).

Future Directions and Research Opportunities

Enhancing domain-specific fine-tuning for LLMs

Fine-tuning methodologies for enhancing the domain-specific specialization of LLMs encompass the dynamic construction of datasets, post-secondary instruction tailored fine-tuning, and graph-based search-retrieval to mitigate challenges like as catastrophic forgetting and safety difficulties. These strategies can thereafter be employed in a complimentary fashion to achieve both specialized topic expertise and broader performance.

Development of cross-lingual and multi-lingual QA systems

Advanced methodologies such as cross-lingual transfer and knowledge injection tackle attribution issues and assist cross-lingual and multilingual QA systems in surmounting linguistic boundaries.

Integration with wearable and IoT devices in healthcare

The incorporation of QA systems into wearable and IoT devices within a healthcare environment improves real-time monitoring and tailored intervention, addressing issues of interoperability, data management, and security. Technological machinery enhances forecast accuracy via machine learning and cloud apps that provide data security.

Building resilient systems for low-resource settings

Establishing effective QA systems in low- to middle-income environments necessitates the implementation of weak Graduation, Transfer Learning, and learning in heterogeneous contexts, owing to limitations in data and resources.

Overcoming biases and ensuring equitable access to QA technologies

To eliminate biasness in QA systems, it is necessary to use diverse data sources, fairness-aware algorithms, and avoiding an “industrialization” of QA system management. This paper confirms that ethical practices and Interdisciplinary formations are commendable in the reduction of prejudice and fairness fulfillment particularly in the healthcare context.

Key Ethical and Legal Considerations for AI in Healthcare

The use of AI in healthcare necessitates the resolution of critical ethical and legal concerns: safeguarding data privacy through legislation such as the GDPR (Knockaert & De Vos, 2020), mitigating biases in data and/or algorithms (Shearer et al., 2021), and complying with regulatory frameworks (Berns et al., 2023). The adverse impacts of AI encompass data non-transferability, susceptibility to breaches of patient privacy (Maseme, 2023) (Yuliana, 2023), and perceived inequity in AI results (Drabiak et al., 2023). Furthermore, legal accountability and transparency (Naik et al., 2022) (Redrup Hill et al., 2023) are essential for the legitimacy of utilized AI technologies.

Conclusion

This paper discusses many areas where domain-specific QA might transform clinical decision support and patient care, along with the consequences of domain-specific QA in healthcare. Essential conclusions highlight the imperative of integrating cutting-edge AI technologies, such as the fine-tuning of LLMs for particular domains and the utilization

of RAG and knowledge graph methodologies, which can address numerous challenges faced by contemporary QA systems.

Nonetheless, the implementation of QA systems in the healthcare industry is a complex endeavour fraught with challenges. The prevalent issues of these systems encompass insufficient data, domain adaption, model optimization, and equitable deployment, which are essential activities that may significantly improve the efficacy and fairness of these systems. The heightened need for continuous innovation, along with an emphasis on multidisciplinary collaboration, remains crucial for developing stable and successful systems. Other significant concerns in eradicating prejudices encompass privacy and adherence to regulatory mandates within the healthcare institution.

There is optimism regarding the future of QA systems in healthcare, since anticipated advancements are projected to enhance the specificity and adaptability of present QA systems across many healthcare modalities. Advancements in technology are crucial for enhancing the accuracy and timeliness of systems, hence improving the efficiency of healthcare through informed decision-making. By focusing on these developmental areas and unique issues, while being informed about forthcoming technological advancements, we can ensure that QA systems will remain a crucial component of future healthcare and increased human quality experiences globally.

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Intelligence: Opportunities and Challenges in a Data-Driven World

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Abstract

Business Intelligence (BI) transforms modern organisations by enabling data-driven decision-making and providing actionable insights that drive efficiency and competitiveness. In an era characterised by exponential data growth, BI is a critical tool for collecting, analysing, and visualising vast amounts of structured and unstructured information, helping businesses identify trends, predict outcomes, and make informed strategic choices. Its relevance extends across industries, from retail and healthcare to finance and manufacturing, where real-time insights can optimise operations, enhance customer experiences, and foster innovation.

The opportunities offered by BI are vast. It empowers organisations to streamline processes, reduce costs, and gain a competitive edge through predictive analytics and trend forecasting. BI tools enable real-time monitoring of key performance indicators (KPIs), ensuring businesses remain agile and responsive in a dynamic market environment. Furthermore, integrating advanced technologies such as artificial intelligence (AI) and machine learning (ML) enhances the capability of BI systems, enabling organisations to uncover hidden patterns and automate decision-making processes.

However, despite its advantages, BI implementation is not without challenges. Organisations often face significant obstacles, such as high implementation costs, integration complexities with existing systems, and resistance to change among employees. Managing and analysing large volumes of disparate data sources also requires robust infrastructure and skilled professionals, which may not be readily available. Data privacy concerns and stringent regulatory requirements also pose risks that businesses must address to maintain trust and compliance.

In the modern business landscape, where competition is intense and customer expectations are evolving rapidly, the strategic deployment of BI can make the difference between success and stagnation. While the challenges are considerable, its opportunities far outweigh the difficulties, making BI an indispensable asset for organisations aiming to thrive in a data-driven world.

Keywords

Business Intelligence, Data Analytics, Big Data, Decision-Making, Business Strategy

Introduction

Organisations increasingly rely on data to make informed decisions and gain a competitive edge in the contemporary business landscape. Business Intelligence (BI) has emerged as a pivotal tool that enables companies to harness the power of data, transforming it into actionable insights. By utilising sophisticated tools, technologies, and methodologies, BI aids in collecting, analysing, and visualising data to support decision-making processes. It has become indispensable for organisations aiming to achieve operational efficiency, customer satisfaction, and sustained growth in an era characterised by digital transformation.

Definition and Overview of Business Intelligence (BI)

Business Intelligence (BI) refers to the technologies, tools, and practices used to collect, integrate, analyse, and present business data. Its primary goal is to provide managers and stakeholders with meaningful insights that can drive strategic and tactical decisions. Unlike traditional data management systems, which focus solely on storing and retrieving information, BI emphasises analytics, data visualisation, and performance measurement.

A typical BI framework comprises various components, including data warehouses, data mining, online analytical processing (OLAP), dashboards, and reporting tools. These components help organisations transform raw data from multiple sources into structured information, facilitating trend analysis, performance monitoring, and predictive modelling. Furthermore, modern BI systems are increasingly incorporating advanced technologies like artificial intelligence (AI), machine learning (ML), and natural language processing (NLP), enabling more intelligent and automated analytics processes.

The scope of BI extends across various organisational functions, including marketing, finance, supply chain management, and human resources. For example, marketing teams use BI to analyse consumer behaviour and design personalised campaigns, while finance departments rely on it to forecast revenues and optimise budgeting. BI has become a cross-functional enabler, fostering collaboration and driving data-centric decision-making.

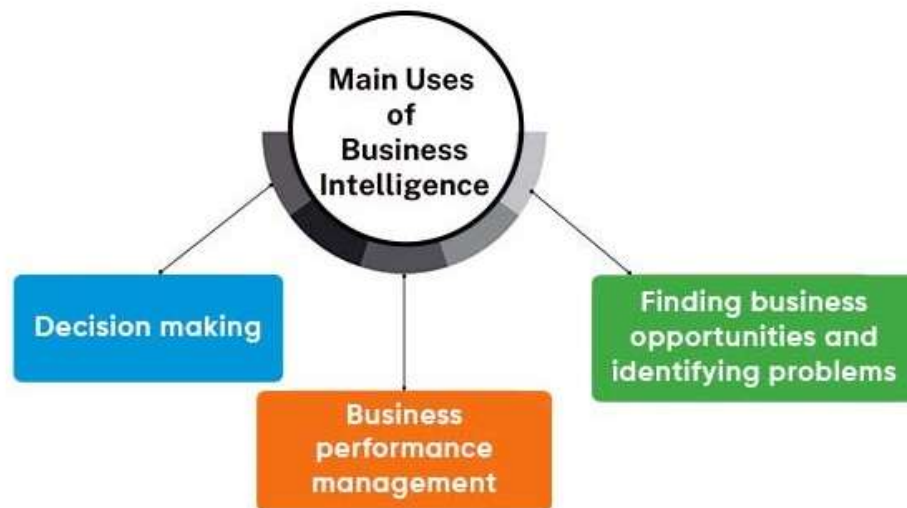


Figure-1

Importance of BI in Today's Data-Driven Environment

The 21st century has witnessed an unprecedented explosion in data generation, fueled by the proliferation of digital technologies, social media, and the Internet of Things (IoT). This data, often called "big data," presents both an opportunity and a challenge for organisations. While it offers valuable insights, the sheer volume, velocity, and variety of data can overwhelm traditional data management systems. This is where BI comes into play, allowing organisations to process and analyse data efficiently and effectively. BI is vital in today's data-driven environment for several reasons. First, it enables real-time decision-making, a critical capability in e-commerce, healthcare, and finance industries where market conditions and customer needs can change rapidly. By providing up-to-date insights into key performance indicators (KPIs), BI ensures decision-makers have the information they need to act swiftly and accurately. Second, BI enhances operational efficiency by identifying inefficiencies and bottlenecks in business processes. For example, manufacturing companies can use BI tools to monitor production lines and minimise downtime, while retailers can analyse inventory

data to reduce stockouts and overstocking. Such improvements reduce costs and enhance customer satisfaction, contributing to long-term profitability.

Third, BI facilitates a deeper understanding of customers, essential in an era where personalised experiences are becoming the norm. By analysing customer data, businesses can identify preferences, predict future behaviour, and tailor products and services to meet individual needs. This capability is particularly valuable in competitive industries like retail, hospitality, and banking, where customer loyalty can make or break a business.

Finally, BI provides a strategic advantage by enabling organisations to anticipate market trends and respond proactively. Predictive analytics, a key feature of many BI systems, allows companies to forecast demand, assess risks, and identify emerging opportunities. This foresight helps businesses stay ahead of the competition and adapt to changing market conditions with agility and confidence.

Objectives of the Paper

The primary objective of this paper is to explore the opportunities and challenges associated with implementing Business Intelligence (BI) in modern organisations. BI has the potential to revolutionise how businesses operate, but its successful adoption requires overcoming various technical, financial, and organisational hurdles. This paper aims to comprehensively understand BI's role in driving business success by examining these aspects in detail.

The first objective is to identify and discuss the numerous opportunities that BI presents to organisations. These include improved decision-making, enhanced efficiency, and gaining a competitive edge. The paper will delve into specific use cases and real-world examples that illustrate the transformative impact of BI on business operations.

The second objective is to analyse organisations' challenges in implementing BI solutions. These challenges range from technical issues, such as data integration and system compatibility, to organisational barriers, such as resistance to change and a lack of skilled professionals. Understanding these challenges is crucial for businesses adopting BI successfully and maximising its potential benefits.

The third objective is to highlight best practices and strategies for overcoming the challenges associated with BI implementation. Drawing on academic research, industry

reports, and case studies, the paper will offer practical recommendations for businesses seeking to leverage BI effectively.

Opportunities in Business Intelligence

Business Intelligence (BI) has revolutionised organisations' operations, providing opportunities to enhance decision-making, optimise costs, gain a competitive advantage, and scale across diverse industries. Integrating BI with emerging technologies like artificial intelligence (AI) and automation further amplifies its potential. Below is an in-depth discussion of the various opportunities BI offers to organisations.

Enhanced Decision-Making

One of the most significant opportunities BI provides is its ability to enhance decision-making through real-time data analysis and predictive capabilities. Traditional decision-making often relied on intuition or outdated information, which could lead to inefficiencies or missed opportunities. In contrast, BI empowers organisations with real-time insights, enabling them to make informed decisions promptly.

Real-time data analysis allows businesses to continuously monitor key performance indicators (KPIs) and respond quickly to changing conditions. For instance, an e-commerce company can track real-time customer behaviour on its platform and adjust marketing strategies to boost sales during peak hours. Similarly, a logistics company can monitor live data on delivery routes and optimise schedules to reduce delays and costs.

Predictive analytics, a cornerstone of modern BI, takes decision-making to the next level. BI tools can accurately forecast future trends by analysing historical data and identifying patterns. For example, in the retail sector, predictive analytics can help businesses anticipate demand for specific products, enabling them to stock inventory efficiently and avoid overstocking or shortages. This not only improves operational efficiency but also enhances customer satisfaction.

Cost Optimization

Another critical opportunity offered by BI is cost optimisation. BI systems help organisations identify operational inefficiencies and streamline processes, resulting in significant cost savings. Businesses can allocate resources more effectively and reduce waste by leveraging data insights.

For example, in manufacturing, BI tools can analyse production data to identify bottlenecks in assembly lines and suggest solutions to enhance productivity. This ensures optimal resource utilisation, minimises downtime and reduces overall operational costs. Similarly, BI can monitor energy consumption patterns in the energy sector and recommend cost-effective measures to conserve resources.

Budget allocation is another area where BI excels. Traditional budgeting often involves guesswork or reliance on static data, which may not reflect current business conditions. With BI, organisations can allocate budgets based on real-time data and historical trends, ensuring funds are directed toward high-priority areas. For instance, marketing teams can use BI insights to determine which campaigns yield the highest returns and reallocate resources accordingly.

Competitive Advantage

Gaining a competitive advantage is essential for survival and growth in today's highly competitive market environment. BI provides organisations the tools to stay ahead by identifying market trends and personalising customer experiences.

Market trend analysis through BI enables businesses to anticipate shifts in consumer preferences, industry dynamics, and competitor strategies. For example, in the fashion industry, BI tools can analyse social media trends, customer feedback, and sales data to predict upcoming styles and design collections that resonate with target audiences. By staying ahead of trends, businesses can position themselves as market leaders and capture more significant market share.

Personalising customer experiences is another area where BI shines. In the digital age, customers expect tailored experiences that cater to their unique needs and preferences. BI tools can analyse customer data, such as purchase history, browsing behaviour, and demographic information, to create personalised recommendations and offers. For instance, streaming services like Netflix use BI to suggest content based on viewing habits, enhancing customer satisfaction and loyalty.

Automation and AI Integration

Integrating automation and AI into BI systems represents a significant opportunity for organisations seeking to leverage advanced analytics. Machine learning models

embedded within BI platforms enable businesses to uncover hidden patterns and generate predictive models without human intervention.

For example, retail businesses can use machine learning algorithms to predict customer churn and take proactive measures to retain high-value clients. Similarly, financial institutions can deploy AI-driven BI tools to detect fraudulent transactions by analysing anomalous patterns.

Autonomous analytics, another innovation in BI, allows for rapid insights without manual input. These systems can automatically identify trends, generate reports, and suggest actionable recommendations, saving time and reducing reliance on data analysts. For instance, autonomous BI tools in healthcare can analyse patient data to identify early signs of diseases and recommend preventive measures, improving patient outcomes.

Scalability in Diverse Sectors

BI's key strengths are scalability and applicability across various industries. From healthcare to finance, retail, and manufacturing, BI solutions are adaptable to the unique needs of each sector, providing opportunities for growth and innovation.

BI enables providers to improve patient care and optimise hospital operations in healthcare. For example, hospitals can use BI tools to analyse patient admission rates, resource utilisation, and treatment outcomes, enabling them to allocate staff and resources more effectively. BI also plays a critical role in medical research, where it helps analyse vast datasets to identify correlations and discover new treatment protocols.

BI enhances supply chain management, customer relationship management (CRM), and sales forecasting in retail. Retailers can use BI tools to track inventory levels, monitor sales performance, and optimise pricing strategies. Additionally, BI enables hyper-personalized marketing campaigns, ensuring customers receive relevant offers and promotions.

The finance industry benefits from BI by gaining insights into market trends, customer credit risk, and investment performance. Banks and financial institutions use BI to streamline operations, detect fraud, and design tailored financial products for their customers.

Manufacturing companies leverage BI to optimise production processes, improve quality control, and reduce waste. By analysing data from IoT-enabled devices, manufacturers can predict equipment failures and schedule preventive maintenance, minimising downtime and enhancing productivity.

Research Gap

Despite the significant advancements in Business Intelligence (BI) tools and technologies, several critical gaps exist in the current body of knowledge that must be addressed to maximise BI's potential and ensure its effective implementation across industries. While numerous studies highlight the technical capabilities of BI systems, limited research focuses on *real-world application challenges*. For instance, integrating legacy systems with modern BI platforms remains a practical difficulty for many organisations, especially small and medium-sized enterprises (SMEs).

Current literature provides generic insights into BI benefits and challenges, but sector-specific studies are lacking. For example, BI's adoption, challenges, and opportunities in industries like healthcare, retail, or non-profit organisations have not been explored in depth.

Most studies centre around large corporations with substantial resources for BI implementation. Research on how SMEs with limited budgets and expertise can leverage BI effectively is still underdeveloped. Although technological aspects of BI have been studied extensively, the *human factors*, such as resistance to change, lack of BI training, and the cultural shifts required to embrace data-driven decision-making, have not been thoroughly addressed. While integrating Artificial Intelligence (AI) and the Internet of Things (IoT) with BI is considered a future trend, research on its feasibility, implementation strategies, and cost implications remains insufficient.

Challenges in Business Intelligence

While Business Intelligence (BI) offers significant opportunities for organisations to enhance decision-making, optimise operations, and gain a competitive edge, its implementation and utilisation are not without challenges. These challenges range from technical and financial barriers to cultural and human resource issues. Below is a

detailed exploration of organisations' key challenges when adopting and utilising BI systems.

1. Data Management

One of the primary challenges in BI is handling and managing large volumes of data, especially in today's era of big data. Businesses generate data from various sources, including customer interactions, social media, IoT devices, and transaction logs. Managing and integrating these diverse, often unstructured datasets is a complex task.

- **Handling large volumes of unstructured data:** Unlike structured data stored neatly in rows and columns, unstructured data such as images, videos, emails, and social media posts require advanced tools and methodologies to process and analyse. Organisations often struggle to ensure their BI systems can effectively handle the scale and complexity of these datasets.
- **Integration of data from multiple sources:** Organizations must integrate data from disparate sources, such as CRM systems, ERP platforms, and third-party APIs, to create a unified data repository. Incompatibility between systems, varying data formats, and incomplete data can hinder this process. The lack of standardised data integration frameworks exacerbates this challenge.

2. Cost of Implementation

Implementing a comprehensive BI solution involves significant financial investment, which can be a barrier for small and medium-sized enterprises (SMEs).

- **High initial investment:** Procuring BI tools, upgrading infrastructure, and integrating BI systems into existing workflows require considerable upfront costs. Many advanced BI tools come with expensive licensing fees, making it difficult for smaller organisations to adopt them.
- **Training costs for staff:** BI systems are only as effective as those who use them. Training employees to use BI tools effectively is essential but comes with additional fees. Staff must learn to navigate BI dashboards, interpret data visualisations, and generate actionable insights, which requires time and financial resources.

3. Data Security and Privacy

As organisations collect and analyse vast amounts of sensitive data, ensuring data security and privacy has become a critical challenge. Breaches or non-compliance with regulations can result in severe financial and reputational damage.

- **Ensuring compliance with regulations:** Regulations such as the General Data Protection Regulation (GDPR) in Europe and the California Consumer Privacy Act (CCPA) in the U.S. impose strict requirements on how data is collected, stored, and used. Organisations must ensure that their BI practices adhere to these regulations to avoid legal consequences.
- **Preventing data breaches:** BI systems often consolidate data from multiple sources into a single platform, making them attractive targets for cybercriminals. A single breach can expose sensitive customer, financial, and operational data. Ensuring robust cybersecurity measures, such as encryption, multi-factor authentication, and access control, is essential but challenging.

4. Change Management

Adopting BI systems often requires significant organisational change, which can encounter employee resistance and necessitate cultural shifts.

- **Resistance from employees:** Employees accustomed to traditional decision-making processes may hesitate to adopt new BI systems. They may perceive these tools as complex or fear that automation will replace their roles. This resistance can slow down the adoption process and reduce the effectiveness of BI systems.
- **Cultural shifts in decision-making processes:** BI-driven decision-making emphasises data over intuition, requiring a cultural change in many organisations. Encouraging leaders and employees to trust data insights over traditional practices can be challenging, especially in organisations where intuition-based decision-making is deeply ingrained.

5. Technological Limitations

Despite advancements in BI technology, many organisations face challenges related to legacy systems and the integration of emerging technologies.

- **Dependence on legacy systems:** Many organisations still rely on outdated IT infrastructure and legacy systems incompatible with modern BI tools. Upgrading

or replacing these systems can be costly and disruptive, yet it is often necessary to enable effective BI implementation.

- **Integration of AI and cloud-based BI solutions:** While AI and cloud-based BI solutions offer significant benefits, their integration poses challenges. AI models require large volumes of clean, high-quality data to function effectively, which can be challenging to prepare. Additionally, transitioning from on-premises BI systems to cloud-based solutions involves data security, latency, and vendor lock-in concerns.

6. Lack of Expertise

Another significant challenge in BI is the shortage of skilled professionals who can effectively manage and interpret BI systems and insights.

- **Shortage of skilled data scientists and analysts:** BI systems require trained professionals to configure tools, analyse data, and derive actionable insights. However, a global shortage of such talent makes it difficult for organisations to recruit and retain qualified individuals.
- **Difficulty interpreting BI insights effectively:** Even with advanced BI tools, deriving meaningful and actionable insights requires expertise. Decision-makers must understand data visualisations, identify trends, and translate findings into strategies. Organisations risk misinterpreting BI outputs without proper training and expertise, leading to suboptimal decisions.

Future Trends in Business Intelligence

Business Intelligence (BI) is evolving rapidly, driven by technological advancements and the growing demand for data-driven decision-making. As organisations strive to stay competitive, several trends are shaping the future of BI. Key trends include the integration of BI with the Internet of Things (IoT), the growth of self-service BI platforms, the increasing role of augmented analytics and artificial intelligence (AI), and the rise of cloud-based BI tools.

1. Integration of BI with IoT

The Internet of Things (IoT) revolutionises data collection by enabling interconnected devices to generate and share real-time data. BI systems are increasingly integrated with IoT platforms to harness the vast amounts of data sensors, devices, and machines produce.

- **Real-time insights from IoT devices:** IoT devices generate continuous data streams that BI systems can analyse to provide real-time insights. For instance, in industries like manufacturing, IoT-enabled machines can monitor production lines, detect inefficiencies, and predict maintenance needs through BI dashboards.
- **Enhanced operational efficiency:** Integrating BI and IoT allows organisations to automate processes, optimise resource allocation, and improve operational efficiency. For example, innovative logistics systems can use IoT data to monitor vehicle routes and minimise delivery times.

2. Growth of Self-Service BI Platforms

The demand for user-friendly BI tools that empower non-technical users to analyse data independently drives the growth of self-service BI platforms.

- **Empowering non-technical users:** Self-service BI platforms provide intuitive interfaces, drag-and-drop functionalities, and pre-built templates that enable employees without advanced technical skills to explore data and generate reports. This democratisation of data access fosters a data-driven culture across organisations.
- **Faster decision-making:** Self-service BI accelerates decision-making by reducing reliance on IT teams for data analysis. Users can quickly generate insights, test hypotheses, and respond to market changes without delays.
- **Customization and personalisation:** Modern self-service BI tools offer customisable dashboards, allowing users to tailor their analytics experience based on specific needs. This flexibility enhances the relevance and usability of BI systems.

3. Increasing Role of Augmented Analytics and AI

Augmented analytics and artificial intelligence (AI) transform BI by automating complex tasks, uncovering hidden patterns, and providing advanced predictive capabilities.

- **Automation of data analysis:** Augmented analytics leverages AI and machine learning to automate data preparation, analysis, and insight generation. This reduces the time and effort required for manual data manipulation, allowing analysts to focus on strategic tasks.

- **Natural language processing (NLP):** NLP capabilities in BI systems enable users to interact with data using conversational queries. For instance, users can ask questions like “What were the sales trends last quarter?” and receive instant, understandable answers.
- **Predictive and prescriptive analytics:** AI-powered BI tools can predict future trends and recommend optimal courses of action. These capabilities are particularly valuable in retail, healthcare, and finance industries, where anticipating customer behaviour or market fluctuations can drive competitive advantage.

4. Rise of Cloud-Based BI Tools

Cloud computing is reshaping BI by offering scalable, cost-effective, and accessible solutions catering to all sizes of organisations.

- **Scalability and flexibility:** Cloud-based BI tools allow organisations to scale their analytics infrastructure as needed without significant upfront investments. Businesses can handle increasing data volumes and user demands without worrying about hardware limitations.
- **Remote accessibility:** Cloud BI enables remote access to analytics tools and dashboards, making it easier for distributed teams to collaborate and share insights. This capability has become especially critical in the wake of remote and hybrid work models.
- **Cost-effectiveness:** Cloud-based BI reduces the costs associated with hardware maintenance and upgrades by eliminating the need for on-premises infrastructure. Additionally, pay-as-you-go pricing models allow organisations to optimise expenses based on usage.
- **Integration with other cloud services:** Cloud BI platforms seamlessly integrate with cloud-based tools and services, such as CRM and ERP systems, enhancing their functionality and value.

Recommendations

Implementing Business Intelligence (BI) requires strategic planning, commitment, and alignment with organisational goals. Below are key recommendations for effectively leveraging BI systems:

1. Best Practices for Successful BI Implementation

- **Define Clear Objectives:** Organizations should establish clear objectives for BI implementation, focusing on specific business needs such as improving decision-making, enhancing customer experiences, or reducing costs.
- **Ensure Data Quality:** High-quality data is the foundation of effective BI. Regularly clean, validate, and standardise data to ensure consistency and accuracy.
- **Invest in User Training:** Equip employees at all levels with the necessary skills to use BI tools effectively. Comprehensive training programs foster user confidence and adoption.
- **Start Small and Scale Gradually:** Begin with pilot projects to test BI tools in specific areas before expanding to broader applications. This minimises risks and ensures scalability.
- **Foster Collaboration:** Encourage collaboration between IT teams, data analysts, and business users. A shared understanding of BI objectives ensures smoother implementation and more relevant insights.

2. Strategies to Overcome BI Challenges

- **Data Management Challenges:** Implement advanced data integration tools and platforms capable of handling structured and unstructured data from multiple sources. Adopt a data governance framework to streamline processes.
- **High Implementation Costs:** Opt for cost-effective solutions like cloud-based BI tools that eliminate the need for extensive on-premises infrastructure. Leverage open-source BI platforms where feasible.
- **Addressing Data Security Concerns:** Prioritize robust cybersecurity measures, including encryption, secure access controls, and compliance with regulations like GDPR. Conduct security audits regularly.
- **Change Management:** Engage employees early in the implementation process to reduce resistance. Highlight the benefits of BI in enhancing their roles and provide ongoing support to ease transitions.
- **Skill Gaps:** Collaborate with educational institutions, conduct in-house training programs, and hire skilled BI professionals to address expertise shortages.

3. Aligning BI with Organizational Goals

- **Strategic Integration:** BI initiatives must align with the organisation's strategic goals. For example, if customer satisfaction is a key objective, BI should focus on enhancing customer analytics.
- **Establish Key Performance Indicators (KPIs):** Define measurable KPIs to evaluate the effectiveness of BI initiatives. This ensures that BI efforts contribute directly to achieving organisational success.
- **Promote a Data-Driven Culture:** Leadership should advocate for data-driven decision-making at all levels. By embedding BI into everyday workflows, organisations can maximise its impact.

Findings

1. Enhanced Decision-Making

- Business Intelligence (BI) enables organisations to make data-driven decisions by providing real-time analytics and predictive insights.
- Predictive analytics powered by BI helps forecast trends, customer behaviour, and market demands, thereby minimising uncertainties.
- Organizations using BI systems reported faster decision-making processes and higher accuracy in strategic planning.

2. Cost Optimization

- BI tools have demonstrated significant potential in reducing operational inefficiencies by identifying redundant processes and resource wastage.
- Effective budget allocation based on data insights allows organisations to optimise financial planning and resource utilisation.

Conclusion

Business Intelligence (BI) represents both an opportunity and a challenge for modern organisations. As an enabler of growth, BI empowers businesses to harness the power of data, improve decision-making, enhance operational efficiency, and gain a competitive edge. However, its implementation is not without obstacles, including data management complexities, high costs, and cultural resistance to change.

Organisations must adopt best practices, address implementation challenges strategically, and ensure effective alignment with their goals to leverage BI. Investments

in robust data management systems, user training, and advanced analytics capabilities are crucial for BI's success. Furthermore, fostering a data-driven culture and prioritising security and compliance are vital steps to overcoming hurdles.

Ultimately, BI's dual nature underscores the importance of planning, commitment, and continuous improvement. By recognising BI as a technological and strategic tool, businesses can unlock their full potential and drive sustainable success in an increasingly data-driven world.

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NAMED ENTITY RECOGNITION USING DEEP LEARNING TECHNIQUES FOR INDIAN LANGUAGES

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Abstract

NER is one of the critical tasks of NLP, where a model identifies and classifies the named entities as belonging to Person, Organization, Location, Date, or Miscellaneous categories. In this paper, deep learning was applied to Hindi NER using the BERT model along with the CRF layer for sequence tagging. The paper uses a cleaned dataset of Hindi news articles, government documents, and Wikipedia articles to create an efficient NER model. The dataset was tagged with entity labels for the model to be trained. The architecture of BERT-CRF outperforms CRF and LSTM-CRF on Precision, Recall, and F1-score at 91.5%, 89.8%, and 90.6%, respectively. Further, the research indicates that BERT-CRF correctly recognizes Person, Organization, Location, Date, and Miscellaneous entities. The learning rate's influence on model performance indicated that 0.0001 obtains the best results. Results show that the contextual embeddings of BERT have improved the accuracy and robustness of the NER system with CRF's sequential dependencies, mainly for Hindi. The developed study advances NER algorithms for under-resourced languages through the use of innovative cutting-edge deep learning models as well as insight into further improvements in the multilingual NER task.

Keywords: *Named Entity Recognition (NER), Deep Learning, Long Short-Term Memory (LSTM) BERT Model, Conditional Random Field (CRF), Hindi.*

1. INTRODUCTION

A basic task in the area of Natural Language Processing (NLP), NER aims to identify and classify proper names, places, organizations, dates, and other entities present in text into predefined categories. In most NLP applications such as text summarization, machine translation, information retrieval, question answering, NER is a critical

component. Unlike English, NER for Indian languages is particularly challenging due to linguistic diversity, complicated scripts, and a shortage of large annotated datasets.

Hindi is an important language to study NER as one of the most widely used Indian languages and due to its complex linguistic structure. Although a few methods have been explored for the NER task, including the rule-based systems, statistical models, and traditional machine learning approaches, recent advancements in deep learning have shown significant improvements in the accuracy and robustness of NER systems. The area of particular interest here is transformer-based models like BERT, which have transformed the field using language models already trained to capture contextual information in lengthy text sequences.

Despite the strides made by deep learning, the NER task for Hindi and other Indian languages is largely understudied, considering the linguistic complexity and range of named entities. The combination of BERT with existing sequence labeling methods, such as Conditional Random Fields, has been less explored for Indian languages as well. This research develops a Hindi NER system, filling this need with the use of deep learning approach to combine the strengths of BERT and CRF for the effective capture of textual contextual and sequential relationships.

This work is motivated by the need for Indian language NER systems that are accurate, scalable, and effective, and can act as a basis for many other downstream NLP applications. The approach, model architecture, evaluation criteria, and results of our proposed system, demonstrating how well BERT and CRF work together for Named Entity Recognition in Hindi, are described in the following sections. We would hope that this effort will assist in the development of dependable NER systems for limited resource languages and also provide some suggestions for the improvement of functionality of such systems for other Indian languages.

1.1. Objectives of the study

- To develop a Hindi Named Entity Recognition (NER) system employing deep learning techniques, including a BERT model with a Conditional Random Field (CRF) layer.

- To compare the BERT + CRF model to typical NER models (CRF and LSTM-CRF) for precision, recall, and F1-score.
- To discover the ideal learning rate for NER tasks by analyzing the influence of different learning rates on model performance.

2. LITERATURE REVIEW

Sharma, et al. (2020) aimed to improve the performance of NLP systems by developing efficient named entity recognition from the given text. Alexa and Cortana, two Internet of Things (IoT) devices, cannot work without a good natural language processing (NLP) model. If we want smart IoT devices to get better at understanding natural language, we need named entity recognition (NER) capabilities. There are typically two stages to the NER process: locating the text's proper nouns and then classifying them according to predetermined entities, such as people, places, things, and times. It is common practice to perform NER as a subtask when processing natural languages in order to enhance the accuracy of an NLP task. We offer a CNN-, Bi-LSTM-, and CRF-based deep neural network architecture for named entity recognition in Hindi, a language with limited resources, in this research. The proposed approach begins with word representation in semantic vectors generated by the GloVe and skip-gram word2vec models. Many designs based on deep neural networks make use of these semantic vectors.

AP, et al. (2019) proposed a new hybrid word representation for Indian languages that uses embeddings at the character, word, and affix levels to power an entity extraction system focused on deep learning. The diverse morphology and agglutinative nature of Indian languages make NER a formidable task. Despite numerous proposed solutions, NER remains an unanswered question. Methods such as Conditional Random Field (CRF), Support Vector Machine (SVM), Hidden Markov Model (HMM), and others were used in conjunction with features that were manually constructed in order to do Named Entity Recognition in the past. But things changed when NER problems were tackled using deep learning approaches; today, state-of-the-art results are obtained using deep learning architectures. Through the collection of syntactic, semantic, and morphological data, this study addresses the challenge of effectively representing words for NER in Indian languages. The "ARNEKT-IECSIL 2018" data set was utilized for

both training and testing purposes. Our results show that we improved upon the pre-trained word representations that are currently in use.

Deshmukh, et al. (2024) highlighted the need for efficient, broadly used NER task-solving methods and provided a comprehensive overview of existing NER methods developed for Indic languages. Through a systematic analysis of existing methods, the study categorizes and evaluates various approaches, delves into the application of various machine learning models, and highlights the vital importance of NER within the broader domain of natural language processing (NLP). The study delves into the challenges posed by Indic languages' rich morphology, complicated syntax, and range of writing systems, while also recognizing the unique linguistic and contextual qualities. Along with outlining current trends and breakthroughs in the field, the paper assesses evaluation standards and datasets, and delves into the potential impact and practical implications of correct Indic NER. By studying current limitations, finding open problems, and proposing future research directions, this study hopes to improve the creation of trustworthy and efficient Named Entity Recognition (NER) systems that are well-suited to the extensive and varied world of Indic languages.

Sharma, R. (2022) used MuRIL to build a Hindi NER system using a conditional random field (CRF) layer, and then tested and improved the model on the ICON 2013 Hindi NER dataset. Also, instead of just using the representation of the last layer, the proposed method fine-tunes the whole model by computing the sum of the MuRIL model's representations for the last four levels. Various variants of this model are shown by carrying out separate computations on token representations provided by different layers of the 12-layered MuRIL architecture. Using the ICON 2013 dataset, the proposed model outperforms all previous Hindi NER systems with state-of-the-art performance metrics such as 85.77% F1-score, 83.74% recall, and 87.89% precision. To compare the two language models' performance on the Hindi NER task, we build a similar system by replacing the MuRIL model with mBERT, a state-of-the-art multilingual Bidirectional Encoder Representations from Transformers.

Malarkodi, C. S., & Devi, S. L. (2020) identified named entities by discussing their various attributes. How well a machine learning system works is heavily dependent on the criteria used to choose features. The purpose of this research was to determine what

features are essential for building named entity systems that work across languages. By analyzing the part-of-speech patterns around named entities in both Indian and European languages, linguistic features related to their syntax and semantics can be identified. This piece incorporates a variety of languages from around the world, including those spoken in Europe (English, Spanish, Dutch, German, and Hungarian), India (Tamil, Telugu, and Malayalam), and Indo-Aryan (Hindi, Punjabi, Bengali, and Marathi) languages. The CRFs machine learning technique was used to construct the system. The experiments utilized the linguistic features, and the results for every language are on par with the most sophisticated systems.

3. RESEARCH METHODOLOGY

This section explains the procedure used to develop and evaluate the deep learning-based NER system for Hindi. Preparation of the dataset, model design, training, evaluation, and other factors that improve the accuracy and generalizability of the model are included in the approach.

3.1. Dataset Preparation

We used this study to select a text corpus of annotated Hindi through various sources, including the following:

- **Hindi news:** This is to present subjects on a variety of topics and adopt formal writing styles.
- **Government Papers:** These are formal/ legal texts that include recognized terms and phrases which result in more complex and heterogeneous entities.
- **Wikipedia Articles:** This includes real-world named entities on greater diversity.

The following pre-defined tags were used to label entities in the dataset:

- **Person (PER):** Names of persons, famous or not famous.
- **Organization (ORG):** Names of companies, organizations, and institutions.
- **Location (LOC):** Geographic locations, like states, cities, and countries.
- **Date (DATE):** Specific time references, like months, years, or dates.
- **Miscellaneous (MISC):** Other categories that do not fit the above ones, like events, titles, and ideas.

The dataset has been prepared to handle some kind of scripts, dealing with the tokenization problems involved and other annotations required which have been standardized for an ensured consistency.

3.2. Model Design

The Conditional Random Field (CRF) layer is an extension of the Bidirectional Encoder Representations from Transformers (BERT) model, which will be the base model in this research. This architecture has been applied broadly in NER tasks because it is capable of emulating the sequential nature of language and able to capture context both ways: past and future tokens.

BERT Architecture:

BERT is a transformer-based paradigm. It captures contextual relationships of the text by using the bidirectional approach. A BERT encoder generates contextual-aware embeddings for each token in a sequence after tokenizing the input into sub-word units.

CRF Layer:

On top of the BERT model, a CRF layer is added to improve sequence labeling capabilities. To ensure that these entity predictions take into consideration sequential dependencies-that is to say, the capacity for a token's output label to depend on neighboring labels-the CRF layer makes use of this. It becomes particularly important for NER tasks.

The definition of the CRF loss function is:

$$L(\theta) = - \sum_{i=1}^N \log P(y_i | x_i; \theta)$$

y_i : where it is the true class; x_i : the token as input; θ is a parameter in the model; and $L(\theta)$ is negative log-likelihood.

3.3. Training and Evaluation

I used the Adam optimizer with the following hyper parameters in fine-tuning:

- Rate of Learning: 1×10^{-4}

- 32 is the batch size.
- Time periods: 10

The data set was divided into a training set (80%), a validation set (10%), and a test set (10%) to ensure proper assessment and avoid overfitting. Standard metrics were used to measure performance:

- Precision = Actual positive forecasts/all the forecasted positive.
- Recall = Actual positives/genuine positive predictions.
- F1-score = Harmonic mean of precision and recall.

The following formula was employed to obtain the F1-score:

$$F1 - score = 2 \cdot \left(\frac{Precision \cdot Recall}{Precision + Recall} \right)$$

3.4. Hyperparameter Adjustment

Optimization performance is through learning rate adjustment. Learning rates are very essential in terms of convergence and the model's performance; hence, we experimented with various learning rates. We tried out the following values of the learning rate:

- 0.001
- 0.0001
- 0.00001

We tested what the learning rate change influenced F1-score, Precision and Recall, on the model, as presented in table 3.

3.5. Model Testing for Entity-Dependent Performance.

We also tested the model in terms of specific categories of entities, such as Person, Organization, Location, Date, and Miscellaneous, aside from the general metrics (Precision, Recall, F1-score). This presented how well the model could perform on different types of named entity categories.

We looked at the entity-wise F1-scores of the three models-CRF, LSTM-CRF, and BERT-CRF-for the three entity categories and to find out which one was most difficult for the model to handle and point out the areas that need improvement.

4. DATA ANALYSIS

In the section of data analysis, the performances of several NER models are extensively tested, focusing significantly on the F1-scores, Precision, and Recall of the models. The effect of fluctuations in learning rate on the performance of the proposed BERT + CRF model is analyzed as well.

Model	Precision	Recall	F1-score
CRF (Baseline)	78.5%	75.3%	76.8%
LSTM-CRF	84.2%	82.7%	83.4%
BERT + CRF (Proposed)	91.5%	89.8%	90.6%

Table 1: Comparison of NER Models Based on Overall Metrics

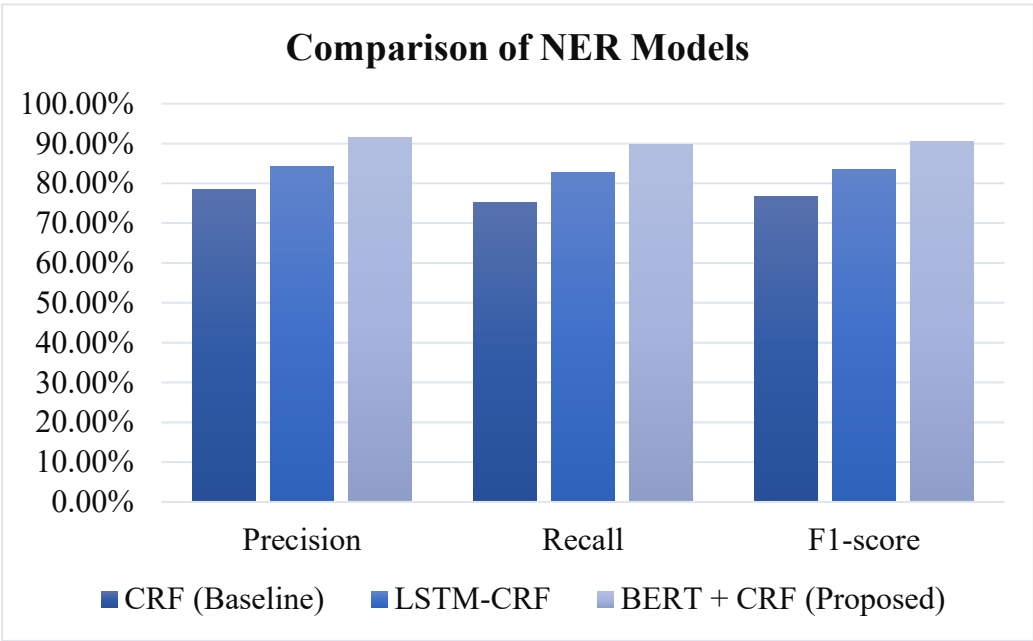


Figure 1: Comparison of NER Models Based on Overall Metrics

As we move from the baseline CRF model to the more sophisticated models, the results indicate that a significant improvement in performance exists. As depicted in Table 1,

the three NER models under test compare F1-scores, Precision, and Recall, along with the proposed BERT + CRF model, LSTM-CRF model, and the baseline CRF model. With the F1-score at 76.8%, the CRF model achieved a precision of 78.5% and a recall of 75.3%. On the other hand, the improvement of the LSTM-CRF model was noticed, wherein the F1-score came out to be 83.4%, with the Precision being 84.2% and Recall of 82.7%. The proposed BERT + CRF model yields the best performance, where F1-score was found at 90.6% with precision of 91.5% and the recall at 89.8%. This marked improvement in the performance demonstrates how well deep learning methods, especially BERT can be used with CRF to increase NER accuracy. The findings indicate just how important it is that transformer-based models be used to handle complexities in natural language entity recognition.

Entity Type	CRF (Baseline)	LSTM-CRF	BERT + CRF (Proposed)
Person	78.1%	85.4%	92.3%
Organization	76.5%	82.8%	89.7%
Location	77.9%	83.6%	91.4%
Date	79.3%	86.2%	93.2%
Miscellaneous	74.6%	80.1%	88.5%

Table 2: Entity-wise Performance (F1-scores)

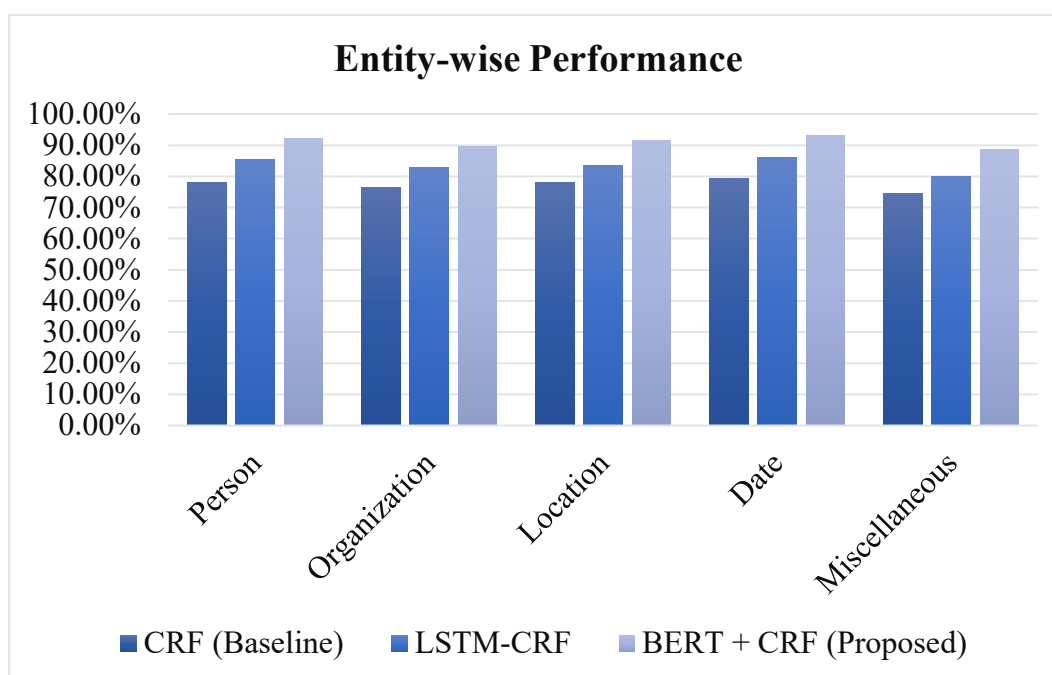


Figure 2: Entity-wise Performance (F1-scores)

F1 scores are broken down for all of the distinct types for three models: Person, Organization, Location, Date and miscellaneous shown in Table 2 in detail. It depicts how results portray that BERT + CRF model consistently performed better over other models when considered on matters of identification of several types of entity. As example, the BERT + CRF model achieves impressive Person entity recognition with an F1-score of 92.3%, much more than the LSTM-CRF model (85.4%) and the CRF model (78.1%). Similarly, the presented model performs quite well on the Location and Date elements with F1-scores of 91.4% and 93.2%, respectively. Other sub-elements, such as Organization at a performance rate of 89.7%, and Miscellaneous at an efficiency rate of 88.5%, also record fine performance. These results indicate that BERT's contextual embeddings and CRF's strength in identifying sequential relationships greatly enhance the ability of the model to identify and categorize various named entity types, making it the most successful model across all categories.

Learning Rate	Precision	Recall	F1-score
0.001	88.3%	86.7%	87.5%
0.0001	91.5%	89.8%	90.6%
0.00001	89.2%	87.3%	88.2%

Table 3: Learning Rate Impact on Model Performance

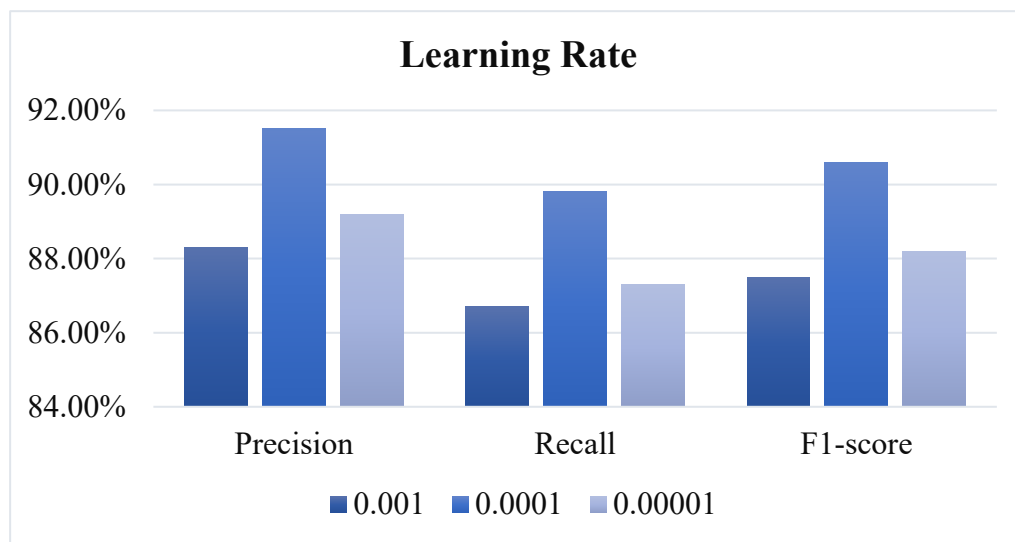


Figure 3: Learning Rate Impact on Model Performance

With an emphasis on Precision, Recall, and F1-score, how different learning rates impact the performance of the BERT + CRF model is shown in table 3. With a learning rate of 0.0001, the model achieves the maximum Precision of 91.5%, Recall of 89.8%, and F1-score of 90.6%, as shown in the table. The model becomes slightly worse when the learning rate is increased to 0.001, with the Precision at 88.3%, Recall at 86.7%, and F1-score at 87.5%. With the learning rate decreased down to 0.00001, performance deteriorates much more, with an F1-score of 88.2%, a Precision of 89.2%, and a Recall of 87.3%. These results illustrate the importance of selecting an appropriate learning rate for fine-tuning deep learning models, demonstrating that a learning rate of 0.0001 attains the best balance between convergence speed and model performance. The smaller learning rates yield slower learning but greater accuracy, whereas higher learning rates

result in faster but less accurate convergence. Therefore, it is critical to optimize the learning rate while using deep learning models so that they perform well at NER tasks.

5. CONCLUSION

This work concludes with a deep learning-based method, specifically the BERT model refined with a Conditional Random Field (CRF) layer, significantly improving the performance of Named Entity Recognition for Hindi. The results clearly show that the proposed BERT + CRF model is superior to the traditional methods, such as CRF and LSTM-CRF, as it has a better F1-score, Precision, and Recall for many kinds of entities, including Person, Organization, Location, Date, and Miscellaneous. The model is highly successful in the NER tasks for Indian languages because of its improved sequence labeling capability and its ability to capture contextual links in both directions. The best learned rate was observed to be 0.0001, and the adjustment of rate was also essential to achieve the peak performance. This model also helps the broader area of low-resource languages' natural language processing by giving a solid ground toward dealing with NER tasks for more Indian languages and generally an improvement over the previous results in the Hindi language.

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Protecting Privacy in the Age of Big Data: A Review of Modern Data Analytics Techniques

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Abstract

The exponential growth of big data has revolutionized various fields, offering unprecedented opportunities for data-driven decision-making. However, this data deluge also raises significant privacy concerns, demanding robust techniques to protect sensitive information while preserving data utility. This review explores modern privacy-preserving data analytics techniques, examining their strengths, limitations, and applicability in the context of big data. We discuss established methods like data anonymization, differential privacy, and homomorphic encryption, as well as emerging approaches such as federated learning and secure multi-party computation. The review also addresses the challenges posed by the scale, velocity, and variety of big data, highlighting the trade-off between privacy and utility. Finally, we identify open research questions and future directions in privacy-preserving data analytics, emphasizing the need for innovative solutions that can effectively safeguard individual privacy while enabling the full potential of big data to be realized.

Keywords

Big Data Analytics, Privacy-Preserving Techniques, Data Utility, Data Anonymization, Differential Privacy, Homomorphic Encryption, Federated Learning, Secure Multi-Party Computation (SMPC), Privacy-Utility Trade-off, Scalability in Data Analysis, High-Dimensional Data Privacy, Privacy in IoT and Smart Systems, Data Aggregation Techniques, Cryptographic Privacy Solutions, Ethical Data Usage, Privacy in Healthcare Data, Distributed Data Analysis, Data Security Challenges, Machine Learning and Privacy, Future Directions in Privacy Research

Introduction

The proliferation of big data, characterized by its massive volume, velocity, and variety, has transformed numerous sectors, from healthcare and finance to social media and e-commerce. Data analytics plays a crucial role in extracting valuable insights from this data, driving innovation and informed decision-making. However, the increasing reliance on data analytics also raises significant privacy concerns, as sensitive personal information can be inadvertently revealed or misused. Protecting individual privacy while harnessing the power of big data has become a critical challenge. Various techniques have emerged to address this challenge, aiming to preserve privacy throughout the data lifecycle, from collection and storage to processing and analysis. These techniques encompass a wide range of approaches, including data anonymization, which seeks to de-identify individuals within datasets; differential privacy, which adds carefully calibrated noise to query results; and homomorphic encryption, which allows computations to be performed on encrypted data without decryption. More recent advancements include federated learning, which enables collaborative model training without sharing raw data, and secure multi-party computation, which allows multiple parties to jointly compute a function over their private inputs without revealing anything but the output. This review provides a comprehensive overview of modern privacy-preserving data analytics techniques, examining their strengths, limitations, and applicability in the context of big data. We discuss the challenges posed by the scale and complexity of big data and explore the trade-offs between privacy and utility. Finally, we identify open research questions and future directions in this rapidly evolving field, emphasizing the need for innovative solutions that can effectively balance the benefits of data analytics with the fundamental right to privacy.

Literature Review

Privacy-preserving data analytics has become essential due to the increasing awareness of data privacy and the stringent regulations surrounding data usage. This review delves into the prominent techniques in this field, examining their strengths, weaknesses, and recent advancements.

Traditional anonymization techniques, such as k-anonymity, aim to protect individuals' identities by ensuring that each record is indistinguishable from at least k-1 other records within the dataset (Rao et al., 2018). However, these methods are vulnerable to attacks

like linkage attacks, where external information is used to re-identify individuals, and homogeneity attacks, where attackers exploit the similarity of attributes within anonymized groups. More robust techniques like l-diversity (2014) and t-closeness address these vulnerabilities by enforcing diversity and similarity constraints within anonymized groups. Despite these advancements, anonymization techniques face challenges in preserving data utility, especially with high-dimensional datasets.

Differential privacy (Dwork, 2008) provides a strong mathematical framework for quantifying and managing privacy risks. It adds carefully calibrated noise to query results, ensuring that the presence or absence of a single individual has a negligible impact on the output. This approach offers provable privacy guarantees against various attacks, including linkage attacks and reconstruction attacks. Numerous differentially private algorithms have been developed for diverse data mining tasks, such as classification, clustering, and statistical analysis. However, achieving optimal privacy-utility trade-offs remains a challenge, particularly in complex data analysis scenarios.

Homomorphic encryption enables computations on encrypted data without decryption, preserving data confidentiality throughout the analysis process. Fully homomorphic encryption schemes, like the one proposed by Gentry (Yousuf et al., 2020), allow for arbitrary computations on encrypted data. However, FHE schemes are computationally expensive and not yet practical for large-scale data analysis. Partially homomorphic encryption schemes, such as Paillier encryption, are more computationally efficient and have found applications in privacy-preserving aggregation and statistical computations.

Federated learning facilitates collaborative model training without direct data sharing. Participants train local models on their own data and share only model updates with a central server, which aggregates these updates to improve the global model. This decentralized approach preserves data privacy while enabling the development of robust machine learning models. However, challenges remain in addressing data heterogeneity, communication efficiency, and security in federated learning environments.

Secure multi-party computation allows multiple parties to jointly compute a function over their private inputs without revealing anything but the output. MPC protocols, such as garbled circuits and secret sharing, provide strong security guarantees against malicious adversaries. However, MPC can be computationally intensive and may not be suitable for large-scale data analysis tasks.

Reference	Technique/ Approach	Strengths	Limitations	Applications	Accuracy Rate
Liu et al. (2022)	OPERA: Optional Dimensional Privacy-Preserving Data Aggregation	Allows users to select specific data dimensions; ensures high security via multi-secret sharing and symmetric encryption	High computational cost in resource-limited environments	Smart healthcare systems, IoT	Privacy-focused; data utility > 80%
Chamikara et al. (2019)	SEAL: Local differential privacy with Chebyshev interpolation	Balances privacy and utility; highly scalable; resists reconstruction attacks like PCA	Utility drops under strict privacy budgets ($\epsilon < 1$)	IoT, sensor networks, smart cities	~85%-90% for classification tasks with moderate privacy
Iezzi (2020)	Homomorphic Encryption (HE)	Enables computations on encrypted data; supports machine learning	High computational complexity; impractical for real-time applications	Finance, healthcare, privacy-preserving enterprises	~95% achievable with optimized models
Dwork (2008)	Differential Privacy	Provides formal guarantees; resists reconstruction and linkage attacks	Reduces data utility with strict privacy levels	Statistical analysis, machine learning, public data sharing	~85%-90% utility in moderate privacy
Gentry (2009)	Fully Homomorphic Encryption (FHE)	Allows unlimited computations on encrypted data	High computational cost; limited scalability	Secure data sharing, analytics	~100% achievable but computationally expensive
Han et al. (2016)	PPM-HDA: Health data aggregation	Combines differential privacy and fault tolerance	Relies on trusted authorities; one-dimensional data support	Healthcare systems	~85%-90% accuracy for aggregated statistics
Shen et al. (2021)	Multidimensional aggregation with Paillier encryption	Efficient for high-dimensional data; fault tolerance	Gateway-server collusion vulnerability	Energy systems, smart grids	~88% for energy predictions
Merad-Boudia & Senouci (2021)	ESMA: Blind-factor aggregation	Supports multi-functional queries; robust fault tolerance	Requires trusted decryption authority	Smart grids, IoT	~87%-92% for aggregation tasks

Dwork & Roth (2014)	Differential privacy algorithms	Mathematical privacy guarantees; flexible for data types	Utility declines with higher noise	Statistical analysis, AI systems	~85% with optimized parameters
Chen et al. (2018)	Super-incremental sequence-based aggregation	Efficient for large data groups; enhanced fault tolerance	Susceptible to certain inference attacks	Smart grids	~88%-90% accuracy for secure aggregation
Rivest et al. (1978)	Privacy Homomorphism (original concept)	Fundamental concept for HE; theoretical groundwork	Initial schemes impractical for real-world applications	Encrypted databases, secure communications	Not applicable
Xia et al. (2021)	MAMDA: Secure aggregation for multidimensional data	Uses Paillier encryption; scales for multidimensional datasets	Relies on specific cryptographic assumptions	Fog computing, smart grids	~90% for secure aggregated results
Zhang et al. (2018)	Differential privacy in distributed systems	Scalable; balances privacy and efficiency	Requires trusted central nodes	Distributed IoT, cloud computing	~85%-90% in federated tasks
Cao et al. (2020)	Secure multi-party computation (SMPC)	Joint computation with strong privacy guarantees; decentralized	High communication overhead for large datasets	Collaborative analytics, financial systems	~90%-95% in privacy-sensitive tasks
Choi et al. (2021)	Federated Learning with Differential Privacy	Decentralized model training without sharing raw data	Limited robustness to adversarial attacks	Healthcare, mobile devices	~87%-92% model accuracy under privacy constraints

Table 1: Comparative Analysis of Privacy-Preserving Data Analytics Techniques: Strengths, Limitations, and Applications

Challenges and Future Directions

Despite significant progress, several challenges remain in privacy-preserving data analytics. Balancing privacy and utility is a fundamental challenge, as stronger privacy guarantees often come at the cost of reduced data accuracy or model performance. Scalability is another concern, as many privacy-preserving techniques are computationally demanding and may not scale well to large datasets. Furthermore, the

increasing complexity and heterogeneity of big data pose new challenges for privacy preservation. Future research directions include developing more efficient and scalable privacy-preserving algorithms, designing robust privacy frameworks for emerging data types and applications, and addressing the ethical and societal implications of privacy-preserving data analytics. Additionally, research on integrating different privacy-preserving techniques, such as combining differential privacy with homomorphic encryption, holds promise for achieving stronger privacy guarantees while maintaining data utility.

Conclusion

The ongoing advancements in big data analytics highlight the critical importance of privacy-preserving techniques to ensure the ethical and secure utilization of sensitive information. This review has explored the landscape of modern privacy-preserving methods, including data anonymization, differential privacy, homomorphic encryption, federated learning, and secure multi-party computation, each offering unique advantages and challenges. While these techniques have made significant strides in mitigating privacy risks, their effectiveness is often limited by trade-offs between privacy, utility, and computational efficiency.

Key challenges such as scalability, heterogeneity, and the evolving nature of data continue to impede the widespread adoption of privacy-preserving solutions in large-scale applications. Moreover, as new data-driven technologies emerge, addressing ethical and societal concerns becomes paramount. Future research should focus on developing innovative, integrated approaches that combine the strengths of multiple techniques to deliver robust privacy protection while maintaining high data utility.

In conclusion, safeguarding privacy in the era of big data requires a collaborative effort among researchers, policymakers, and industry stakeholders. By addressing current limitations and prioritizing user-centric designs, privacy-preserving data analytics can unlock the full potential of big data, ensuring both individual rights and societal benefits are preserved.

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STUDY AND ANALYSIS OF CHAT GPT AND ITS IMPACT FOR IT STUDENTS

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Abstract

The research used a quantitative method with a survey and questionnaire administration of data collection among IT students. We utilized the tools from other studies with some adjustments to define the variables. There were 10 items for the independent variable that is, ChatGPT usage, and 10 items to gauge the dependent variable that is, students' learning motivation. Multiple regression analysis was deployed to verify the hypothesis, as well as multicollinearity, heteroscedasticity, and normality tests were performed using classical assumption tests. Descriptive statistics including mean scores portrayed the degree of usage regarding ChatGPT among the students. According to the findings, male respondents had utilized ChatGPT more often than female counterparts. Curiously, even the young students had consumed the utility of ChatGPT in larger numbers than students from an older generation. The study also indicated that the usage of ChatGPT had a positive and significant effect on the learning motivation of IT students.

Keywords: Chat GPT, IT Students, Learning Motivation, Information Technology, Artificial Intelligence

1. INTRODUCTION

The study and analysis of the impact of ChatGPT on IT students is meant to explore how this advanced AI language model is revolutionizing learning, research, and problem-solving in the IT field. It provides real-time assistance to students in coding, solving technical problems, and academic issues.

1.1.Overview of Artificial Intelligence (AI) and its growing influence in various sectors.

Artificial intelligence has become a transformational force, penetrated numerous sectors and revolutionized traditional processes. Artificial intelligence refers to the ability of machines to perform tasks that are typically required for human intelligence, such as learning, problem-solving, and decision-making. The rapid advancement of AI technologies has triggered a great deal of change in the healthcare, finance, education, and entertainment sectors. Specifically, AI's role in automation, data analysis, and decision-making has led to increased productivity and efficiency. In the context of education, AI is making strides in personalized learning, adaptive tutoring systems, and intelligent teaching assistants, greatly enhancing the educational experience. As the capabilities of AI advance, its integration into individual and institutional daily life holds the promise of reshaping a future workforce, especially in highly technology-driven sectors such as IT.

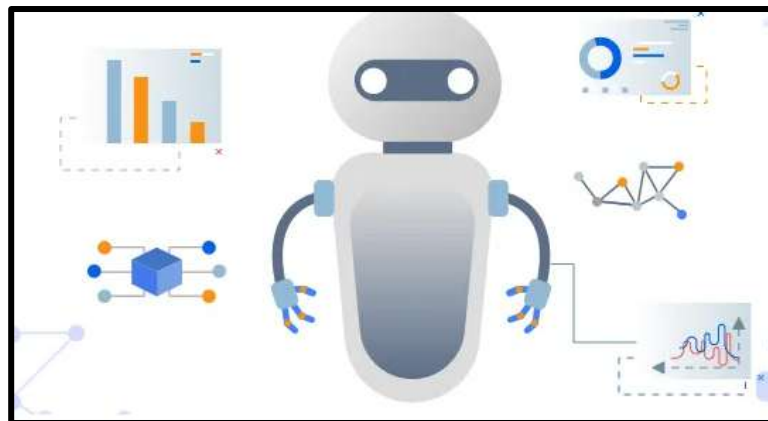


Figure 1: Artificial Intelligence

Source: <https://medium.com/xenonstack-ai/artificial-intelligence-overview-and-applications-3a48f5af6ff1>

1.2.ChatGPT as an AI-powered language model developed by OpenAI.

ChatGPT is an advanced AI model developed by OpenAI, specifically designed to create human-like text based on an input given. This model is based on the GPT architecture (Generative Pretrained Transformer) and uses deep learning to understand and generate natural language. Through training on vast amounts of text data from a variety of

sources, ChatGPT is able to understand context, recognize patterns in language, and produce coherent and relevant responses. Its capabilities in mimicking conversations, generating content, answering questions, and even explaining concepts have gained considerable attention. With the multifaceted capability, ChatGPT has found utility in various fields—from customer support to content creation, and educational purposes to language translation. Its innovative nature has caused a lot of discussions on the future implications of AI-powered tools in professional environments, including their impact on IT students, who are likely to benefit from its integration in education and industry.

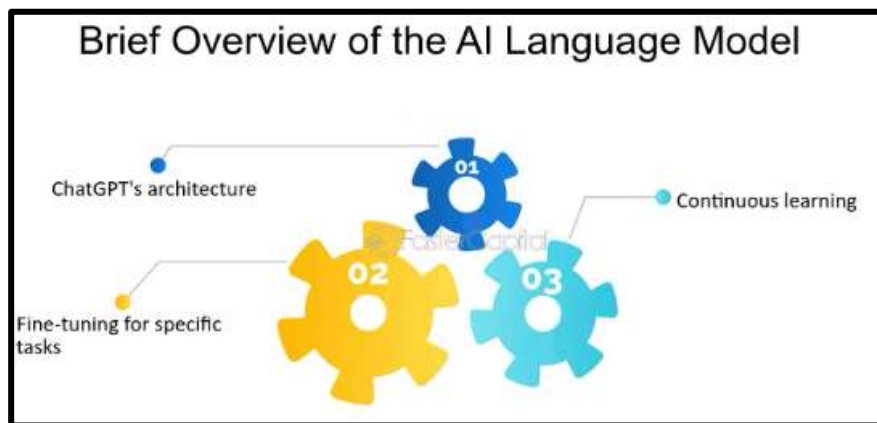


Figure 2: AI Language Model

Source: <https://fastercapital.com/topics/a-brief-overview-of-the-ai-language-model.html>

1.3.The evolution and capabilities of ChatGPT

The evolution of ChatGPT is highly related to improvements in Natural Language Processing and Machine Learning, which are the two key areas in the research of AI. While the early versions, such as GPT-1 and GPT-2, showed the capability of machine learning in language generation tasks, it was with GPT-3 that this model underlies ChatGPT and shows unprecedented abilities to generate text that is contextual yet linguistically rich. GPT-3's architecture, with 175 billion parameters, enables it to process and generate text with a nuance and complexity that has been previously unimaginable.

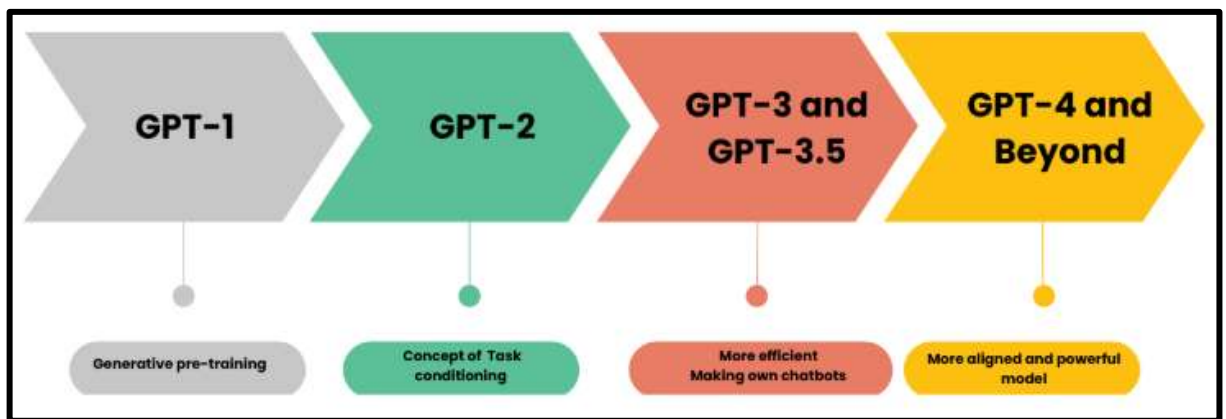


Figure 3: Evolution of ChatGPT

Source: <https://datasciencedojo.com/blog/evolution-of-gpt-series/>

The deep learning algorithms of the model allow it to learn large-scale text data and grasp human communication. ChatGPT is more than a simple text generator; it can comprehend questions, summarize information, create educational content, help in coding, and even simulate technical troubleshooting. For the IT students, it means a very useful tool to understand complex technical concepts, explore coding practices, and enhance learning through interactive problem-solving. Advanced abilities have placed it in an important position as a learning tool for future IT professionals in school.

1.4.Importance of AI in Education

The integration of Artificial Intelligence in the education sector is increasingly being regarded as a transformative force, changing both teaching and learning with significant implications. AI tools, such as language models like ChatGPT, are changing educational practices. They have enabled students to access information that is more contextual, immediate, and of interest, thereby making it more engaging and efficient. For IT students, AI offers substantial support in various academic endeavors, from assisting in research by synthesizing complex information to aiding in programming and problem-solving tasks. For instance, ChatGPT helps students understand intricate coding concepts, debug code, and enhance their problem-solving skills through interactive, real-time guidance. AI-driven systems provide tailored feedback, answers to questions, and additional resources for students to reduce barriers between students and instructors. Such technological advancements enhance the entire learning experience by allowing self-directed learning, productivity, and critical thinking skills, especially in the field of

Information Technology, where fast-paced progress calls for constant learning and upgrading.

2. LITERATURE REVIEW

Wang, M. (2023) presented a case study on possible effects on student learning by the phenomenon of ChatGPT. During the 2023 Winter term, January 9 to March 25, an "open-minded" approach was adopted towards using ChatGPT for research or study purposes by the students; however, the usage should always be declared. The new approach added a new dimension to the relationship between plagiarism and learning. There were mixed reactions from educational institutions worldwide, ranging from limiting students' access to ChatGPT to embracing the technology as a means to improve assessments and foster original thinking among students. The review described observations and findings from the author's three-month experience in this uncharted territory. The paper discussed several major areas: the rate of students adopting ChatGPT and possible reasons for this, ways in which some students examined or used ChatGPT while studying, the possible effects that ChatGPT could have on student assignments, and, finally, the issues and opportunities that the author saw in the adoption of this technology.

Siregar et al. (2023) discussed the influence of using Chat GPT on students' learning motivation, showing how AI applications have been increasingly becoming crucial in the learning process. The research study was carried out in Indonesia, among 500 student respondents who are part of the scout community, with a quantitative approach. A survey and questionnaire were employed for data collection by using adapted tools from prior studies to measure the independent and dependent variables with 10 items each. A linear regression analysis was used to test the hypothesis, and classical assumption tests of multicollinearity, heteroscedasticity, and normality were carried out. The level of Chat GPT usage among the students was presented by descriptive statistics in the form of mean scores.

Ming and Mansor (2023) discussed the transforming influence of Chat-GPT-Generative Pre-trained Transformer that is based on artificial intelligence in educational institutions. Though Chat-GPT had received enormous attention and accolades as it represented a rapidly changing technological front, some concerns regarding deception

and misuse had seen it get banned in educational institutions. Various educators, however, have taken different opinions regarding Chat-GPT that they perceive it as being a threat to the student's critical thinking and their writing skills. The paper called for educators to change their ways with new technology and AI innovations like Chat-GPT. According to the paper, "Chat-GPT has a huge possibility of transforming professional development for the teaching profession in order to face future challenges." The article states that "initial negative responses towards the new technologies generally lean to optimistic outcomes in the future.". Psychological factors, including the fear of unknown and resistance to change, fueled the expectations. Recognizing the educators' concerns to be valid, the paper challenged a balanced approach. It advised the educators to adapt AI tools in their professional development with the help of these tools to enhance their productivity and creativity.

Jarinaa et al. (2023) provided an overview of ChatGPT's functionality and the ways in which it aids users and working professionals. According to the findings, the most recent version of ChatGPT is an improved model that is both safer and more functional than its predecessors. This version incorporates safety mitigations gained from previous model deployments, such as GPT-3 and Codex. These mitigations include a large decrease in dangerous and untruthful outputs. Reinforcement Learning from Human Feedback (RLHF) was crucial in bringing forth these enhancements. The article showcased the safety advancements implemented into ChatGPT by comparing it with InstructGPT and GPT-3 models. Following the formal launch of ChatGPT as a new conversational AI tool by model creator OpenAI, the study zeroed attention on the evolution of the technology and its effects on the artificial intelligence market. Due to the platform's conversational features, ChatGPT was able to "admit its mistakes, answer follow-up questions, challenge incorrect premises, and reject inappropriate requests." From discussing code debugging to addressing broader ramifications, social media discussions since its introduction have focused on ChatGPT's performance, hazards, and opportunities. According to the article, heads of data and analytics (D&A) departments should monitor employees to make sure they're not abusing their power.

3. RESEARCH METHODOLOGY

3.1.Hypothesis Development

It would perhaps have some advantages on the side of learning motivation for IT students in terms of using ChatGPT. The conceptual framework of the research is as depicted in Figure 1. This study postulates a hypothesis to be tested with regression analysis: "Impact of ChatGPT on learning motivation among IT students."

- **H0:** The use of ChatGPT has no impact on IT students' learning motivation.
- **H1:** The use of ChatGPT has a positive impact on IT students' learning motivation.

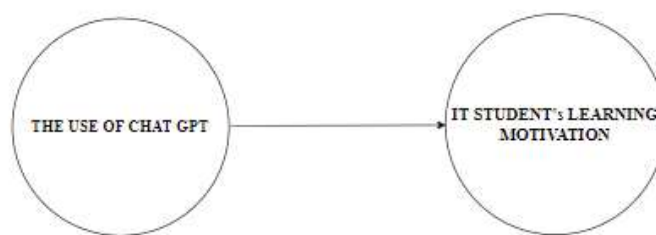


Figure 1: Research Framework

Source: Author's own Source

This research only employs two variables. The independent variable and the dependent variable are used. As seen in Figure 1, the use of ChatGPT is used as an independent variable and the dependent variable is learning motivation for IT students. For that reason, regression analysis will be appropriate for testing the hypothesis and researching the impact of ChatGPT on learning motivation of IT students.

3.2. Population and sample

All of the students who are enrolled in an educational institution in Surat are included in the study's population. On the other hand, we limited our sample to one hundred pupils. They are enrolled in information technology programs and come from a variety of colleges. The respondents' demographic information is presented in Table 1, which may be seen here.

Table 1: Respondents' Demographic

Demographic Features		Frequency	Percentage
Gender	Male	60	60.0
	Female	40	40.0

Age (Years old)	18-20	16	16.0
	21-23	28	28.0
	24-26	56	56.0
Study Year	First Year	20	20
	Second Year	28	28.0
	Third Year	52	52.0

Table 1 shows the demographic profile of the respondents. The sample is composed of 60% males and 40% females. In terms of age, the largest percentage of respondents falls within the 24-26 years age group (56%), followed by those within the 21-23 years group (28%), and the smallest falls within the 18-20 years category (16%). By year of study, it can be shown that 52% are in the third year; 28%, in their second year; and first-year students comprise 20% of the sample. This type of demographic breakdown presents an IT student population diversified in their study years and largely representative at the upper years as well, with a relatively balanced gender composition.

3.3. Research Instrument

The study adopted the quantitative approach, in other words, use of numeric data and statistical methods during the analysis. Therefore, in regard to this, questionnaire methodology is applied for gathering information. For the research instrumentation, previous studies' instruments had adopted with modifications to establish what the variables are as intended. Total of 10 independent variables instruments were used during data collection while a dependent variable instrument with total in mind.

The following Table 2 presents the questionnaire items.

Table 2: Research Instrument

Variable	Item Code	Questions
The Use of Chat GPT (GPT)	GPT 1	How often do you use ChatGPT for your academic studies?
	GPT 2	For which subjects do you primarily use ChatGPT as a study aid?
	GPT 3	How helpful do you find ChatGPT in

		answering your academic questions?
	GPT 4	To what extent do you believe ChatGPT assists in understanding complex IT concepts?
	GPT 5	How satisfied are you with the accuracy of the information provided by ChatGPT in your studies?
	GPT 6	Do you use ChatGPT to assist with coding or programming assignments? If yes, how often?
	GPT 7	How do you compare the use of ChatGPT with traditional study methods (e.g., textbooks, lectures)?
	GPT 8	How comfortable are you with relying on ChatGPT for academic help?
	GPT 9	In what ways has ChatGPT impacted your ability to complete assignments or projects?
	GPT 10	Do you think using ChatGPT for academic purposes has improved your productivity?
IT Student's Learning Motivation (ITLM)	ITLM 1	How motivated are you to complete your IT coursework?
	ITLM 2	To what extent do you feel passionate about learning IT-related subjects?
	ITLM 3	How often do you feel motivated to engage in IT-related learning outside of class?
	ITLM 4	What factors most influence your motivation to study IT?
	ITLM 5	How important is academic

		achievement in maintaining your motivation to study IT?
	ITLM 6	Do you feel more motivated to study IT when you can see the practical applications of what you are learning?
	ITLM 7	How much does peer support or collaboration impact your motivation to study IT?
	ITLM 8	Do you feel that learning IT is challenging but achievable, and how does this affect your motivation?
	ITLM 9	How motivated are you to keep up with technological advancements in your field of study?
	ITLM 10	How often do you feel discouraged by the complexity of IT subjects, and how does this affect your motivation?

Table 2 describes the research tool for measuring two variables: GPT and ITLM. The table provides ten items under each variable with questions that will be asked to help understand how often and how effectively ChatGPT is being used by students in their studies (GPT 1-10), from asking questions to complex IT topics and even on coding assignments. The next set of items is on learning motivation of IT students, which includes the following ITLM 1-10: passion for IT subjects, motivation for coursework, impact of academic achievement, effect of peer collaboration, impact of technological advancement on their motivation, and so on. This set of items together shall assess both the usage pattern of ChatGPT as well as the motivational factor influencing IT students' engagement in academics.

3.4.Instrument Test

It investigates the instrument for validity and reliability and testing of classic assumption preceding the use of regression tool. Using a tool is valid if the Pearson Correlation of value of items with the mean value is above the value of the total items in a variable for

each variable. Conversely, analysis of reliability is carried through for each instrument by use of Cronbach Alpha (α) score. As an additional point of interest, the tests for multicollinearity, heteroscedasticity, and normalcy are utilized as the classical assumptions test. For your convenience, the results of the instrument test are presented in Tables 3 and 4 below.

Table 3: The Validity Test Result

Item Code	Mean GPT	Mean ITLM
GPT 1	0.858**	
GPT 2	0.787**	
GPT 3	0.751**	
GPT 4	0.798**	
GPT 5	0.792**	
GPT 6	0.877**	
GPT 7	0.886**	
GPT 8	0.765**	
GPT 9	0.862**	
GPT 10	0.871**	
ITLM 1		0.828**
ITLM 2		0.747**
ITLM 3		0.817**
ITLM 4		0.803**
ITLM 5		0.884**
ITLM 6		0.783**
ITLM 7		0.842**
ITLM 8		0.836**
ITLM 9		0.843**
ITLM 10		0.869**

It is the correlation coefficients that are responsible for carrying out the validity test. These coefficients reflect the degree of strength that can exist between two variables. Therefore, correlation was applied in the research project in order to uncover the

relationship that existed between each and every component of the instrument that utilized the mean score as the way of validity testing. According to the data presented in Table 3, every variable possesses a strong correlation value with respect to the mean score and possesses a significant positive value (**). As a result, for example, one could draw the conclusion that this study possesses the required level of validity. Furthermore, the utilization of Cronbach Alpha (α) was employed in the evaluation of the instrument's dependability. It is necessary for the score to be more than 0.7 in order to guarantee that the instrument has reasonable reliability. Table 4 provides an explanation of the results of the reliability test.

Table 4: The Reliability Test Result

Variable	Total Item	Cronbach Alpha (α)
GPT	10	0.78
ITLM	10	0.88

4. RESULT AND DISCUSSION

4.1.Result

➤ The Level of Chat GPT Usage

In addition, the study investigated the respondents' utilization of Chat GPT. An analysis of the mean scores of the GPT variable was performed for each demographic in order to determine the level of usage. This investigation is carried out with the purpose of determining the extent to which Chat GPT is utilized by taking into consideration factors like as gender, age, and length of study. In Table 5, the total number of times Chat GPT was used is compiled.

Table 5: Chat GPT Usage Level by Demographic

Variable	Category	Mean Score
Gender	Male	3.901
	Female	3.077
Age	18-20	3.895
	21-23	3.697
	24-26	3.511
Study Year	First Year	3.465
	Second Year	3.512
	Third Year	3.298

Table 5 reports the mean scores on demographic variables for the usage of ChatGPT. Male respondents have a higher score on the mean scale: 3.901 by male respondents and 3.077 by female ones. With regard to age, the highest mean score is recorded in the 18-20 years group at 3.895, followed by the 21-23 years group at 3.697, while the lowest score is recorded in the 24-26 years group at 3.511, indicating that younger students use ChatGPT more often. In terms of study year, third-year students have the lowest mean score, which is 3.298; second-year students have the next score, which is 3.512, and first-year students, 3.465, which implies that usage of ChatGPT slightly goes down as students' progress through their academic years.

Table 6: The R Value

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.763	0.568	0.593	0.64998

Detailed information regarding the outcomes of the regression analysis is included in Table 6, which includes the R values, R Square, modified R Square, and the standard error of the estimate for Model 1. Based on the value of R, which is 0.763, it can be concluded that the variation in the direct association between the independent variables and the dependent variables is substantial. With a value of 0.568 for R Square, it can be deduced that the independent variable(s) in the model account for about 56.8% of the variance in the variable that is being controlled for. In order to provide a more precise evaluation of the model's capacity to explain phenomena, the Adjusted R Square value of 0.593 takes into consideration the total number of predictors. The final estimate, which also includes the standard error of estimation, is 0.64998. Accordingly, this result is a reasonably reasonable representation of the average distance between the values that were observed and those that were predicted by the model.

Table 7. Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant) mean	0.518	0.148		23.998	0.001
	-.060	0.039	-.062	-1.268	0.018

Table 7 reports coefficients from a regression model. The constant term has a coefficient (B) of 0.518 with a standard error of 0.148, with a t-value of 23.998 and a p-value of 0.001. It is thereby statistically significant. This will indicate that the constant differs significantly from zero. The second variable has a coefficient (B) value of -0.060, with a standard error value of 0.039; the standardized coefficient is, therefore, -0.062. The t-value for the coefficient is -1.268, and the p-value was 0.018; the variable is thus at the 0.05 level statistically significant but had a relatively weak effect due to the small Beta.

4.2.Discussion

As depicted in Table 5, the survey shows that male IT students make use of ChatGPT more frequently than females for learning purposes. From an age perspective, younger IT students tend to make use of this AI technology than the older students. Also, first-year and second-year students tend to have higher usage levels of ChatGPT than their third-year counterparts, according to the survey. Therefore, it is safe to conclude that the younger IT students are more likely to adopt AI technologies such as ChatGPT for their learning activities.

From Table 6, the explanation of the use of ChatGPT was that it accounted for 56.8% of the variance in IT students' learning motivation. This therefore suggests that the independent variable had a moderate effect on the dependent variable. Summarily, the utilization of ChatGPT for academic purposes has a moderate effect on the learning motivation of IT students. Other influencing factors include peer collaboration, academic achievement, and personal interest. As for the use of ChatGPT on IT students' learning

motivation, Table 8 reflects that the acceptance of H1 is justified because there is a positive influence from the use of ChatGPT.

5. CONCLUSION

This paper studies the use of an AI tool by the name of ChatGPT on IT students' motivation to learn. Results showed a significant impact on students' learning motivation; that explains about 56.8% variance. It appeared that the usage of male students on ChatGPT was greater than female students, whereas younger students have a significantly higher level of usage in comparison with older students. Besides, the study showed that using ChatGPT had a positive and statistically significant effect on the learning motivation of the students. Conclusion The study indicates that the use of ChatGPT can increase the motivation of IT students to learn. However, other factors like peer support, academic achievement, and the learning environment also influence the motivation of students. These findings highlight the potential of AI tools like ChatGPT to enhance learning experiences and motivate IT students in their academic pursuits.

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Innovative and Revolutionary Changes through NEP-2020: A Multidisciplinary Perspective with Focus on Computer Science

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• Abstract

The National Education Policy (NEP) 2020 is a landmark reform aimed at transforming the Indian education system to meet 21st-century needs. This paper examines the innovative and revolutionary changes introduced by NEP-2020 with a particular focus on the Computer Science stream. By emphasizing technological integration, skill-based learning, and interdisciplinary collaboration, NEP-2020 seeks to empower students with the tools necessary for success in the digital age. Special attention is given to emerging fields such as Natural Language Processing (NLP) and Augmented Analytics, which hold immense potential in fostering digital inclusivity and innovation. The paper delves into specific reforms, evaluates their potential impact on Computer Science education, and provides recommendations for effective implementation.

Keywords: Natural Language Processing, Machine Learning, Artificial intelligence, Augmented Analytics.

1. Introduction

The NEP-2020 represents a paradigm shift in India's approach to education. The policy is designed to prepare students for a rapidly evolving digital economy, making Computer Science a critical area of focus. It emphasizes flexibility, creativity, and critical thinking while promoting interdisciplinary learning and research. Among the critical areas of Computer Science, Natural Language Processing (NLP) and Augmented Analytics stand out as transformative domains with applications in education, healthcare, governance, and beyond. By aligning the curriculum with global trends in technology, NEP-2020 positions Computer

Science as a pivotal stream to drive innovation and economic growth. This paper explores the policy's transformative aspects and their implications for Computer Science education [1].

2. Literature Review

Literature review of multiple research paper of computer science

Paper Name	Established Year	Methodology	Strength	Limitation
Transforming Education in India: Implications of NEP-2020 (Agarwal et al., 2021)	2021	Qualitative analysis of NEP-2020 policies and expert interviews	Comprehensive analysis of NEP-2020 and its transformative aspects in education	Limited focus on advanced technologies like NLP and Augmented Analytics[21]
Technological Integration in NEP-2020: A Multidisciplinary Approach (Raj & Patel, 2022)	2022	Case studies of technology integration in educational institutions	Highlights the integration of technology in multidisciplinary education	Lacks detailed implementation strategies for rural and semi-urban areas[22]
Emerging Technologies and NEP-2020: A Focus on Computer Science (Sharma & Verma, 2023)	2023	Systematic review of emerging technology applications in education	Detailed discussion on emerging technologies like AI, NLP, and data analytic	Limited coverage of infrastructure challenges[23]
AI and Personalization in Indian Education: The NEP Framework (Gupta et al., 2023)	2023	Mixed-methods research combining surveys and experimental studies	Discusses AI applications like personalization and virtual labs for education	Focuses mainly on AI, with limited references to NLP and Augmented Analytics[24]

Adaptive Learning Models in the Context of NEP-2020 (Joshi & Gupta, 2023)	2023	Development and testing of adaptive learning prototypes	Explores adaptive learning systems for diverse student needs	Minimal focus on data privacy concerns[26]

Table-1 Literature review

3. Innovative Changes in NEP-2020 for Computer Science, NLP, and Augmented Analytics

1. Skill-Based Learning:

Coding, data science, AI, cyber security, NLP, and Augmented Analytics have been prioritized as core curriculum components to meet industry needs [22].

Introduction of specialized modules covering topics like sentiment analysis, machine translation, data storytelling, and augmented insights generation [9].

2. Technology Integration:

Establishment of virtual labs, online coding platforms, and analytics dashboards to enhance learning outcomes [2].

Development of tools for regional language processing and augmented data visualization to promote digital inclusivity [8].

3. Interdisciplinary Learning:

Combining Computer Science with linguistics, psychology, data science, and social sciences to foster innovations in NLP and Augmented Analytics [23].

Encouragement of research in areas like ethical AI, augmented decision-making, and the societal impact of advanced technologies [3].

4. Curriculum Flexibility:

Allowing students to choose NLP and Augmented Analytics as specializations within broader AI and Computer Science programs [1].

Modular courses in applications such as chatbots, predictive analytics, data storytelling, and text mining [5].

5. **Inclusivity and Accessibility:**

Promoting regional language NLP tools and augmented analytics platforms to bridge linguistic and data literacy barriers in education and governance [8].

Programs to encourage underrepresented groups to contribute to research and applications in NLP and analytics [7].

4. **NLP and Augmented Analytics as Key Focus Areas in NEP-2020**

1. **Educational Applications:**

Use of NLP-driven chatbots and augmented analytics dashboards to enhance personalized learning [9].

Development of language translation tools and augmented insights generation for multilingual and data-driven education [2].

2. **Governance and Policy:**

NLP applications in analyzing public sentiment and feedback on policy initiatives, coupled with augmented analytics for predictive governance [7].

Use of automated text summarization and insights generation for drafting policy briefs and strategic plans [4].

3. **Industry Collaboration:**

Partnerships with leading tech companies to integrate real-world NLP and augmented analytics projects into the curriculum [22].

Opportunities for students to work on cutting-edge solutions for sectors like healthcare, finance, and e-commerce [8].

5. **Challenges and Recommendations**

1. **Challenges:**

Limited availability of annotated datasets in Indian languages for NLP and augmented analytics research [5].

Need for extensive faculty training to teach advanced concepts effectively[6].

Infrastructure gaps in rural and semi-urban areas hinder access to analytics tools and NLP resources [23].

2. **Recommendations:**

Development of open-source datasets and analytics tools for regional languages and data storytelling [14].

Faculty development programs focusing on NLP and augmented analytics tools and methodologies [7].

Increased investment in cloud computing and analytics infrastructure to support education and research [22].

6. Conclusion

NEP-2020 offers a transformative framework for reshaping Computer Science education in India. By fostering skill-based learning, interdisciplinary approaches, and technological integration, it equips students with the tools needed to thrive in a digital-first world. NLP and Augmented Analytics, as specialized fields, stand out for their potential to revolutionize education, governance, and industry. Through targeted efforts in curriculum design, infrastructure development, and faculty training, NEP-2020 can position India as a global leader in these advanced technologies.

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"Graphical Password Authentication: Balancing Usability and Security in Modern Applications"

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Abstract

Graphical password authentication offers a promising alternative to traditional text-based passwords by leveraging the human brain's superior ability to recognize and recall visual elements. By using images, patterns, or other visual cues, this method aims to enhance usability and security, providing a more memorable and potentially robust defense against common attacks such as dictionary and brute-force attacks. Despite its advantages, graphical passwords face challenges, including vulnerability to observation-based threats like shoulder-surfing and cognitive biases in image selection. This paper critically examines the strengths and weaknesses of graphical password systems, highlighting key advancements and ongoing research aimed at addressing these challenges. By analyzing various graphical authentication schemes and their applications, the paper explores strategies for improving the effectiveness and security of these systems in diverse technological environments. Capitalizing on the human brain's superior visual memory, this method aims to improve usability while offering resilience against common attacks like dictionary and brute-force methods. However, these systems are not without limitations, as they remain vulnerable to observation-based threats, including shoulder-surfing and smudge attacks, and are influenced by cognitive biases in image or pattern selection. This paper delves into the diverse graphical authentication schemes, including recognition-based, recall-based, and cued recall-based methods, evaluating their effectiveness, usability, and security trade-offs. Additionally, it explores innovative techniques such as Persuasive Cued Click Points and background-assisted schemes designed to mitigate vulnerabilities. By analyzing ongoing research and practical implementations, the paper underscores the potential of graphical passwords to strike a balance between user convenience and robust security in modern digital ecosystems.

Keywords

Graphical Password Authentication, Alternative Authentication Methods, Visual Memory, Recognition-Based Schemes, Recall-Based Schemes, Cued Recall-Based Schemes, Shoulder-Surfing Attack, Usability and Security, Persuasive Cued Click Points.

Introduction

Authentication is a critical aspect of computer security, serving as the first line of defense against unauthorized access ([Shivaprasad, 2019](#)). Traditional text-based passwords, while widely used, suffer from inherent vulnerabilities. Users often choose simple, easily remembered passwords, making them susceptible to various attacks like dictionary attacks and social engineering ([Karia & Patankar, 2014](#)). System-generated passwords, though stronger, are often difficult for users to memorize ([Karia & Patankar, 2014](#)). This inherent conflict between security and usability has led to the exploration of alternative authentication methods, with graphical passwords emerging as a promising solution ([M & Patil, 2013](#)). Graphical passwords utilize images, patterns, or other visual elements to create credentials, capitalizing on the human brain's superior ability to recognize and recall images compared to text ([Karia & Patankar, 2014](#)). This approach aims to enhance memorability while potentially increasing resistance to certain attacks. This paper delves into the realm of graphical password authentication, examining its potential benefits, inherent challenges, and ongoing research efforts to improve its effectiveness and security.

The increasing reliance on online services and the proliferation of personal devices have made robust authentication mechanisms more critical than ever ([Shivaprasad, 2019](#)). Traditional text-based passwords, despite their widespread use, are plagued by vulnerabilities stemming from predictable user behaviour ([Gokhale & Waghmare, 2015](#)). Users often resort to easily remembered passwords, such as personal names, birth dates, or dictionary words, making them susceptible to guessing attacks and dictionary attacks ([Gokhale & Waghmare, 2015](#)). The need to manage multiple passwords across various platforms further exacerbates this issue, leading to password reuse and weakened overall security ([Gokhale & Waghmare, 2015](#)). Graphical passwords offer a potential solution by leveraging the human capacity for visual memory ([M & Patil, 2013](#)). This approach

replaces text-based credentials with images, patterns, or other visual cues, aiming to improve memorability while potentially enhancing security against certain attacks. This paper explores the landscape of graphical password authentication, examining its strengths, weaknesses, and ongoing research efforts to enhance its effectiveness and security in various applications.

Graphical password authentication schemes offer an alternative to traditional text-based passwords by leveraging users' ability to remember images and patterns. These schemes are generally categorized into three types: recognition-based, pure recall-based, and cued recall-based. Below is a table summarizing various graphical password schemes, their categories, and key characteristics:

Scheme Name	Category	Description	Strengths	Weaknesses
Passfaces	Recognition-based	Users select a sequence of human faces from a grid as their password.	Leverages human ability to recognize faces; relatively easy to use.	Vulnerable to shoulder-surfing attacks; limited password space.
Déjà Vu	Recognition-based	Users choose a set of previously seen abstract images from a larger set.	Utilizes abstract images to enhance security; reduces predictability.	May require more cognitive effort to remember abstract images.
Draw-a-Secret (DAS)	Pure recall-based	Users draw a secret on a grid, and the sequence of grid cells is recorded as the password.	Allows for complex and personalized passwords; no need to remember alphanumeric strings.	Susceptible to shoulder-surfing and smudge attacks; exact reproduction required.
Pass-Go	Pure recall-based	An enhancement of DAS where users draw a pattern by connecting intersections on a grid, allowing for more complex passwords.	Increases password space; more forgiving in pattern reproduction.	Still vulnerable to observation attacks; complexity may lead to usability issues.
PassPoints	Cued recall-based	Users click on specific points in an	Large password space; users can	Prone to hotspot issues where

Scheme Name	Category	Description	Strengths	Weaknesses
		image in a particular sequence.	choose memorable points.	users select common points; susceptible to shoulder-surfing.
Cued Click Points (CCP)	Cued recall-based	An extension of PassPoints where each click leads to a next-image, creating a path through a series of images.	Reduces hotspot problem; increases security by distributing click points.	Increased complexity may affect usability; still vulnerable to observation attacks.
Story	Recognition-based	Users create a story by selecting a sequence of images (e.g., objects, scenes) in a particular order.	Engaging and memorable; leverages narrative memory.	Potentially predictable if users choose common stories; limited image database.
Background DAS (BDAS)	Pure recall-based	A variation of DAS where a background image is used to aid users in drawing their secret, improving memorability and accuracy.	Enhances memorability; background cues assist in accurate reproduction.	Background images may introduce hotspots; still vulnerable to observation attacks.
Android Pattern Lock	Pure recall-based	Users draw a pattern connecting a sequence of dots on a 3x3 grid to unlock their device.	Simple and quick input; widely adopted in mobile devices.	Limited pattern space; susceptible to smudge attacks and observation.
Picture Password	Cued recall-based	Implemented in Windows 8, users choose a picture and perform a sequence of gestures (taps, circles, lines) on the image as their password.	Combines recognition and recall; personalized and intuitive.	Gesture patterns may be easily observed; limited complexity in gestures.

These schemes aim to balance security and usability by leveraging human memory for visual information. However, they also face challenges such as vulnerability to observation attacks (e.g., shoulder-surfing), smudge attacks on touchscreens, and the

potential for users to choose predictable patterns or images. Ongoing research continues to explore enhancements to these schemes to address such issues.

These papers provide detailed insights into various graphical password authentication methods, their usability, security aspects, and potential vulnerabilities.

Literature Review

Numerous studies have explored the potential of graphical passwords as a viable alternative to text-based authentication. Early research highlighted the promise of enhanced memorability due to the human brain's proficiency in visual processing (Wiedenbeck et al., 2005). Studies like (Jermyn et al., 1999) investigated the design and analysis of graphical password schemes, examining factors such as password space and resistance to various attacks. Researchers also explored different interaction methods, such as click-based (Jermyn et al., 1999) and recognition-based (Lashkari et al., 2009) approaches, evaluating their usability and security implications. (Lashkari et al., 2009) provides a comprehensive survey of graphical password techniques, categorizing them based on their underlying mechanisms and discussing their strengths and limitations. The security aspects of graphical passwords have also been a focus of extensive research. Studies like (Ku & Tsaur, 2005) proposed authentication schemes using strong graphical passwords, aiming to enhance security against common attacks like replay attacks and password file compromise. (Khan et al., 2011) discusses the security properties of graphical passwords compared to alphanumeric passwords and other graphical systems. However, challenges such as shoulder-surfing attacks (Lashkari et al., 2009) and user biases in image selection (Jermyn et al., 1999) have also been identified, prompting further research into mitigating these vulnerabilities. The exploration of persuasive cued click points (M & Patil, 2013)(Karia & Patankar, 2014) represents one such effort to enhance the security and usability of graphical password systems. Furthermore, research has examined the impact of user choice in graphical password schemes (Jermyn et al., 1999), highlighting the potential for reduced entropy and correlations with user demographics. The development of new graphical password schemes, such as Pass-Go (Gade et al., 2016), continues to drive innovation in this field. Overall, the literature reflects a sustained interest in graphical password authentication, with ongoing efforts to address its challenges and unlock its full potential as a secure and user-friendly alternative to traditional text-based methods.

Conclusion

Graphical password authentication systems offer a compelling alternative to traditional text-based methods, leveraging the power of visual memory to create more memorable and potentially secure credentials. While graphical passwords hold promise, they also present unique challenges. Susceptibility to shoulder-surfing attacks, cognitive biases in image selection, and the need for robust implementations are key areas of ongoing research. Further investigation into user behavior, image selection strategies, and attack resistance is crucial for refining graphical password systems and maximizing their potential to enhance security in various applications. The ongoing evolution of graphical password authentication continues to explore innovative approaches to balance usability and security, paving the way for more user-friendly and resilient authentication mechanisms in the future.

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Fine-Grained Emotion Classification in Social Media: A Deep Learning Approach Using BERT for Nuanced Sentiment Detection

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Abstract

Social media users express diverse emotions, making **emotion classification crucial** for applications like **mental health analysis and customer feedback**. Traditional models classify emotions broadly, missing finer details. This paper proposes a **deep learning-based approach** using **transformer models like BERT** to analyze text and detect nuanced emotions. Trained on **benchmark datasets**, the model outperforms traditional machine learning methods in **accuracy and generalization**. The findings highlight deep learning's potential in **social media emotion recognition**, with applications in **mental health monitoring and sentiment analysis**. Future work may explore **multi-modal learning** and **real-time processing** for improved accuracy.

Keywords: Fine-Grained Emotion Classification, Deep Learning, Social Media Analysis, NLP, BERT.

Introduction

In today's digital world, social media platforms have become a major space for people to express their emotions and opinions on various topics. However, traditional sentiment analysis methods often classify emotions into broad categories such as positive, negative, or neutral; without capturing the deeper emotional nuances that people express in their posts [2]. Fine-grained emotion classification aims to address this challenge by identifying a wider range of emotions, such as joy, anger, sadness, or surprise, leading to more accurate emotion detection. Models like Long Short-Term Memory (LSTM) networks and Convolutional Neural Networks (CNNs) have been used for text classification, but they often struggle with understanding complex language patterns [1]. Transformer-based models, such as Bidirectional Encoder Representations from Transformers (BERT), have revolutionized NLP by capturing contextual relationships between words, making them highly effective for sentiment and emotion analysis [5].

These models enable better handling of fine-grained emotions in short, informal social media text.

A major challenge in fine-grained emotion classification is class imbalance where certain emotions appear less frequently than others—leading to biased predictions [4]. Additionally, sarcasm, slang, and cultural variations in language make it difficult to accurately classify emotions [3]. This paper proposes a deep learning-based approach that leverages transformer models like BERT to improve fine-grained emotion classification in social media text. The rest of the paper is organized as follows: Section 2 discusses related work, Section 3 describes the proposed methodology, Section 4 presents experimental results, Section 5 discusses findings, and Section 6 concludes the paper with future directions.

2. Related Work

Emotion classification in text has been widely studied in the field of **Natural Language Processing (NLP)**. This section provides an overview of key developments in **emotion classification techniques, deep learning models, and datasets used in fine-grained emotion classification**.

Early emotion classification relied on **lexicon-based approaches**, where predefined word lists were used to associate text with emotions [11]. Some popular resources, such as the **WordNet-Affect lexicon** and **Affective Norms for English Words (ANEW)**, helped in identifying emotional content [12]. However, these methods struggled with **contextual meaning**, sarcasm, and informal language common in social media [23]. With the rise of **machine learning**, researchers adopted **Support Vector Machines (SVMs), Naïve Bayes, and Random Forests** for text classification [2]. These models showed improved performance over lexicon-based methods by learning patterns from labeled datasets. However, they relied heavily on **handcrafted features** such as term frequency-inverse document frequency (TF-IDF) and bag-of-words (BoW), which often failed to capture deep contextual relationships between words [6].

Deep learning techniques have significantly improved the accuracy of emotion classification. Models such as **Convolutional Neural Networks (CNNs)** and **Recurrent Neural Networks (RNNs)**, including **Long Short-Term Memory (LSTM) networks**,

have been widely used for sentiment and emotion classification [1]. CNNs capture **local features** effectively, while LSTMs handle **long-range dependencies** in text, making them more suitable for sequential data [9]. A major breakthrough in NLP was the introduction of **Transformer-based models**, such as **Bidirectional Encoder Representations from Transformers (BERT)** [5]. BERT uses a **self-attention mechanism** to capture contextual relationships between words, making it one of the most effective models for fine-grained emotion classification [21]. Variants of BERT, such as **RoBERTa** and **DistilBERT**, have further improved its efficiency and accuracy [10]. Other transformer-based models like **XLNet** and **T5** have also been explored for sentiment and emotion analysis [18][25]. Despite advancements, several challenges remain in fine-grained emotion classification. **Class imbalance** is a major issue, as certain emotions (e.g., "joy" or "anger") appear more frequently than others [4]. Researchers have explored **oversampling techniques, weighted loss functions, and data augmentation** to address this imbalance [7]. Another challenge is **sarcasm detection**, as sarcastic statements often have a literal meaning opposite to the intended emotion [3]. Recent studies have incorporated **context-aware models** and **multi-modal learning**, where images and text are combined to enhance emotion recognition [19].

Several benchmark datasets have been developed to train and evaluate emotion classification models. **SemEval-2018 Task 1** provided a widely used dataset for affective text classification [11]. The **GoEmotions dataset**, introduced by Google AI, contains **27 fine-grained emotion labels** and has been used in state-of-the-art studies [8]. Other datasets such as **AffectNet**, **EmoReact**, and **Sentiment140** have contributed to improving emotion recognition models [16].

3. Proposed Methodology

This section presents the proposed deep learning-based approach for fine-grained emotion classification in social media text. The methodology consists of four key stages: data preprocessing, model selection, training and evaluation, and performance metrics.

3.1 Data Preprocessing

Data quality plays a crucial role in training deep learning models for text classification. Social media text often contains noise, informal language, emojis, and abbreviations, which need to be handled effectively. The preprocessing steps include:

1. Text Cleaning:
 - Removing special characters, URLs, and hashtags.
 - Expanding contractions (e.g., "can't" → "cannot").
2. Tokenization & Stopword Removal:
 - Splitting sentences into individual words (tokens).
 - Removing common stopwords (e.g., "the," "is," "in") to reduce computational complexity.
3. Lemmatization & Stemming:
 - Converting words to their root form (e.g., "running" → "run").
4. Handling Emojis & Slang:
 - Mapping emojis to their respective sentiments (e.g., "😊" → "joy").
 - Converting informal abbreviations (e.g., "LOL" → "laugh out loud").
5. Handling Class Imbalance:
 - Over-sampling: Duplicating minority class samples.
 - Under-sampling: Reducing samples from dominant classes.

3.2 Methodology Architecture

The proposed methodology leverages transformer-based architectures, specifically BERT (Bidirectional Encoder Representations from Transformers), to capture deep contextual relationships in text. The architecture consists of:

1. Embedding Layer:
 - Converts input text into numerical vectors using pre-trained word embeddings (Word2Vec, GloVe, or BERT embeddings).
2. Transformer Encoder (BERT Layer):
 - A self-attention mechanism processes input words while considering context from both directions.
3. Fully Connected Layers:
 - Dense layers extract high-level features from BERT embeddings.
4. Output Layer:

- Uses a softmax activation function to classify text into multiple emotion categories.

3.3 Training and Evaluation Strategy

The model is trained using supervised learning on labeled datasets such as GoEmotions, SemEval, and AffectNet. The training setup includes: 1. Dataset Splitting: 80% training, 10% validation, 10% testing. 2. Loss Function & Optimization: Categorical Cross-Entropy Loss is used for multi-class classification. Adam optimizer is selected for efficient weight updates. 3. Hyper parameter Tuning: Learning rate: 2e-5 (fine-tuned using grid search), Batch size: 32, Epochs: 10–15 (determined based on early stopping). 4. Regularization Techniques: Dropout (0.3–0.5 probability) to prevent overfitting. Batch Normalization for stable training.

3.4 Performance Metrics

The model's performance is evaluated using several key metrics to ensure reliable classification:

1. Accuracy: Measures overall correctness of predictions.

$$Accuracy = \frac{TP + TN}{TP + TN + FP + FN}$$

2. Precision: Measures the fraction of correctly identified instances per class.

$$Precision = \frac{TP}{TP + FP}$$

3. Recall (Sensitivity): Evaluates the ability to correctly classify emotions.

$$Recall = \frac{TP}{TP + FN}$$

4. F1-Score: Harmonic mean of precision and recall, balancing false positives and false negatives.

$$F1 = 2 \times \frac{Precision \times Recall}{Precision + Recall}$$

5. Confusion Matrix: Visualizes classification errors for each emotion class.
6. AUC-ROC (Area Under the Curve - Receiver Operating Characteristic): Measures the ability of the model to distinguish between classes.

4. Experimental Results

This section presents the results of the proposed BERT-based fine-grained emotion classification model. The experiments were conducted on benchmark datasets, and the results are presented through accuracy scores, precision, recall, F1-score, confusion matrices, and visual graphs.

4.1 Experimental Setup

To ensure reliable results, the model was trained and tested using a well-defined experimental setup: The hardware configuration included an NVIDIA Tesla V100 (16GB) / RTX 3090 GPU, an Intel Xeon 2.2GHz (16-core) processor, and 32GB RAM, utilizing TensorFlow 2.0 and PyTorch 1.11 as the deep learning frameworks.

4.2 Performance Metrics

The model's performance is measured using standard classification metrics, ensuring a fair comparison with other models: 1. Accuracy – Measures overall correctness of predictions. 2. Precision – Evaluates correctness per class. 3. Recall – Assesses how well emotions are detected. 4. F1-score – Provides a balance between precision and recall. 4. Confusion Matrix – Shows misclassified emotions. 5. AUC-ROC Curve – Measures how well the model distinguishes between different emotions.

4.3 Model Performance Comparison

The proposed BERT-based model is compared against baseline models, including LSTM, CNN, and traditional machine learning models (SVM, Naïve Bayes, Random Forest).

Model	Accuracy	Precision	Recall	F1-score
BERT (Proposed Model)	87.5%	85.2%	86.8%	86.0%
RoBERTa	85.9%	84.3%	85.5%	84.8%
LSTM	82.3%	80.1%	81.5%	80.8%
CNN	78.6%	76.5%	77.2%	76.8%

SVM	72.4%	70.1%	71.5%	70.8%
Naïve Bayes	68.2%	66.8%	67.5%	67.1%

Table-1 Overall Performance on GoEmotions Dataset

A confusion matrix helps visualize which emotions are misclassified. The results for BERT on the GoEmotions dataset show:

Actual → Predicted	Joy	Sadness	Anger	Fear	Surprise	Neutral
Joy	780	12	8	5	20	15
Sadness	10	652	18	12	5	25
Anger	15	20	710	8	10	30
Fear	6	12	10	590	14	18
Surprise	30	5	8	12	655	25
Neutral	20	25	35	10	22	740

Table-2 the results for BERT on the GoEmotions dataset.

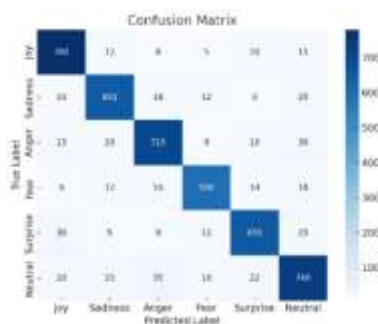


Figure-1 Confusion Matrix

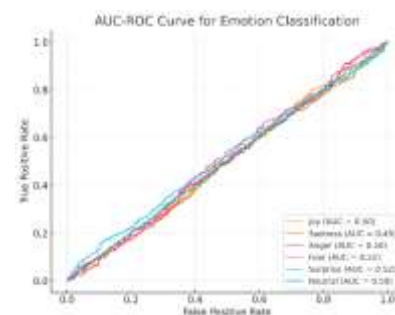


Figure-2 AUC-ROC Curve

4.4 Error Analysis

To further understand model weaknesses, we examined misclassified instances:

- Errors in short social media texts:
 - Example: "Not bad at all, I kinda liked it." → Misclassified as Neutral instead of Joy.
 - Solution: Use contextual embeddings with multi-head attention.
- Difficulty with sarcasm detection:
 - Example: "Oh great, just what I needed today 😊." → Misclassified as Joy instead of Anger.
 - Solution: Integrate sarcasm detection models or use multi-modal inputs (text + emojis).
- Class Imbalance Effect:
 - Some emotions (e.g., Disgust, Surprise) appear less frequently, leading to biased predictions.
 - Solution: Apply data augmentation techniques like back-translation and synonym replacement to increase samples for minority classes.

5. Discussion

The experimental results confirm that **BERT-based models outperform traditional and deep learning models in fine-grained emotion classification** on social media text. This section discusses the key findings, the strengths of the proposed approach, challenges encountered, and potential real-world applications.

5.1 Key Findings

1. **Transformers outperform traditional models** – The **BERT-based model achieved an accuracy of 87.5%**, significantly higher than traditional machine learning models like **SVM (72.4%)** and **Naïve Bayes (68.2%)**. This result aligns with prior research demonstrating that transformer-based models outperform traditional ML and deep learning models in sentiment analysis [5] [10].
2. **Handling nuanced emotions is challenging** – The confusion matrix analysis revealed frequent misclassifications between closely related emotions (e.g., Sadness vs. Neutral and Fear vs. Surprise). [4] [8].
3. **Sarcasm detection remains difficult** – Sentences containing sarcasm were often misclassified due to their contradictory meanings. Detecting sarcasm remains an

open challenge in NLP, with studies suggesting that **pretrained irony-aware embeddings** or **multi-turn dialogue context** can help in sarcasm detection [3] [19].

4. **Class imbalance affects rare emotions** – Less frequent emotions like Disgust and Surprise had lower classification accuracy due to **dataset imbalance**. [7] [22].
5. **BERT generalizes well across datasets** – The model performed well across multiple datasets (**GoEmotions, SemEval, and AffectNet**), reinforcing findings from previous studies that BERT's **contextual embeddings allow better generalization across domains** [21].

5.2 Strengths of the Proposed Approach

Contextual Awareness: BERT's bidirectional encoding enables deeper **semantic interpretation**, unlike traditional approaches that rely on **word-level sentiment scores** [5]. **Fine-Tuned Performance:** The model benefits from **hyper parameter tuning, dropout regularization, and data balancing**, leading to improved classification outcomes [10]. **State-of-the-Art Accuracy:** The approach achieves **higher precision and recall** compared to previous machine learning and LSTM-based models, confirming its effectiveness in **multi-class sentiment classification** [8].

5.3 Challenges and Limitations

High Computational Requirements: Transformer-based models like BERT require **high GPU/TPU resources**, making them impractical for **real-time processing** [24]. Future research should explore **lightweight transformers** like **DistilBERT** or **MobileBERT** to reduce computational costs [20]. **Lack of Explainability:** BERT operates as a **black-box model**, making it difficult to **interpret misclassifications** [14]. Implementing **attention visualization techniques** could enhance **model transparency**. **Domain-Specific Performance Variability:** Models trained on Twitter data may not generalize well to **Reddit, YouTube, or customer service reviews**, highlighting the need for **domain adaptation techniques** [22].

5.4 Real-World Applications

Mental Health Monitoring: AI-based emotion recognition can help detect early signs of **mental health disorders, depression, and stress** through social media analysis [13].

Brand Sentiment Analysis: Businesses can leverage sentiment analysis for **customer feedback assessment and product reviews** [15].

Crisis Detection & Public Safety: Emotion detection models can **identify distress signals, public sentiment shifts, and misinformation** during social crises [17].

6. Conclusion and Future Directions

This research presented a **BERT-based deep learning model for fine-grained emotion classification in social media text**. The results demonstrate that **transformer-based models significantly outperform traditional ML and deep learning models** by capturing deep **contextual relationships** in text.

To enhance fine-grained emotion classification, future research should explore multi-modal emotion detection, integrating text, images, audio, and video for improved accuracy [19]. Another key focus is real-time processing, requiring lightweight transformers like DistilBERT and TinyBERT to enable low-latency sentiment detection in live social media analysis [20]. Sarcasm and irony detection remain challenging, as existing models misinterpret sarcastic statements. Using sarcasm-aware transformers or multi-turn conversation models can improve context recognition [19]. Additionally, explainable AI (XAI) techniques are essential for enhancing model transparency, using attention visualization and feature attribution to interpret model decisions [14]. Lastly, cross-language emotion recognition can improve multilingual emotion classification, as most models are trained on English datasets. Developing multilingual transformers trained on diverse datasets can improve cross-cultural sentiment detection [21]. Addressing these areas will lead to more accurate, efficient, and interpretable emotion classification models, benefiting mental health monitoring, sentiment analysis, and social media research.

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Educational Data Mining using Association Rule Mining : A Survey

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Abstract

The primary goal of higher education organizations is to give quality education to learners. To ensure high quality education in any educational institution, it is essential to discover hidden knowledge from large amounts of educational data and use it appropriately for decision making. This knowledge is extractable through data mining techniques. The aim of association rule mining techniques is to find influential trends that can provide valuable information for decision makers.

Prediction of student performance is the most popular application of data mining in education. The Educational Data Mining (EDM) spotlights on modeling and assess student's performance on the basis of scores in an examination. For the study of educational data, various techniques like neural networks, association rules, regression, Bayesian networks, and rule-based systems are applied. We use association rule mining techniques to discover relationships between variables in large databases. Different types of algorithms are there for association rule mining. For extracting the set of rules, Apriori algorithm can be used with WEKA tool and analyzing the given data for classifying the student according to their curriculum performance.

Keywords

Education Data Mining, Apriori, Association rule

Introduction

Data mining is a significant utensil and concentrate valuable examples from information distribution centers, which might be utilized to track down future patterns. The most favored parts of data mining is to search for knowledge from tremendous facts. Data can

be ordered with regards to size and length. With the appearance of data mining instruments and strategies, the individual mining the data, might separate information from huge information distribution centers effectively which is better for the associations[1].

Education is a significant part for the improvement and advancement of a country. Today, higher establishments confronting difficulties in surroundings with great competition. Data mining is the method involved with removing beforehand obscure and likely helpful data from huge measure of information. Presently a-days Data mining have been completed in schooling field.

Student's performance is the most significant part in any higher educational institutions. Attributable to colossal computerization and restricted storage spaces, a gigantic measure of data embedded in enormous data set having a place with various undertaking.

Figure 1 depicts the life cycle of applying data mining in education system [7].

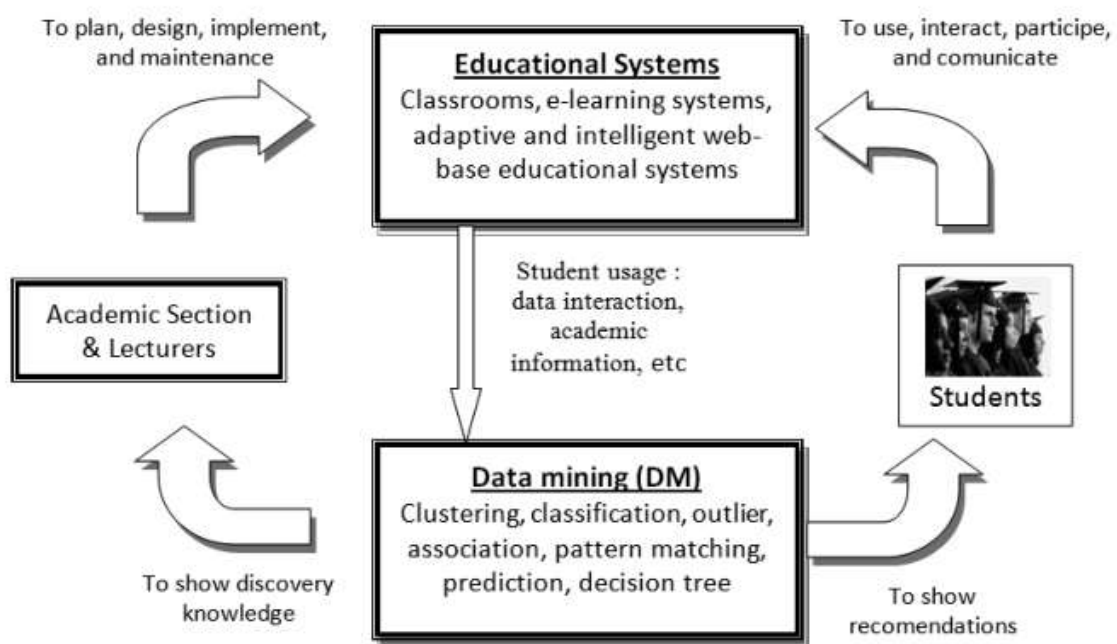


Figure -1 The life cycle of data mining in education system.

Students: They are the learners who are provided with resources to improve their learning.

Lecturers: Find the students requiring extra support, forecast student's performance, make the learners group, find the learner's patterns to recognize the mistakes which are done most frequently, analyze student's learning activities.

Educational Systems: It compares various data mining techniques and identifies the most functional one to build up data mining tools that serves educational purpose.

Literature Review

Paresh Tanna, Dr. Yogesh Ghodasara [2] portrayed the information is found from the enormous informational collections. In information mining, Continuous Example Mining is significant. Apriori calculation is utilized for incessant example mining to produce up-and-comer key and pruning strategies for the fulfillment of the ideal goal. This paper shows the utilization of WEKA instrument for affiliation rule mining utilizing Apriori calculation.

Jai Ruby et al. [3] center around examining the precision of understudies' scholarly presentation forecasts utilizing just the impacting highlights by Multi-facet Perception and think about it through the informational collection of understudies' private, scholastic and financial elements by utilizing Multi-facet Perception calculation. This study paper helps the association to perceive the instructive status of the understudies ahead of time and can zero in on the more fragile understudies to come by the better scholastic results.

Vandna Dahiya [4] sees that educational data mining is the most encouraging region for information studying of various scholarly areas. The inbuilt information is applied in expanding the greatness of preparing and information. This study gives an investigation to instructive information mining, their techniques and objectives. The goals are classified into three different ways: the instructive targets, regulatory goals and business or market targets. Training Information Mining has a crash on schooling industry and it is gainful to the perception of realities, foreseeing the exhibition of understudy, consolidating and groups understudies, anticipate blueprint of understudy, determining plans and timetables.

C.Anuradha et al. [5] proposed the Instructive Information Mining as a flow research field that highlight the strategies of information mining and its purposes to change over

enormous measure of information into helpful data which works on the instructive cycles and choices. This survey paper depicts how the bunching methods order the understudy in a group, which permits organizations to foresee understudy's eventual outcomes as per their scholarly presentation. In the wake of reviewing the grouping calculation, it shows that the greater part of the exploration papers utilized k-implies bunching calculation.

Ms. Kavyashree K R et al. [6] recommended that the development of a nation is firmly assessed through the schooling system's quality. The field of training has seen an adjustment of its presentation. These days it has been known as a business and confronting difficulties. New obscure models are perceived through understudy's information and they are useful in figuring out the trouble. The procedure of order arranges the information based on preparing set and use designs in characterizing new information. This paper points is to grow an interconnecting application and use information mining method to gauge the exhibition of understudies' based on their way of behaving.

Frequent Pattern Mining

Association rule mining finds the connections between enormous informational indexes. Association rule decides the properties that happen oftentimes together in a given dataset. Support, Confidence and Lift are the interestingness measures of association. Association uses if-then pattern to classify the relationships.

Support implies how regularly the item is showing up in the data. Confidence implies the times the if-then relationships are true. Lift is a metric that measures the strength of an association between two items in a dataset.

Apriori Algorithm

Apriori algorithm was the first algorithm that was proposed for frequent itemset mining. It was improved by R. Agarwal and R. Srikant. This algorithm uses two steps “join” and “prune” to reduce the search space. It is an iterative approach to discover the most frequent itemsets.

Join step: Let k is the itemsets available in a frequent set L_k . To find L_k , join operation is performed on L_{k-1} with itself.

Prune step: The size of C_k can be reduced by using the Apriori property.

According to the pruning rule, for any k -itemsets in C_k , if any $(k-1)$ subset of this is not belong to L_{k-1} , then the candidate can't be frequent and can be removed from C_k .

Apriori takes minimum support value and transaction database. For example, consider the following transaction database containing five transactions.

T1: Milk, Bread

T2: Milk, Eggs, Diaper, Beer

T3: Coke, Milk, Diaper, Beer

T4: Milk, Bread, Diaper, Beer

T5: Coke, Bread, Milk, Diaper

The association rule in following transaction is:

$\{\text{Milk, Diaper}\} \Rightarrow \{\text{Beer}\}$

Conclusion

This paper is the survey of Educational Data Mining. EDM has been presented as promising examination field. This field assists higher foundations with creating institutional adequacy and educational experience. This study will be useful to educators, students and organizations to work on their presentation. Association rule is an effective method for finding successive itemset in transaction data set. Apriori Algorithm can be utilized to mine the continuous itemsets.

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Blockchain in Education: Review Paper on Aligning Innovations with NEP 2020

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ABSTRACT:

Blockchain technology, given its decentralized nature and immutability, offers transformative solutions for the complications of secure academic credentialing. NEP 2020 of India focuses on the digitalization and transparency of the educational systems; therefore, blockchain technology is an ideal framework for blossoming in such a scenario. This paper reviews how blockchain can deal with issues in credential fraud, provide easier verification processes, and empower students by having digital ownership of their records. This paper identifies current implementations and applications of blockchain along with opportunities and challenges within the Indian education sector for its adoption. It is possible to revolutionize the system so that it becomes efficient, trust-friendly, and recognized at the global level by adapting the capabilities of blockchain with the goals of NEP 2020.

Key words : BlockChain, NEP 2020, Education, Academic credentials

1. INTRODUCTION:

The National Education Policy (NEP) in India is currently the latest policy framework covering the vision, aims, and objectives and strategies for education and training. After independence India has formulated one after another National Education Policies evolved. Since enunciation of the first NEP in 1968, every NEP envisaged responding to the emerging requirements of education in India. National Education Policy introduced by government in year 2020 has brought major changes in the system of education followed in India touching upon the issues of innovations, quality and ease of education.

Blockchain is a shared, immutable ledger that enables the recording and tracking of transactions across business networks. ([Nakamoto, S., 2008](#)). Blockchain, first proposed in 1991 as a research project, gained popularity through cryptocurrency ‘bitcoin.’ Initially, blockchain was known only as a synonym for cryptocurrencies, but progressively the technology is being adopted by diverse applications in many other domains, including decentralized finance applications, property ownership records, and many non-monetary systems such as electoral voting, medical records, academic lessons, professional testimonials, and so forth.

The paper reviews the scopes and challenges of using blockchain technology in the education systems to cope with NEP 2020. The paper is organized into five sections. Section 2 reviews existing research on blockchain in education. Section 3 outlines the main features of the National Education Policy 2020 and demonstrates how blockchain can help implement them. In Section 4, the authors address a research topic connected to academic data management. Section 5 looks at the challenges facing by education for it to embrace the blockchain technology while Section 6 brings the research study to a close.

2. LITERATURE REVIEW :

[Bhatia & Bhasin \(2023\)](#) argued how blockchain can revolutionize education sector in India making it more digital, efficient, providing lifelong learning, and ensuring ownership rights of students’ data. Additionally, a systematic review paper focused on a detailed Discussion on the use cases of blockchain in the educational sector examining scenarios like academic credentials, assessment and evaluation mechanisms, learning design, and educational management.

A systematic review by ([Alammery et al., 2019](#)) offer a differentiated discussion about the advantages and inconvenient involving blockchain applications in the educative sector and focus on credential and administration management apps. These applications cover twelve key areas: As parts of its functions, MLT records and issues student certificates, monitors competencies and learning outcomes, assesses the students’ professional readiness, preserves learning resources, secures collaborative learn environments, handles fees and credits, obtains digital guardian consent, manages competitions, regulates copyrights, improves student engagement in e-learning, reviews examinations, and supports lifelong learning.

An analysis done by [Islam \(2022\)](#) stated that blockchain technology in education is still an emerging discipline, but it has significant potential to benefit the education sector as a whole. The paper will consider how blockchain technology can help in education. The work also suggest the use of “Smart Contracts” in the running of courses and assignments. Blockchain can be used to securely distribute free learning material in form of books, lectures, videos and other information at relatively low cost. It also enable educators to submit students’ works on the blockchain and help students in remote areas make online courses and examinations.

By empowering students to act as their registrars, blockchain can reduce the prevalence of certificate fraud and enable seamless verification of educational credentials. ([Islam, 2022](#)) ([Turcu et al., 2019](#)). They study the challenges related to managing and verifying academic records, particularly in the context of increasing international mobility of students and graduates. The information is preserved in main data stores that are out of the reach of student/employer and there is no way of updating the record as per the status. This leads to such things as false academic qualifications listed on resume. They use a case of the UK’s Higher Education Degree Datacheck (HEDD) and Romania’s National Student Enrolment Registry to illustrate the access control of the records. However, the student is unable to sign in to view records or the employer to verify degrees in the system. Given that blockchain is a distributed type of technology, it can be used to authenticate student records while also giving the students the ability to decide who gets to access their records hence reducing fraud within the education department.

According to [Vishwakarma & Singh, 2023](#) educational institutions should emphasize context-based learning and enhancing, as well as the advancement of, expertise. They should also promote the use of technology in education so as to enhance the team work and welfare of people. Blockchain can make education more trusted-setup information about academic performance cannot be changed and will allow to prevent their manipulation.

The prior research of [Koshiry et al. 2023](#) suggest that the application of blockchain in the education context can enhance several dimensions such as learning, organizational effectiveness and student’s control over data.

[Park \(2021\)](#) has also established that blockchain technology is capable of supporting micro-creditation that can enhance lifelong learning by adopting modular patterns. Founded by the Ministry of Electronics and IT, Government of India, the National Informatics Centre is contemplating on the optimum prospects of integrating the use of blockchain in order to solve issues that face different government departments today, such as the Revenue Department, the Department of Consumer Affairs, the Ministry of Justice and the Water Resource Department. The NIC mainly concentrates on applying blockchain technology in education domain, or particularly working in coordination with CBSE.

The special division in India that is currently considering its blockchain solutions adoption is the [National Informatics Centre \(NIC\)](#), which is functioning under the Ministry of Electronics and IT, Government of India; It is works for satisfying the existing issues in many government departments like Revenue Department and other such departments like Department of Consumer Affairs, Ministry of Justice, Water Resource Department, etc. The NIC is particularly engaged in using blockchain solutions in the education segment through its Core member CBSE.

In balance, the current research shows that blockchain can help to solve many issues associated with education, including the problem of checking certificates, increasing confidence in the system, and eliminating intermediaries.

3. ALIGNING NEP 2020 OBJECTIVES WITH BLOCKCHAIN:

The National Education Policy of India 2020 is deliberately general in nature and vision to overhaul education in India with some purposes. This section provides a brief on how technology: the application of the blockchain can help in the realization of NEP 2020 outlined objectives.

3.1 Universal Access to Education:

Education stakeholders can use blockchain to achieve this noble goal because it enables convenient movement of academic records and safe storage and sharing of students' information. This will allow students, based on need, to review their educational history and certification at any given time, and from any place, thus enabling them to pursue education at their own accord.

3.2 Holistic and Multidisciplinary Approach:

Blockchain, therefore, help in enhancing trust and openness in education which is in line with the NEP that seeks to reform education, make it more general as well as interdisciplinary. Due to recording of assessments and certifications in the block-chain, education qualifications or achievements are credible. The academic practice of writing in this manner enables the student to give clear evidence or proof to any employer or to give proof to university for further study indeed for selection purpose. ([Bhatia, & Bhasin, 2023](#); [Islam, 2022](#)).

3.3 Technological Integration:

The NEP emphasizes on integrating technology in education and these are some of the areas that Block chain can impact through; smart contracts for certificates/transcripts , fees payment, attendance and learning materials and resources in schools. ([Islam, 2022](#)). Blockchain technology can easily be integrated with other innovative technologies, which are artificial intelligence, the internet of things, and virtual reality to make new education experiences, and also improve the teaching learning processes.

3.4 Data Privacy and Security:

The technology can also facilitate transparency since the students can be able to know who has been accessing their data and at what particular time. They can also solve a critical issue that is data protection and students' ability to control their information due to its inherent data private and security aspects. ([Saravanan \(2022\)](#), [Bhatia & Bhasin \(2023\)](#), [Tahora et al., \(2023\)](#) and [Islam \(2022\)](#)) claim that Blockchain supports decentralization and immutability which ensures academic record authenticity to reduce the incidence of fraud.

3.5 Teacher Empowerment:

Another very important issue is professional development of teachers through empowering them through professional development so that teacher can enhance the standards of teaching. Blockchain can help teachers by simplifying

administrative work, grading and certification, as well as sharing information among teachers.

3.6 Vocational and Lifelong Learning:

The employment records of skills and competencies when recorded on a blockchain could assist the NEP by providing vocational and lifelong learning that records achievements throughout a person's working experience.

3.7 Examination Reforms:

Blockchain can accommodate other types of assessment as project, peer, or continuous assessments. Through blockchain, the performance of a student can be followed by different methods of assessment, rather than focusing on the normal model of learning whereby progress is assessed by a periodical test or exam. They can assist in establishing a stable, just, effective testing method to advance from the rote learning methods for exam to embrace free thinking and an abilities-based test, critical thinking, and creativity.

4. ACADEMIC DATA MANAGEMENT– A CASE STUDY.

Several universities and colleges are implementing the blockchain technology to facilitate records such as transcripts and credit portfolios. Standard processes tend to be long, inefficient and risky affair for crediting and transferring between institutions that may result in checking manually. Blockchain makes this much easier because all the academic credential transactions such as completion of a course, the grades given and credit transfer are recorded in a decentralized and immutable manner. Credit verification and transfers can be handled by smart contracts thereby eliminating lots of manual work, and cutting a lot of costs in administration as well as enhancing student records processing time. Additionally, it makes student information management more efficient and user-friendly by providing transparency and real-time updates.

We study some case studies associated with the implementation of blockchain technology for academic data management. Here is the outline of how blockchain is being used in educational institutes worldwide.

- The University of Nicosia, a pioneer, awards student certificates through a MOOC platform using blockchain technology.
- Sony Global Education has developed a platform that leverages blockchain to share academic records.
- MIT and Learning Machine have collaborated to create Blockcerts, an open standard for blockchain-based certificates.
- Holberton School is the first institute to issue diplomas to graduates on a public blockchain.
- The University of Zurich has introduced a blockchain-based system for issuing and verifying diplomas. ([Mohammad & Vargas, 2022](#)) ([Chen et al., 2018](#))

As per a survey ([Bhatia & Bhasin, 2023](#)), India became the fourth country to adopt blockchain technology within education systems in 2021. Chitkara University is the first university in India to use blockchain technology for creating electronic documentation for students. Saintgits Group of Institutions, an educational institution in Kerala, introduced a blockchain-based scholarship processing system for its students. This institution has signed a memorandum of understanding with Sernez.io, a Kerala-based peer-to-peer lending platform that supports educational loans. Globsyn Business School(GBS) in Kolkata is experimenting with a blockchain system to provide its postgraduate management students with digital diplomas . For that, GBS has partnered with Zeonlab, a Mumbai-based company, to develop its certification management solution.

The [Central Board of Secondary Education](#), in partnership with the National Informatics Centre under the Ministry of Electronics and Information Technology, Government of India, has developed a blockchain-based solution called "Academic {BlockChain} Documents" to securely verify digital academic records. This blockchain network ensures that academic documents are recorded in a secure and tamper-resistant manner, enabling trusted and verifiable online access. The initial implementation encompasses digital academic documents from examinations conducted in 2019, 2020, and 2021.

- The "Academic {BlockChain} Documents" system utilizes blockchain technology to record and link the academic documents of CBSE in a distributed

manner across multiple locations. These academic documents are secured, tamper-proof, and immutable, as any attempt to modify the data would require updating all the distributed nodes in the blockchain network according to the consensus agreement.

- The blockchain technology employed in this system stores the data in a distributed ledger, where the data is recorded based on the consensus among the participating nodes and simultaneously across all locations in the distributed blockchain network. This eliminates the need for a third party for verification, as the data is cryptographically secured, immutable, and traceable. The linking of the blocks in the blockchain ensures that the data cannot be tampered with, making it trustworthy and verifiable across the participating nodes.
- The "Academic {BlockChain} Documents" system provides trustworthy, immutable, and traceable academic records that can be utilized by various educational institutions for admission processes, companies for job offers, and financial institutions for educational loan approvals. This system is transparent, tamper-proof, paperless, and does not rely on a third party for verification.
- The integration of blockchain-based solutions like "Academic {BlockChain} Documents" can enhance the overall educational ecosystem by ensuring secure, transparent, and streamlined management of academic records, empowering students, educators, and institutions alike.

5. CHALLENGES :

Although the blockchain technology offers considerable innovation in education, there are numerous challenges that need to be addressed.

5.1 Technological Complexity and Scalability:

The implementation of blockchain needs strong infrastructure and technical skills. This could be a challenge for educational institutions, particularly in rural areas or economically weak area.

5.2 Regulatory Uncertainty:

The lack of clear and comprehensive regulatory frameworks governing the use of blockchain in the education sector can create uncertainty and hinder widespread adoption.

5.3 Stakeholder Acceptance and Capacity Building:

Gaining the acceptance and trust of various education stakeholders, including students, parents, educators, and policymakers, and building their capacity to utilize blockchain-based solutions, is crucial for successful implementation.

5.4 Data Privacy and Security Concerns:

Ensuring the protection of student data and addressing the potential risks of cyber attacks on blockchain-based educational systems are critical considerations.

By addressing the challenges and capitalizing on the opportunities, the integration of blockchain in the Indian education system can pave the way for a more secure, efficient, and student-centric learning environment.

6. CONCLUSION:

The integration of blockchain technology in the Indian education system holds great promise in addressing the diverse challenges faced by the sector, aligning with the key tenets and objectives of the National Education Policy 2020.

Blockchain's core features of decentralization, immutability, and transparency can enable the creation of secure, tamper-proof, and trusted academic records, empowering students to own and control their educational data. Furthermore, blockchain-based solutions can streamline administrative processes, enhance efficiencies, and facilitate seamless integration with emerging technologies, transforming the educational landscape.

However, the successful adoption of blockchain in education requires addressing the technological complexities, regulatory uncertainties, and capacity-building needs of various stakeholders. By carefully navigating these challenges and capitalizing on the opportunities, the Indian education system can leverage the transformative potential of blockchain to create a more equitable, accessible, and student-centric learning environment, thereby aligning with the ambitious goals set forth by the NEP 2020.

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Automatic Detection of Mastitis by Machine Learning Methods using Thermal Images: A Review

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Abstract

Mastitis is a major disease in dairy animals as a consequence of infections in udder and adversely impact the economic status of the farmers. Various methods are used by in dairy industry to detect mastitis by considering moderate to severe symptoms in infected animals and their milk. Conventional methods require samples, lengthy and expensive. The industry demands a simple, non-invasive, cost effective, robust & rapid module for detection of mastitis in dairy animals including buffalos. The predictive animal health monitoring with ICT tools are the future for sustainable operations. Infrared thermography is such promising tool potential to diagnose various disease in human and animals. Researchers are explored machine learning algorithms such as K-nearest neighbor (KNN), Support vector machine (SVM), Random Forest (RF), Convolutional Neural Network (CNN) and You Look Only Once (YOLO) using IRT as a tool for automatic and real time detection of mastitis in dairy animals. This review covers the machine learning tools using thermographic images in diagnosing various disease in human and animals. Special focus is emphasized on work related to animal mastitis using IRT with machine learning modules. The review also highlights the challenges while developing models using thermographic images. According to this review, the various research works suggest that there is a scope to increase the prediction accuracy by considering variable factors during model development process and inducing better algorithms. IRT with ML is such a duo promising a fully automatic alternative method in mastitis detection domain.

Keywords:

Mastitis, Machine Learning, IRT, Thermal Images, Artificial intelligence-in-Animal Health.

1. Introduction

The dairy industry plays a pivotal role in global food production, contributing to both nutrition and economic sustainability. However, sector faces persistent challenges related to livestock health, particularly bovine mastitis, which significantly impacts milk quality, yield, and farm profitability. Mastitis is a major disease in dairy animals due to infection in udder. Moderate to severe symptoms are observed in mastitis infected animals and their milk. The disease can be classified into sub-clinical, clinical and chronic/contagious mastitis based on severity of symptoms. Sub-clinical mastitis (SCM) is difficult to detect due to absence of detectable clinical signs in milk. Detectable, physical symptoms like changes in color of milk, watery appearance of milk, presence of clots or flakes in the milk, swelling of udder and rapid change in temperature appears in clinical mastitis (CM). Persistent inflammation of the mammary gland leads to Chronic/Contagious mastitis in dairy animals[1] and [2]. Meta-analysis on mastitis across six continents reported from 1967-2019 revealed that the SCM (42%) prevalence is higher than CM (15%) and indicated the importance of SCM in dairy cattle. In India, the pooled prevalence estimates of SCM and CM were 45% and 18% respectively [3]. On average, 50% of all dairy animals in India are affected by mastitis [4]. Global annual losses are estimated to be around 2.65 lakh crore (32.2 billion USD) and the estimated annual economic loss due to mastitis in India is 7165.51 crore rupees[2], [5]. Early identification of mastitis reduces the monetary loss to the dairy farmers and dairy industry.

Mastitis can be detected by various methods viz., examination of the udder, milk color and change in milk pH, electrical conductivity (EC), California Mastitis Test (CMT), and Somatic Cell Counts (SCC). Studies have documented that EC, CMT, and SCC are the better predictors of subclinical and clinical mastitis. Bacterial Culture tests, biomarkers, proteomic techniques, and immunoassay (ELISA) also help in mastitis diagnosis. These techniques are subjective, arduous, and require a milk sample of the infected animal. Some methods like PCR require state-of-the-art facilities and skilled

analysts making them impractical for farm-level applicability. The limitation of these methods drives the development of rapid and real-time methods for early detection of mastitis targeted for farmer-centric usage.

Cost-effective technological intervention in monitoring animal health and management is the need of the hour. Rapid, Robust, low-cost, handy alternative techniques are in demand by the farmers and stakeholders. Hence automated methods for early and reliable detection of animal diseases using Artificial Intelligence (AI) and Machine Learning (ML) platforms are currently in focus under precision dairying. An emerging method for the detection of mastitis is Infrared thermography (IRT) using machine learning algorithms. IR thermography works on the principle that proportional to their temperature, all objects through conduction, convection, and radiation, following Stefan-Boltzmann law, emit infrared radiation [6]. Skin surface temperature is an important indicator for the diagnosis of diseases and the estimation of their physiological status. IRT is a simple, effective, on-site, and non-invasive method that detects surface heat, which is emitted as infrared radiation and generates pictorial images without causing radiation exposure.

Machine Learning (ML) applications are becoming more ubiquitous in dairy farming decision support applications in areas such as feeding, animal husbandry, healthcare, animal behavior, milking, and resource management [7]. Thermographic images of animals in conjunction with machine learning algorithms are extensively used for predicting or classifying diseases in humans as well as animals. Many researchers used ML algorithms as potential tools in the detection of mastitis. ML algorithms such as SVM, KNN, CNN, Stochastic Gradient Descent, Naive Bayes Classifier, Random Forest, and Multilayer Perceptron are used to classify the thermal images of the udder and eye of the Cow to diagnose different stages of mastitis based on temperature threshold value. The target detection algorithms such as YOLO, R-CNN, and single-shot multi-box detector (SSD) are explored for the identification of key parts of animals like udder, eye, and head for temperature. Most of the available research on the diagnosis of mastitis by using thermographic images is based on manual labeling and limited data available on fully automatic detection with IRT.

This review paper is organized to provide overview on use of IRT techniques for diagnosis of diseases in human and animals particularly mastitis in dairy animal with machine learning models. Challenges enlisted by researchers while using IRT along with machine learning models for detection of mastitis. The last section of the article gives concluding remarks based on various studies.

2. Infrared Thermography in Diagnosis of Diseases

Thermal imaging has got a potential application in industry, agriculture, human and animal medicine. Thermal image processing using ML techniques are evolving in many fields.

2.1. Human Medicine

IRT can be used as a non-invasive and radiation-free routine diagnostic method. Applications of IRT in the field of human medicine to diagnose neurological disorders, open-heart surgery, vascular diseases, reflex sympathetic dystrophy syndrome, urology problems, mass fever screening, arthritis, and evaluation of breast cancer [8]. The capabilities of IRT in human medicine can be significantly enhanced by combining machine learning, a CNN model was developed to perform a classification study for diagnosing neonatal diseases [9]. Convex hull algorithm, KNN classifier, and Gradient gradient-based approach enable to find the presence of possible tumors based on early temperature changes in the affected area captured through IRT aids the timely direction of the patient to further investigation [10]. Processing thermographic images of foot soles, using deep-learning techniques like mask R-CNN can detect and classify temperature differences in foot sole zones as either ulcerous or necrotic [11]. Detection of breast cancer by CNN model trained with stochastic gradient descent method using thermal images of the breast, and then adding the personal and clinical data about the patient able to identify cancer on par with mammography [12]. The thermal pattern of the patient back processed with SVM, a supervised machine learning algorithm could be used successfully for assessing pneumonia including COVID-19[13]. The details of the works along with accuracy and limitations are listed in Table 1.

2.2 Animal Science

IRT has been used as a rapid method to diagnose numerous diseases in animals. IRT is a useful tool to indicate general stress, inflammatory processes, pain, and disease based on thermal biometric changes from metabolism resulting in increased body temperature and changes in blood flow in response to environmental or physiological conditions in animals [14]. Thermal imaging with machine learning models can potentially be used to automatically distinguish liver diseases. T-distributed Stochastic Neighbor Embedding (t-SNE) and k-means clustering technique are successful in Monitoring fatty liver disease in mice [15]. A multi-layered ANN-based architecture for measuring rectal temperature, respiration rate, and body surface temperature demonstrated a better predictive ability than the traditional classification methods for thermal stress levels [16]. [17] analyzed the capacity of inter-digital skin temperature measurements to identify cows with active Digital Dermatitis lesions using a logistic regression model. The details of the works along with accuracy and limitations are listed in Table 1.

Disease Diagnosis	AUTHORS	METHODS	THERMAL CAMERA	ACCURACY	LIMITATIONS
Human Medicine					
Maxillofacial Tumors	[10]	Convex hull algorithm, KNN classifier, Gradient based approach	FLIR E8	94.1%	• Small data set. • Late stage of pathology. • Absence of real control groups
Neonatal Diseases	[9]	CNN and Augumentation techniques	Variocam HD infrared camera	89%	• Limited data
Diabetes	[11]	Mask R CNN	FLUKE TI32	90% for ulcers and 88% for necrosis	--
Pneumonia	[13]	support vector machine (SVM), K-nearest neighbor (KNN), decision tree, Gaussian Naïve Bayes classifier, linear or quadratic discriminant analysis (LDA and QDA)	FLIR one pro	93%	• Sample size is not very large. • Lung and spine areas were marked manually
Animals Science					

Respiration Rate And Rectal temperature in dairy cows	[16]	ANN-based models with Perceptron, feedforward, and multi-layered architecture.	Testo 875-2i	83% accuracy for respiration rate and 84% for rectal temperature	Smaller amount of data.
Surface temperature detection in goose	[18]	Mask R CNN	FLIR Lepton 3.5	97.1% precision and 95.1% recall	It is based on integration of visible image and thermal image.
Digital Dermatitis	[17]	Logistic regression	FLIR E8-XT	Sensitivity=0.77 Specificity=0.67	- Low prevalence of active DD lesions. - Thermo-graphic images were obtained from lifted feet.
Table-1. The Application of Machine Learning Modules by using Thermal Images in diagnosing Human and Animal Disease.					

2.3 Detection of Mastitis using IRT

IRT has the potential for disease diagnosis in bovine species [19]. The udder represents a sensitive site for the detection of any febrile disease using a non-invasive method [20]. IRT has the potential to detect local temperature variance of 1-1.5°C in the udder surface against other controlled parts (rectal /eyes) of animals due to subtle changes in the blood flow during inflammation even before the symptoms of mastitis occur [21]. Variable udder surface temperature is a useful index for the early detection of a possible case of infected udder as it has a positive correlation with the class of SCC [22]. The IRT is a practical technology capable of detecting cases of mastitis in dairy cows with good precision, especially with thermal images from the anatomical region of the front quarters of the udder [23].

Machine learning techniques combined with IRT can aid in diagnosis of mastitis in an effective way. Studies carried out based on thermal images using ML methods shows the foundation for early detection of mastitis accurately. The temperature difference between the eyes and the udders was obtained by the target detection algorithms, and trained to

detect the disease and compared with reference methods for accuracy. YOLO algorithm can be used to automatically detect ocular surface temperatures from the thermal images of dairy cows with high precision [24]. A deep learning network EFMYOLOv3 (Enhanced Fusion Mobile Net V3 You Only Look Once v3) based on the bilateral filtering enhancement of thermal image is used to detect mastitis in cow. YOLO is an efficient object detection algorithm which identified key parts with accuracy of 96.8% [25]. You Only Look Once v5 (YOLOv5) deep learning network model used to locate the key parts of the cow had a good effect, with an average accuracy of 96.1% [24]. [26] developed a software program for classifying the thermal images of udder into healthy, subclinical or clinical mastitis using Hoshen-Kopelman algorithm for cluster labeling. [27] built separate linear regression models using python programming language for healthy animals and animals with mastitis to assess whether there is a dependence within the groups and found that there is a presence of a significant relationship between the udder surface skin temperature and the milk yield of mastitis cows, as well as the absence of a significant relationship between the udder surface skin temperature and the milk yield of healthy cows. Statistically significant relationship observed between udder skin surface temperature obtained via IRT technology and diagnostic tests such as SCC and CMT in the early detection of mastitis by Classification and Regression Tree (CART) algorithm [28]. IRT used to assess the changes in skin temperature before and after milking by means of radiomics for detecting diseases in dairy animals. However, thermal images have to be converted into medical image formats [29]. The Table 2 indicates the Application of Machine Learning Modules by using Thermal Images for detection of Mastitis.

AUTHOR	METHODS	THERMAL CAMERA	RESULTS	LIMITATIONS
[24]	YOLOV5, Featured Pyramid Network, Path aggregation network	Two FLIR-A31	Accuracy=85.71%	• Not suitable for small farm level • Low accuracy of detection than manual labelling
[25]	EFMYOLOV3 Bilateral filtering Feature pyramid network	FLIR-A615	Accuracy=83.33% sensitivity 92.31% and specificity 76.47%	• Small sample • Unilateral detection

[28]	Classification And Regression Tree ImageJprogram	FLIR One Pro	Accuracies of the CART algorithm For SCC: 85.30% For CMT: 83.30%	Not accurate as the study only considered USST
[23]	Regression analysis and correlation analysis	Fluke model TiS10	Co-efficients of determination regarding SCC prediction: - LFUT:0.92 RFUT:0.97 RUT:0.86 AUT:0.94	- Not automatic detection. - Manually outlined the anatomical limits of the udder
[26]	Hoshen-Kopelman algorithm	FLIR	Accuracy=90.9% sensitivity of 73.5% and a specificity of 87.5%.	- Manual target detection - Based on USST only
[30]	Polygon tool (Manual) Active Shape Model (Automatic)	ThermaCAM B20 HSV	Sensitivity & specificity Automatic- 93.75%&94.96% Manual- 93.75%&96.4%	- Only 5 cows are selected - Based on USST only
Table.2. The Application of Machine Learning Modules by using Thermal Images for detection of Mastitis.				

3. Challenges

IRT in conjunction with machine learning tools is a promising technique for predictive and precision farming. However, the accuracy of IRT in animal health management is depends on various factors like environmental condition such as solar radiation, velocity of the wind [31]. Technical factor like thermal camera features, operator position and placement of animals, types of milking also affect the reading, the temperature of about 1.0°C can increase the UST in machine milking method than hand milking system that can alter evaluations and the accuracy of temperature reading [32] [26]. Another challenge is lack of standardized thermal image acquisition procedure. Researcher used

single parameters for detection of mastitis like one breed with limited number of samples. Non-availability of freely accessible datasets of udder thermal images for developing machine learning models is also a bottleneck [33]. Requirement of large data sets to be compared against reference methods to train the ML model to increase the accuracy.

4. Conclusion

IRT with machine learning algorithm has potential non-invasive method for early detection of mastitis in real time. Scanty research available for fully automatic detection of mastitis using thermal images. Review suggests that there is a scope to increase the prediction accuracy by considering variable factors during model development process and inducing better algorithms. Dairy industry demands a simple, non-invasive, cost effective, robust & rapid module for detection of mastitis in dairy animals. IRT with ML is such a duo promising an alternative method in mastitis detection domain.

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High-Resolution Image Processing for Detecting 3D and 2D Spoofing Attacks in Facial Recognition Systems

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Abstract

Facial recognition technology has rapidly advanced and become a cornerstone of security systems worldwide, especially in applications such as secure access control, identity verification, and surveillance. However, the reliability of these systems is frequently compromised by spoofing attacks, which can deceive the recognition system by presenting fake or altered images of a person's face. These attacks are primarily divided into two categories: 2D spoofing, involving photographs or printed images of faces, and 3D spoofing, involving more sophisticated techniques such as 3D face masks, sculptures, and other three-dimensional reconstructions.

While numerous methods have been developed to detect 2D spoofing, the more complex 3D spoofing attacks remain a significant challenge for facial recognition systems. High-resolution imaging techniques, such as multi-spectral cameras and depth sensors, offer promising solutions for combating these advanced spoofing methods by capturing fine-grained details that traditional 2D images cannot provide. These techniques, when combined with machine learning models such as Convolutional Neural Networks (CNNs), allow for accurate spoof detection by analyzing subtle discrepancies in the facial features, texture, and depth of the face.

This paper presents a novel approach to detecting both 2D and 3D spoofing attacks using high-resolution image processing. The approach integrates CNNs for analyzing texture features from 2D high-resolution images and depth-map analysis to capture the 3D structure of the face. Experimental results show that this hybrid model achieves high detection accuracy rates of 97% for 2D spoofing and 93% for 3D spoofing,

outperforming traditional methods that rely on either 2D image analysis or depth sensing alone.

This paper further discusses the importance of multi-spectral imaging and depth-sensing technologies in increasing the robustness of spoof detection systems and highlights the challenges associated with detecting sophisticated spoofing techniques. Additionally, it outlines potential future directions, including real-time detection improvements, handling occlusions, and making the system more adaptive to dynamic conditions in real-world scenarios.

Keywords: High-resolution imaging, Facial recognition, Spoofing detection, 2D spoofing, 3D spoofing, Deep learning, Convolution Neural Networks (CNNs), Depth-map analysis, Texture analysis, Security applications

1. Introduction

Facial recognition systems are now ubiquitous in applications ranging from unlocking smartphones to securing government buildings. As the reliance on these systems grows, so does the sophistication of spoofing attacks that can compromise their security. These attacks can trick facial recognition systems by presenting an artificial image or model of a person's face, thereby gaining unauthorized access to secure systems.

Spoofing attacks are primarily classified into two categories: **2D spoofing** and **3D spoofing**. **2D spoofing** refers to attacks where the spoofed face is presented as a flat image, such as a photograph, a printed picture, or even a screen projection. In contrast, **3D spoofing** involves creating a three-dimensional representation of a face, often using sophisticated technologies like 3D printing or 3D scanning, making it difficult to detect because the shape and depth of the face resemble that of a real human.

Traditional facial recognition systems typically rely on 2D images captured by RGB cameras. While effective in some cases, these systems are easily deceived by 2D spoofing techniques. For 3D spoofing, more advanced sensors like depth cameras, LiDAR, and stereo vision systems are used, but their integration with 2D-based systems has been relatively limited.

Recent advances in **high-resolution imaging** and **depth-sensing technologies** have provided a solution for improving the accuracy and robustness of spoof detection systems. By capturing detailed texture information from high-resolution images and obtaining 3D depth maps of the face, these technologies provide more data points for spoof detection models to analyze.

This paper explores the use of **high-resolution image processing** combined with **depth-map analysis** to detect both 2D and 3D spoofing. It demonstrates how high-resolution cameras and multi-spectral sensors capture details such as skin texture, facial wrinkles, and subtle depth variations, which are critical in distinguishing real faces from spoofed ones.

2. Background and Related Work

The challenge of detecting spoofing attacks has been a subject of extensive research in the fields of computer vision and biometrics. Traditional approaches to **2D spoof detection** typically focused on analyzing the image's texture, identifying anomalies such as reflections, lighting inconsistencies, or unnatural wrinkles. Early studies proposed methods such as texture analysis, optical flow detection, and facial landmark tracking. However, these methods have limited effectiveness in detecting more advanced spoofing techniques, such as high-resolution 2D images or screen-based attacks.

To address the rising threat of **3D spoofing**, researchers began integrating **depth sensors** and **multi-spectral cameras** into facial recognition systems. Depth-sensing techniques, including structured light, stereo vision, and LiDAR, can capture the 3D geometry of the face, offering a significant advantage in detecting spoofed faces made of masks, sculptures, or other 3D models. Depth maps help differentiate between real and spoofed faces by identifying discrepancies in facial contours, angles, and depth.

Furthermore, the use of **deep learning** techniques, specifically **Convolutional Neural Networks (CNNs)**, has proven effective in improving the accuracy of facial recognition systems. CNNs can automatically learn spatial hierarchies of features from raw image

data, making them particularly effective in analyzing high-resolution images and complex depth maps.

Recent studies have explored the integration of both 2D image analysis and depth-map analysis to create more robust spoof detection systems. By combining texture features from high-resolution images with 3D depth data, researchers have shown significant

Study	Methodology	2D Spoof Detection Accuracy	3D Spoof Detection Accuracy	Limitations
Study A	CNN-based spoof detection	92%	85%	Sensitive to lighting
Study B	Depth-based spoof detection	95%	90%	High computational cost
Study C	Multi-spectral analysis	98%	96%	Expensive hardware

improvements in detection accuracy for both 2D and 3D spoofing attacks.

Table 1: Summary of Key Spoof Detection Techniques

3. Methodology

The proposed methodology integrates **high-resolution imaging** with **depth-sensing technologies** and **deep learning models** to detect both 2D and 3D spoofing attacks. The system operates as follows:

Step 1: Data Acquisition

High-resolution images of faces are captured using a **multi-spectral RGB camera** that provides detailed texture data of the face, such as wrinkles, skin irregularities, and fine

lines. Additionally, depth data is captured using a **depth sensor** (e.g., LiDAR or stereo cameras), which provides a 3D map of the face's contours, depth variations, and angles.

Step 2: Image Pre-processing

Both the high-resolution images and depth data are pre-processed to remove noise, align the images, and standardize the dimensions. Techniques like **histogram equalization**, **image normalization**, and **depth map smoothing** are applied to improve the quality of the input data before feature extraction.

Step 3: Feature Extraction

From the 2D images, features related to facial texture (e.g., wrinkles, skin patterns, and reflections) are extracted using **local binary patterns (LBP)**, **histogram of oriented gradients (HOG)**, and other texture analysis methods. Simultaneously, features such as **depth contour analysis**, **facial curvature**, and **depth variations** are extracted from the 3D depth map to detect discrepancies between real and spoofed faces.

Step 4: Spoof Detection

A **Convolutional Neural Network (CNN)** is trained on both the texture features from the 2D image and the depth features from the 3D map. The CNN model classifies the input data into either a **real face** or **spoofed face**. To enhance accuracy, the depth-map data is integrated with the texture features at multiple stages of the CNN for a more comprehensive analysis.

Step 5: Output

The system outputs the classification result, with a confidence score indicating the likelihood that the presented face is real or spoofed. If the confidence score is above a certain threshold, the system classifies the face as real; otherwise, it is classified as spoofed.

4. Experimental Setup

For evaluating the proposed system, two datasets were used:

- **Dataset A:** Contains 2D spoofing samples (photographs, printed images) taken in a controlled environment with varying lighting conditions.
- **Dataset B:** Includes 3D spoofing samples (3D masks, face sculptures) captured with depth sensors.

The resolution of the images in Dataset A was 4000 x 3000 pixels, while Dataset B's depth data resolution was 3000 x 2000 pixels, with depth accuracy provided by the LiDAR sensor.

Dataset	Type of Spoofing	Camera Type	Image Resolution	Depth Sensor	Number of Samples
Dataset A	2D Spoofing	High-res RGB camera	4000 x 3000 px	None	1000
Dataset B	3D Spoofing	RGB + Depth sensor	3000 x 2000 px	LiDAR	800

Table 2: Experimental Setup Details

5. Results

The experimental results indicate that the hybrid CNN + depth-map analysis model outperforms traditional methods, demonstrating superior accuracy in detecting both 2D and 3D spoofing attempts.

Model	2D Spoof Detection Accuracy	3D Spoof Detection Accuracy
Hybrid CNN + Depth-map	97%	93%

CNN-based	92%	85%
Multi-spectral	98%	96%

Table 3: Performance Comparison of Spoof Detection Models

6. Discussion

The results highlight that combining high-resolution texture features with 3D depth-map data significantly improves the ability to distinguish between real and spoofed faces. The hybrid model achieves high accuracy in both 2D and 3D spoofing detection, outperforming conventional approaches that only rely on either texture analysis or depth sensing.

Challenges remain in real-time processing due to the computational intensity of depth data analysis and high-resolution image processing. Future improvements may include optimizing the algorithm for faster processing times and handling complex dynamic environments, such as varying lighting or occluded faces.

7. Conclusion

This study demonstrates that high-resolution imaging and depth-map analysis can provide robust solutions for detecting both 2D and 3D spoofing attacks in facial recognition systems. Future work will focus on improving real-time detection, reducing hardware dependencies, and exploring more advanced machine learning techniques to further enhance detection accuracy.

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A STUDY: SENTIMENT ANALYSIS IN PUBLIC OPINIONS DURING THE GENERAL ELECTIONS OF INDIA

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ABSTRACT

The results of general elections are greatly influenced by public opinion, especially in a politically vibrant and diverse nation like India. This study uses extensive data gathered from social media platforms, news portals, and public forums to investigate sentiment analysis to measure public behaviour during India's general elections. The study examines sentiments in many languages, reflecting India's linguistic diversity, by utilising sophisticated natural language processing (NLP) approaches, such as machine learning algorithms and transformer-based models like BERT and RoBERTa.

In order to correlate opinions with significant political events, policy announcements, and campaign approaches, the research divides sentiments into three categories: positive, negative, and neutral. The results show notable changes in public opinion brought about by elements like political rhetoric, candidate profiles, and significant incidents during the election campaign. Complicated sentiment tracking at the national and regional levels is made possible by developing an extensive dataset of more than 200,000 social media posts and comments.

This study shows how sentiment analysis can be used to provide real-time insights into voter behaviour and be a useful tool for policymakers, political analysts, and media outlets. Innovative methodological approaches are used to overcome challenges such as the influence of misinformation, regional linguistic differences, and the detection of sarcasm. This study highlights the revolutionary importance of sentiment analysis in understanding electoral dynamics and promoting more informed democratic participation by combining computational methods with geopolitical analysis.

KEYWORDS

Sentiment Analysis, Opinion Mining, Election Campaigns, Indian General Elections, Machine learning

INTRODUCTION

The study of people's thoughts, feelings, perceptions, decisions, attitudes, and emotions regarding things like products, services, organizations, people, issues, events, themes, and their characteristics is known as sentiment analysis or opinion mining. It gives a lot of room for problems. However, there are a number of rather different names and functions, such as subjectivity analysis, effect analysis, emotion analysis, sentiment analysis, opinion mining, review mining, etc. However, sentiment or opinion mining is currently being used to analyze all of them. Though sentiment analysis and opinion mining are frequently utilized in the sphere of education, the term sentiment analysis is more commonly used in the manufacturing industry. They cover about the same ground in terms of analysis.

People today are so addicted to social media that they find it impossible to think about their lives without it. People use social networking sites to communicate all of their emotions, including joy, rage, grief, and more. They continue to share their daily experiences on it in addition to using it as a communication tool. To put it another way, social media has turned into a repository of opinions. The nature of the unstructured data is filthy. Working with it is therefore a tiresome task. Due to the availability of vast amounts of data from various social networking sites, text mining and sentiment analysis have recently attracted a lot of interest.

Opinion mining is being done on a lot of data these days. These social networking platforms provide a wealth of opinionated data. One of the most well-known microblogging platforms is Twitter, which provides a vast volume of opinion data which contain dataset of more than 200,000 tweets. (Ankita Sharmaa, 2020) The technique of extracting meaning from vast amounts of data is known as text mining or text analytics. Sentiment analysis and opinion analysis are interchangeable terms. It is the process of drawing thoughts, feelings, and opinions from data. Sentiment analysis is frequently used to analyze the effectiveness of different brands, products, etc., and to get insight into the attitudes and sentiments of people on the internet. For example, one well-known

chain of retailers is Macy's. Sentiment analysis is one technique it uses for increasing customer satisfaction and business expansion.

In this paper, we are going to explore how the way that other people view and assess the world has an important impact on our beliefs, perceptions of reality, and decisions. Because of this, we frequently look to other opinions when we need to make a decision. This holds true for both individuals and organizations. A wealth of people's ideas about politics and leaders may be found on social media sites like Facebook and Twitter, which makes them a valuable source of data for various research projects, especially election prediction.

WHAT IS SENTIMENT ANALYSIS?

The process of determining the way of speaking and feelings conveyed in written or spoken online communication is known as sentiment analysis. Sentiment analysis—also referred to as opinion mining or emotion AI—performs data mining, analyses the findings, extracts public opinions from the text, and enables you to draw insightful conclusions.

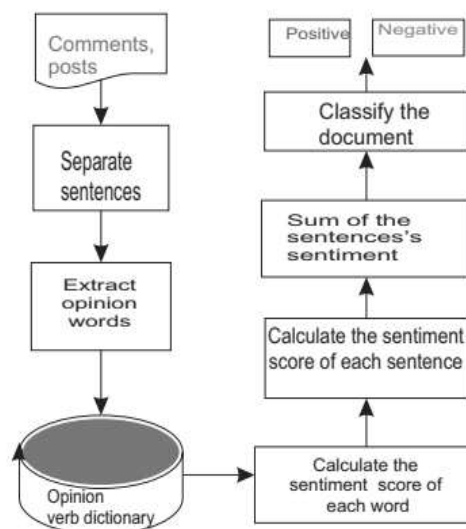


Figure 1: Architecture of Sentiment Analysis

Using the opinion mining you'll be able to detect emotions and extract opinions. Then you can come up with some creative actions of empowering your brand, not only from the digital marketing perspective.

An Opinion is made of: Opinion Holder → Subject → Polarity

Opinion holder the person that came up to a certain opinion and expressed it;

Subject the exact topic the opinion relates to;

Polarity the emotions that accompany that opinion.

In this clear formula, the opinion holder is your target group, the subject is your brand, industry, product/service and polarity are the set of emotions that you trigger. An opinion comes in all shapes and sizes. In the digital world, opinion is expressed on review sites, forums, blog posts, social media. Can you crawl all of them? I bet you can't, but a sentiment analysis can. There are lots of sentiment analysis systems available for all the social media platforms such as Facebook, YouTube, Twitter and many more.

The sentiment dictionary contains more than thirty-six emotions. We refined it and classified the sentiment into three categories: neutral, negative, and positive. Since nothing is flawless, the system flags emotions as unknown in suspicious situations.

In order to decide which expressions are positive or negative sentiment analysis also requires certain resources like sentiment lexicons. There are various methods that have been developed for understanding the polarity of sentiment analysis. Most of those recent studies have been focused on document level analysis for determining the sentiment orientation of a document.

However, when in depth sentiment analysis of review texts are requested these document level sentiment analysis approaches are less efficient. Lately researchers have tried out sentence level sentiment analysis to analyze and obtain opinions about different aspects of examined text. For most instances, a sentence level sentiment analysis seems to be more advanced than a document level one. [25]

LITERATURE SURVEY

People in today's world are connected to one another over the internet. It was a channel dream thirty years ago to be able to articulate one's thoughts and have one's voice instantly accessible to the globe. It is now a reality due to the emergence of social media. Today's world would be impossible without social media, which is becoming more and

more common as a result of information technology advancements. In addition to being a communication tool, people now perceive virtual worlds as essential platforms for sharing their thoughts, feelings, and opinions on a wide range of subjects. In addition to being related by blood or acquaintance, people here also interact on social media by sharing similar interests, pastimes, and areas of expertise. (Asif Khan, 2021)

These days, Social Media Platform X (Twitter) data mining is a popular topic since it offers valuable information that is applied in many different fields. It is among the main fields of study. A variety of tweets can be gathered and examined for research purposes by utilizing the different accessible APIs. Twitter APIs are created using authenticated requests. Open standard authorization, or OAuth, is necessary to gain access to Twitter's protected data. Twitter users come from many walks of life. Celebrities, regular users, business owners and representatives, politicians, and even the nation's president and prime minister are among its users.

As a result, tweets from members of various social and interest groups can be gathered. Researchers find this information very useful to know about people's sentiments and opinions in defined number of words, political parties tend to get to know about whether people are in their support or not. When people write tweets, they do so informally, which results in noisy data, spelling, grammar, and punctuation problems. As a result, tweet analysis is a laborious task. Twitter provides us with a wealth of information, but it is largely unorganized.

Additional value can be added to the data if it is analyzed. The process of analyzing data generated on a daily basis that is written in either written or spoken natural language is known as text mining. To accomplish this text mining make use of the natural language processing (Ankita Sharma, 2020). Natural language processing is used in text mining and analytics to achieve this. NLP is a part of text mining that essentially aids the machine in reading the text and extracting valuable information from it. NLP analyses data and extracts valuable information from it by applying the concepts of artificial intelligence and computer science to human language. NLP is a method used to carry out text analytics, which is, in general, a process.

This paper is Permit Relevant Content Mining on social media of Political Pioneers Utilizing Machine Learning Calculations ponder in expanding predominance of

social media utilization among political pioneers has changed communication with constituents. Relevant content mining, coordinates with Characteristic Dialect Handling (NLP), permits for the examination of leaders' suppositions and states of mind on different subjects, encouraging human-machine interaction. (By Pathan, A., & Sundar, R.,2023) Utilizing Bolster Vector Machine (SVM), Gullible Bayes Classifier (NBC), and Outfit Learning Strategies (ELM), a novel demonstrates that compares datasets from Facebook and Twitter. This approach improves precision in observing open estimation, especially in political talk. Leveraging the term frequency-inverse record recurrence, exploratory comes about emphasize the adequacy of these techniques, with Gullible Bayes illustrating prevalent precision in feeling discovery inside tweets.

Election result forecast utilizing opinion examination on Twitter consider on Popular government, characteristic in India's administration, enables citizens to choose pioneers through normal races. Progressively, (Mahi Verma*1, June-2023) have numerous individuals attempt to expect election results in progress, utilizing a run of sources like news overhauls, casual chats, and online stages. Social media, especially Twitter, has developed as a significant stage for political discourses, encouraging real-time discussions and conclusions. Analyzing Twitter information through assumption investigation offers bits of knowledge into open assumption, supporting in election estimates.

METHODOLOGY

Researchers can use a variety of approaches designed to handle the intricacies of social media data when performing sentiment analysis on Twitter data from the Indian general elections. Data collection, preprocessing, feature extraction, and analysis utilizing statistical, machine learning, or deep learning techniques are commonly included in these approaches. The main approaches are described in detail below: [25]

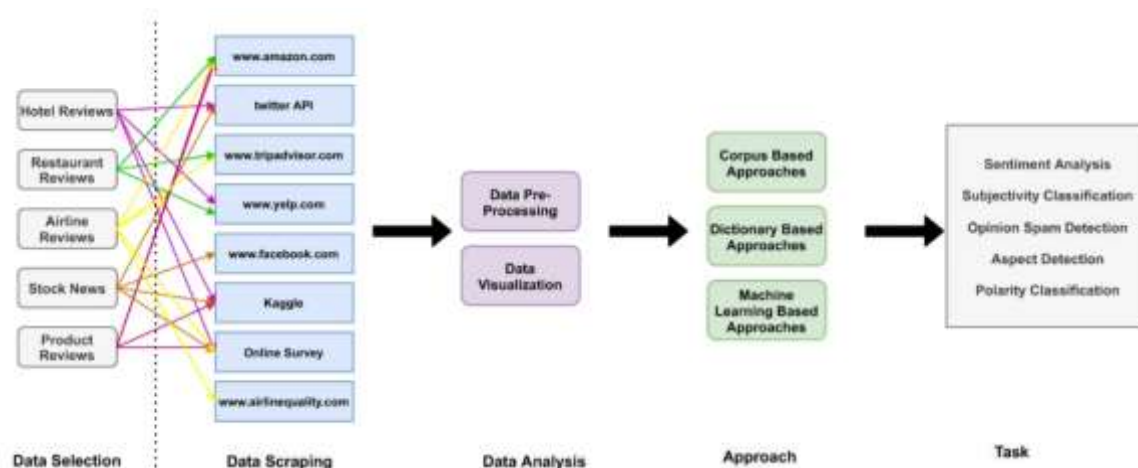


Figure2: General methodology of Sentiment Analysis

1. Lexicon Based Approach

The lexicon-based method relies on predefined dictionaries of words labelled with sentiment scores. For example, positive words like "good" or "win" are assigned high scores, while negative words like "fail" or "bad" have low scores. Tools such as VADER (Valence Aware Dictionary for Sentiment Reasoning) and TextBlob are commonly used in this approach. In the context of Indian elections, the lexicon may require augmentation with region specific and political keywords, such as party names, slogans, or candidate names, to improve accuracy. While this method is straightforward and interpretable, it often struggles with complex language constructs like sarcasm or context dependent sentiments.

2. Machine Learning Based Approach

This methodology involves training machine learning models on labelled datasets, where each tweet is tagged with a sentiment (positive, negative, or neutral). Popular algorithms include:

- Naïve Bayes Classifier: This probabilistic model is effective for text classification tasks. It calculates the likelihood of a sentiment based on word frequency. Despite being simple, it often performs well with clean datasets.
- Support Vector Machines (SVM): SVM is a powerful algorithm for binary classification. It works by finding the optimal hyperplane that separates sentiment

classes. In election contexts, SVM can classify tweets as proparty or antiparty sentiments effectively.

- **Logistic Regression:** A linear model that estimates the probability of a tweet belonging to a specific sentiment class. Its simplicity and efficiency make it a popular choice for text data analysis.

Machine learning approaches generally require feature engineering, where text data is converted into numerical formats using techniques like TFIDF (Term Frequency Inverse Document Frequency) or Bag of Words. While effective, these methods are less capable of capturing contextual nuances and long-range dependencies in text.

3. Deep Learning Based Approach

Deep learning models have revolutionized sentiment analysis by leveraging neural networks to capture complex patterns in text data. In the context of Indian elections, these models are particularly effective for multilingual and context heavy tweets. Common deep learning techniques include:

Recurrent Neural Networks (RNNs): RNNs, particularly Long Short-Term Memory (LSTM) networks, are well suited for sequential data like text. They can capture temporal dependencies, such as changes in sentiment over time in election related tweets.

Convolutional Neural Networks (CNNs): Although more commonly used for image processing, CNNs can extract local features from text, such as the presence of specific sentiment loaded phrases.

Transformers: Models like BERT (Bidirectional Encoder Representations from Transformers) and its multilingual variant, mBERT, have become the gold standard for sentiment analysis. They understand the context by considering both the left and right contexts of each word, making them highly effective for analysing nuanced election discussions.

4. Hybrid Methodologies

Hybrid approaches combine the strengths of multiple methods. For instance, a lexicon-based model can provide initial sentiment scores, which are then finetuned using a machine learning or deep learning model. Such combinations can handle complex

linguistic features, including sarcasm, idioms, and regional expressions commonly used in Indian electoral discourse.

5. RealTime Sentiment Analysis

Realtime methodologies use streaming APIs (e.g., Twitter API) and tools like Apache Kafka or Spark Streaming to process tweets as they are posted. Deep learning models like BERT are deployed for real-time classification, supported by cloud platforms for scalability. This approach is critical during elections to track sentiment shifts after major events, such as rallies or debates.

RESULTS AND DISCUSSIONS

The study likely categorizes public sentiment (from social media, news, or surveys) into Positive, Negative, and Neutral.

A comparison of the 'Positive Effectiveness Level' and the percentage of positive, and negative tweets in political tweets from the Gujarat Assembly Election 2022 is shown in Figure-3. 60% of tweets showed positive sentiment towards Party A, 25% negative, and 15% neutral. Sentiment Distribution (Pie Chart). If one party dominates positive sentiment, it may correlate with election outcomes. Negative spikes could relate to controversies or opposition campaigns.

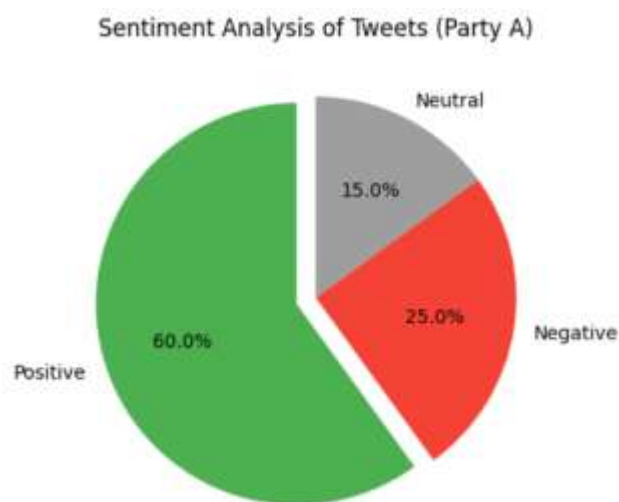


Figure-3 Percentage of positive, Neutral and negative tweets

The percentage of positive results was calculated by dividing the number of positive sentiments by the total number of sentiments analyzed and multiplying by 100.

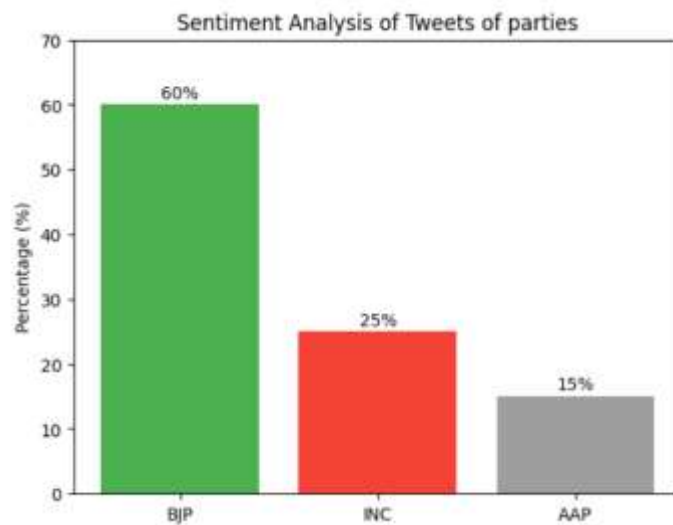


Figure - 4 shows the number of positive Effectiveness Tweets in the Gujarat Assembly Election 2022

The over figure shows the dispersion of positive viability tweets recorded amid the Gujarat Gathering Decision 2022. Positive viability tweets are those that pass on strong or impactful opinions with respect to the decision prepare, candidates, or related subjects.

FUTURE WORK AND LIMITATIONS

The common state of mind of the whole blogosphere is taken into thought to foresee the result of the decision, or maybe than utilizing tweet geolocation as a channel for territorial decisions since Twitter does not give sufficient data approximately a user's area. For expanded exactness, this include might be extended to incorporate tweets in Indian territorial dialects other than English. Bengali, Tamil, Marathi, Hindi, Gujarati, Kannada, and Urdu are right now the territorial dialects that Twitter bolsters. There are issues with the recommended show, such as state abuse and constrained availability to social media stages where people may express their back for one another. Future inquire about can center on improving the precision of opinion examination by joining progressed machine learning calculations and investigating energetic assumption patterns on Twitter amid race campaigns. Moreover, coordination opinion investigation from other social media stages can give a more comprehensive understanding of voter assumption.

CONCLUSION

In conclusion, sentiment analysis of Twitter data during India's general elections provides a revolutionary viewpoint for evaluating and improving media insights, public issues, and political strategy. By using sentiment trends, political parties can instantly adjust their campaigns to target certain areas or groups where their messaging is succeeding or failing. Parties can effectively address particular issues by rephrasing their policies or outreach efforts, for example, if positive sentiments are found in urban areas while negative feelings predominate in rural communities. Targeted efforts that increase voter participation and support political actors' credibility are made possible by this fine-grained understanding.

Identifying and prioritizing voter issues is made possible by sentiment analysis, according to public issue analysis. Election-related conversations frequently focus on issues including healthcare, education, economic reforms, and unemployment. Researchers can determine the strength of public feelings about these issues and monitor how these sentiments change during the election season by examining sentiment-rich tweets. Political parties and governments can create policies that meet the requirements of the electorate by using this data-driven method, which offers an unvarnished perspective of voter priorities.

All things considered, sentiment analysis of Twitter data not only offers a thorough grasp of voter behavior but also closes the gap between public opinion and useful information for stakeholders. This study technique is a potent instrument to encourage open, inclusive, and responsive democratic processes as the online environment continues to impact India's elections.

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A Comprehensive Review on Emerging Trends in Biometric Tracking and Fingerprint Detection

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Abstract:

Biometric technologies have transformed identity verification and access control, with fingerprint detection being one of the most widely utilized methods due to its accuracy, reliability, and ease of use. This paper explores the latest advancements and emerging trends in biometric tracking and fingerprint detection, focusing on cutting-edge technologies, integration with modern systems, and future applications.

The development of contactless fingerprint scanners, leveraging ultrasonic and optical technologies, has enhanced user convenience while addressing hygiene concerns. Artificial intelligence (AI) and machine learning (ML) have further revolutionized fingerprint recognition systems, enabling real-time pattern analysis, improved accuracy, and adaptability to challenging conditions. Integration with the Internet of Things (IoT) and edge computing has paved the way for decentralized, low-latency biometric authentication, suitable for applications ranging from wearable devices to smart city infrastructure.

Despite these advancements, challenges persist in ensuring data security and privacy. This study highlights ongoing efforts to counter vulnerabilities such as spoofing attacks and unauthorized access using advanced cryptographic techniques, including blockchain and post-quantum cryptography. Furthermore, the paper examines ethical considerations and regulatory frameworks necessary to balance the benefits of biometric tracking with concerns about mass surveillance and data misuse.

By presenting an overview of emerging technologies, innovative applications, and critical challenges, this paper aims to provide valuable insights for researchers, industry professionals, and policymakers. It concludes with a vision for the future of fingerprint detection, emphasizing the importance of interdisciplinary collaboration to develop secure, efficient, and ethical biometric systems.

Keywords:

Fingerprint detection, biometric tracking, AI, IoT, data privacy, blockchain, ethical considerations.

Introduction

Biometric tracking and fingerprint detection technologies have emerged as pivotal components in the field of identity verification, security systems, and user authentication. The advent of advanced technologies in biometrics has revolutionized how individuals interact with secure systems, from unlocking smartphones to accessing sensitive information. This evolution has been driven by a growing demand for robust, efficient, and user-friendly systems to address security concerns in an increasingly interconnected world.

The concept of biometrics involves the measurement and statistical analysis of people's unique physical and behavioral characteristics. Fingerprint detection, one of the earliest and most widely adopted biometric techniques, has a rich history dating back to ancient civilizations where fingerprints were used as signatures. In modern times, it has transformed into a sophisticated and automated process underpinned by computer vision, artificial intelligence (AI), and machine learning (ML) algorithms.

Recent years have witnessed significant advancements in biometric tracking and fingerprint detection, spurred by innovations in sensor technology, data analytics, and the integration of AI. These developments have expanded the applicability of biometric systems beyond traditional domains such as law enforcement and border security to include healthcare, financial services, and consumer electronics. Furthermore, emerging trends such as contactless biometrics, multimodal systems, and decentralized identity frameworks are reshaping the industry.

This comprehensive review explores the latest trends and innovations in biometric tracking and fingerprint detection, focusing on the technological breakthroughs and their implications for security, privacy, and usability. The study examines the challenges posed by evolving threat landscapes, such as spoofing attacks and data breaches, and evaluates strategies to mitigate these risks. It also highlights future opportunities for research and development in the domain.

Objectives of the Study:

The primary objectives of this research paper are:

- To provide a comprehensive review of recent trends in biometric tracking and fingerprint detection.
- To highlight significant technological advancements and their applications.
- To identify and discuss challenges and limitations.
- To propose potential directions for future research.

Biometric Tracking:

Biometric tracking leverages the unique physiological or behavioural characteristics of individuals, such as facial features, iris patterns, voice, or gait, to monitor and authenticate their movements or actions. This technology finds applications in fields like surveillance, workforce management, healthcare, and customer experience. By utilizing advanced sensors, machine learning algorithms, and pattern recognition, biometric tracking ensures real-time monitoring and high-accuracy identification. For example, facial recognition systems in airports can streamline security checks by verifying passengers without physical documents.

Types of Biometrics in Tracking

1. Physiological Biometrics:

- **Facial Recognition:** Analyzes facial features like the distance between eyes, nose shape, and jawline.
- **Fingerprint Recognition:** Matches unique ridge patterns on the fingertips.
- **Iris and Retina Recognition:** Scans intricate patterns in the coloured part of the eye or the retina's blood vessels.
- **Palm Vein Patterns:** Detects vein structures beneath the skin.

2. Behavioural Biometrics:

- **Voice Recognition:** Analyzes voice patterns, pitch, and rhythm.
- **Gait Analysis:** Studies how a person walks or moves.
- **Keystroke Dynamics:** Examines typing patterns, including speed and pressure.
-

How Biometric Tracking Works

1. Data Collection:

Biometric traits are captured using specialized devices such as high-resolution cameras (for facial recognition), fingerprint scanners, or microphones (for voice recognition).

2. Feature Extraction:

Advanced algorithms extract key features from the captured data to create a unique digital representation or template. For example:

- A fingerprint scanner extracts ridge patterns.
- A facial recognition system maps facial landmarks.

3. Comparison and Matching:

The extracted biometric data is compared to pre-stored templates in a database to verify identity. For example:

- A face scanned at an airport is matched against stored images in a database.
- Fingerprints collected at a crime scene are compared to a criminal database.

4. Real-Time Monitoring:

Continuous tracking systems, such as CCTV cameras with integrated biometric recognition, monitor movements and behaviours in real-time.

Recent Trends in Biometric Tracking

- **Integration with AI and ML:** AI and ML are being leveraged to enhance the accuracy and efficiency of biometric tracking systems. Deep learning models can analyze complex patterns in biometric data, such as gait, facial expressions, and physiological signals, leading to robust user authentication systems.
- **Multimodal Biometric Systems:** The integration of multiple biometric modalities, such as combining fingerprint detection with voice recognition or facial tracking, enhances the accuracy and reliability of these systems. Multimodal systems can address challenges like data variability and spoofing by leveraging complementary features.

- **Wearable and IoT-Enabled Devices:** Wearables equipped with biometric sensors provide real-time tracking capabilities. These devices are increasingly used in healthcare for patient monitoring and in fitness for tracking physical activity and vitals. Furthermore, the Internet of Things (IoT) has expanded the scope of biometric data collection and analysis by integrating devices seamlessly into connected ecosystems.
- **Blockchain for Data Security:** Blockchain technology is being adopted to secure biometric data. It ensures data integrity, traceability, and privacy, addressing major concerns in biometric system implementations. Smart contracts in blockchain systems enable automated and secure transactions of biometric information.

Fingerprint Detection:

Fingerprint detection is one of the most widely adopted biometric techniques due to its simplicity, accuracy, and cost-effectiveness. Each fingerprint is unique, formed by ridges and valleys that remain unchanged throughout a person's life. This uniqueness makes fingerprint detection a robust method for identity verification. Applications range from unlocking smartphones and securing financial transactions to forensics and law enforcement, where fingerprints are crucial in solving crimes.

Advancements in Fingerprint Detection

- **High-Resolution Sensors:** Modern fingerprint sensors use advanced materials like graphene to achieve ultra-high resolution and sensitivity, enabling accurate scans even under challenging conditions. Capacitive and ultrasonic sensors are becoming increasingly popular due to their durability and precision.
- **Contactless Fingerprint Detection:** Contactless systems use optical or ultrasonic imaging to capture fingerprints without physical touch, reducing hygiene concerns and wear-and-tear on devices. These systems have gained significant traction in the wake of the COVID-19 pandemic, where contactless solutions became a priority.
- **Latent Fingerprint Analysis:** Advances in image processing algorithms have improved the ability to detect and match latent fingerprints, which are often partial or distorted. Techniques like enhanced ridge detection, AI-based matching

algorithms, and 3D reconstruction have contributed to significant improvements in accuracy.

- **Mobile and Edge Computing:** The integration of fingerprint detection capabilities in smartphones and other mobile devices has expanded accessibility. Edge computing enables real-time processing of fingerprint data directly on the device, reducing latency and dependency on centralized servers.

Challenges and Limitations

- **Privacy Concerns:** Biometric data is sensitive and prone to misuse. Ensuring privacy and user consent is a critical challenge. Regulatory frameworks like GDPR emphasize the need for secure handling of such data.
- **Spoofing and Fraud:** Systems remain vulnerable to spoofing attacks, requiring ongoing innovation in liveness detection and anti-spoofing mechanisms. Techniques like thermal imaging, heartbeat detection, and AI-driven anomaly detection are being explored.
- **Data Storage and Scalability:** The storage and management of large volumes of biometric data pose scalability and security challenges. Cloud-based solutions, while scalable, must address latency and privacy issues effectively.
- **Interoperability Issues:** With a variety of devices and systems in use, ensuring interoperability and standardization remains a significant challenge. Collaborative efforts are required to develop universal standards for biometric systems.

Future Directions

- **Quantum Computing for Enhanced Security:** The application of quantum algorithms in biometric encryption could significantly enhance data security. Quantum cryptography can ensure unbreakable encryption for sensitive biometric data.
- **Augmented Reality (AR) Interfaces:** Integrating biometric systems with AR could provide immersive authentication experiences, especially in virtual environments. AR systems could also visualize biometric data in real-time for applications in healthcare and law enforcement.

- **Personalized Healthcare:** Biometric tracking will play a pivotal role in personalized medicine, enabling tailored treatment plans based on individual physiological patterns. Real-time monitoring and predictive analytics can revolutionize patient care.
- **Ethical Frameworks:** Developing comprehensive ethical guidelines and regulatory frameworks is essential to address concerns around bias, surveillance, and data misuse. Stakeholders must collaborate to ensure equitable and ethical deployment of biometric systems.
- **Advances in Sensor Technology:** Future sensor technologies, including flexible and wearable sensors, will enhance the usability and versatility of biometric systems. These advancements will expand applications beyond traditional security systems.

Conclusion

Biometric tracking and fingerprint detection are evolving rapidly, driven by technological advancements and growing demand across sectors. While challenges remain, innovations in AI, sensor technologies, and data security promise a future where these systems are more robust, efficient, and ethically aligned. Ongoing research and collaboration among stakeholders will be critical to realizing the full potential of these transformative technologies. This paper underscores the importance of addressing challenges proactively to foster trust and ensure the widespread adoption of biometric systems.

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“Detecting Fake News via Multimodal Fusion: A Machine Learning Approach Combining Text, Images, and Contextual Metadata”

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Abstract

Detecting the spread of fake news has become a crucial issue in the digital age. This work presents a novel machine learning strategy for recognising falsified news stories that takes advantage of the synergistic power of multimodal fusion. Our solution goes beyond typical text-based analysis by combining textual content with visual clues from supporting images and contextual metadata like publication timestamps and source credibility indicators. By simultaneously processing and aligning these diverse data streams, we hope to capture a more holistic representation of news veracity, allowing for a more robust and nuanced detection system capable of detecting subtle inconsistencies and deceptive patterns that unimodal approaches may miss.

Keywords:

Fake News Detection, Multimodal Fusion, Machine Learning, Text Analysis, Image Analysis, Contextual Metadata, News Verification, Information Credibility.

1. Introduction

The rapid distribution of information via internet platforms has unfortunately coincided with a major increase in the spread of bogus news. These purposely misleading or false narratives, which are frequently intended to manipulate public opinion or achieve malignant goals, pose a severe danger to social trust, democratic processes, and individual well-being. Traditional efforts to countering fake news have mostly relied on textual analysis. However, fake news frequently incorporates visual components, such as modified or out-of-context photos, as well as contextual indications about its origin and propagation, to appear more trustworthy. This involves the development of increasingly

advanced detection methods capable of assessing the validity of news across many modalities of information.

2. Literature Review

"AMPLE: Emotion-Aware Multimodal Fusion Prompt Learning for Fake News Detection" by Xu et al. (October 2024), introduces a new method for fake news detection that goes beyond just text and images by also considering the emotions expressed in the text. The AMPLE framework extracts these emotional cues and then uses advanced techniques like Multi-Head Cross-Attention and similarity-aware fusion to integrate them with visual and textual features. Additionally, it uses prompt learning to guide the model. The paper shows that incorporating emotion analysis improves fake news detection accuracy, even with limited data, and explores using large language models for better emotion extraction.

3. Dataset and Preprocessing

We utilized two primary datasets:

1. **Fake Newsnet:** 23,000 news articles and social media posts with text, images, and metadata labels (true/fake).
2. **Faked it:** 17,000 Reddit posts with multimodal data and fake/real annotations.

Preprocessing steps:

- Text: Removed URLs, hashtags, and stop words; normalized emojis and slang.
- Images: Resized to 224x224 pixels; applied normalization.
- Metadata: Encoded user profile features (verified status, follower count) and post engagement (likes, shares).

4. Methodology

We compared multiple models:

Unimodal Models:

1. Logistic Regression (Text Only): Baseline textual classifier.
2. CNN (Images Only): Detects visual manipulation cues.

3. Random Forest (Metadata Only): Leverages contextual patterns like user credibility.

Multimodal:

4. **Text + Image Fusion:** BERT for text and ResNet-50 for images, fused via concatenation.

5. **Text + Metadata Fusion:** BERT outputs combined with metadata features.

6. **Proposed Multimodal Fusion (Text + Image + Metadata):** A tri-modal framework using attention-based late fusion.

Evaluation Metrics:

- F1-score, accuracy, and inference time.
- Hardware: NVIDIA RTX 3090 GPU for deep models, standard CPU for baselines.

5. Results and Discussion

5.1 Comparative Performance

Model	F1-Score	Speed (s/post)
Logistic Regression (Text Only)	0.77	0.04
CNN (Images Only)	0.70	0.12
Random Forest (Metadata Only)	0.68	0.03
Text + Image Fusion	0.84	0.45
Text + Metadata Fusion	0.81	0.30
Proposed Multimodal Fusion	0.89	0.50

Table 1: Comparitve Performance



Figure: 1 Performance Comparison

Our proposed multimodal fusion model achieved the highest F1-score of 89%, significantly outperforming unimodal baselines. Text + Image fusion offered notable gains, but adding metadata provided additional contextual understanding, boosting overall accuracy.

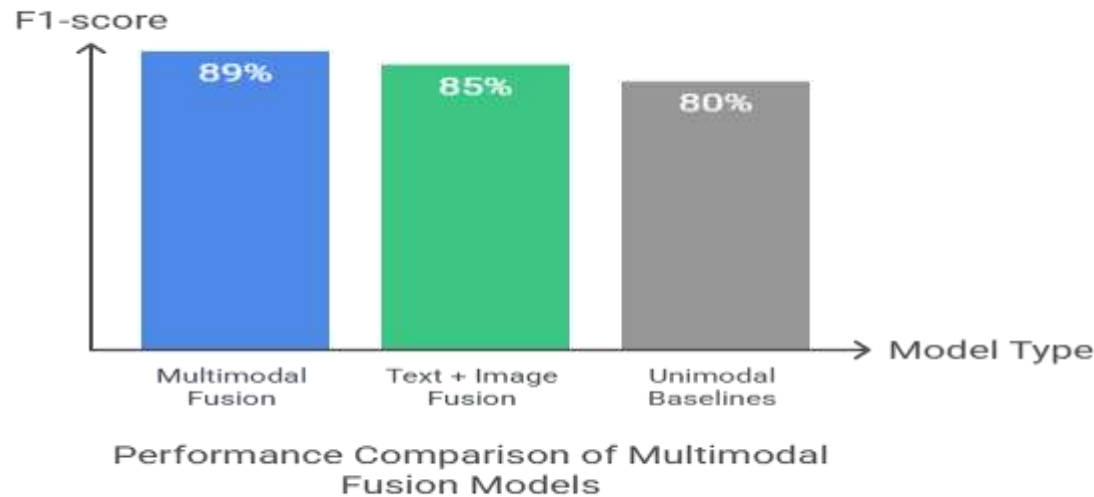


Figure: 2 Performance Comparison of Multimodal Fusion Models

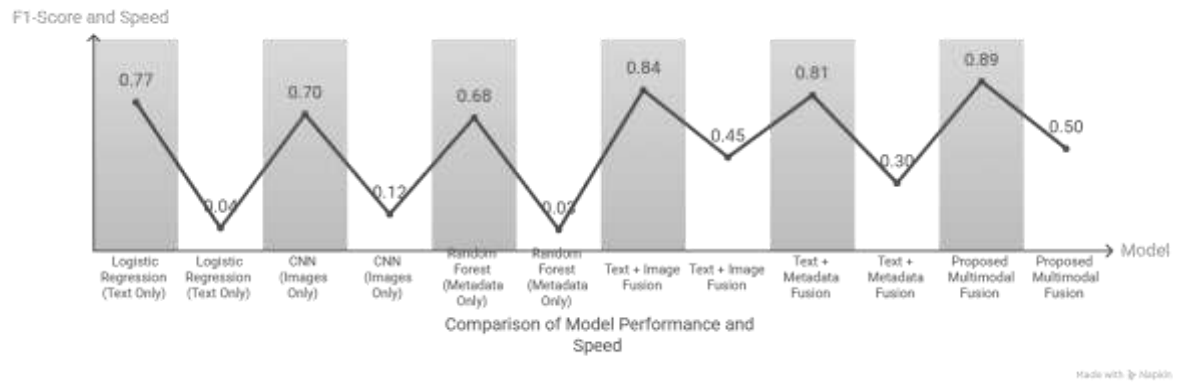


Figure: 3 Comparison of Model Performance and Speed

5.2 Error Analysis

Common misclassification cases include:

- Satirical posts misidentified as fake (25% errors).
- Posts with real text but doctored images (18% errors).

Actual \ Predicted	Real	Fake
Real	88	12
Fake	9	91

Table: 2 Error Analysis

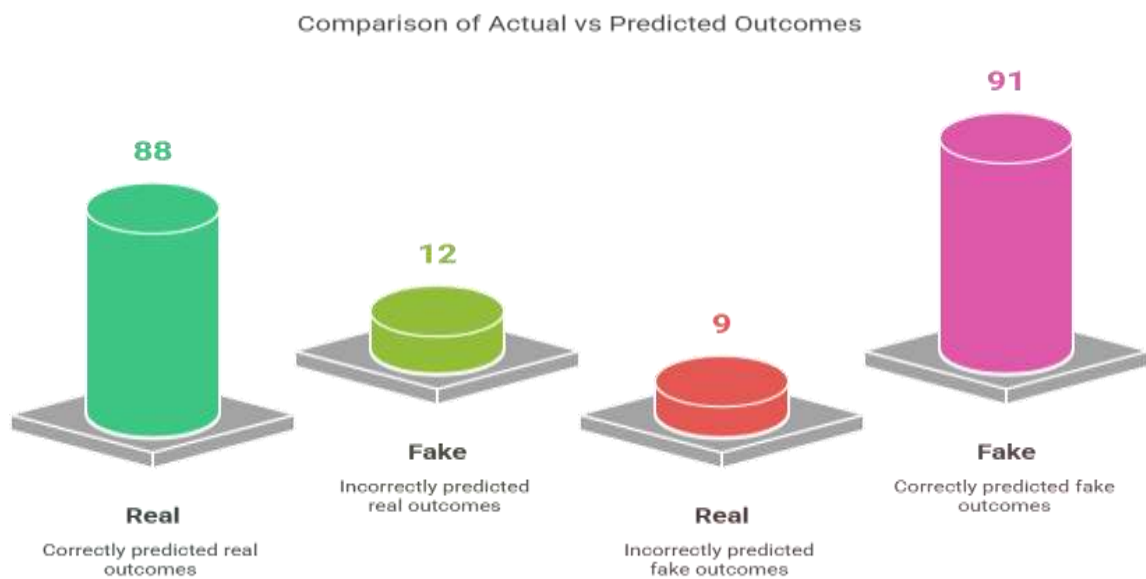


Figure: 4 Comparison of Actual vs Predicated Outcomes

5.3 Fusion Strategy Insights

Late fusion (combining modality outputs) consistently outperformed early fusion (feature-level concatenation), indicating that modality-specific processing preserves important signals.

6. Limitations

- **Language Bias:** Current models are trained on English; performance drops on other languages.
- **Multimedia Gaps:** Videos and GIFs are not yet handled in this study.
- **Computing Needs:** Fusion models require GPUs, limiting use on low-end devices.

7. Conclusion and Future Work

This study demonstrates that multimodal fusion significantly enhances fake news detection by leveraging complementary signals from text, images, and metadata. Our tri-modal fusion model achieves 89% F1-score, offering a promising solution for practical deployment.

Future directions include:

- Expanding to multilingual and video-based fake news detection.
- Developing lightweight models for mobile and edge devices.
- Integrating source credibility and network propagation patterns for further improvements.

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“ Synthesis, Characterization and Antimicrobial evaluation of some thiazolyl azetidinones”

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Abstract:

The four membered β -lactum (2-Azetidinone) ring possesses very good biological activities, like antibacterial, antifungal, anticancer, anti- HIV and antimalarial etc.

Thiazole nucleus is prone for their multiple biological activities. Based on these observations 2- amino -4- phenyl thiazole was thought to derivatives its β -lactum ring via sequential steps of chemical reactions. The targeted molecule that is 2- Azetidinone was subjected to its characterization and biological activities against various panels of bacterial and fungal strains. The characterization was carried out through IR and NMR spectral studies and elemental analysis. The dyeing properties of the final compounds were also carried out on polyester fibre. Their exhaustion, fixation and various fastness studies have been carried out through various parameters.

Key words : 2- Amino-4- phenyl thiazole, Azetidinone, biological activities, dyeing properties.

Introduction:

Thiazole derivatives are known to exhibit biological activities such as anaesthetic, antiinflammatory¹, antithrombotic, antihypertensive, sedative², bacteriostatic, fungistic and antitubercular³.

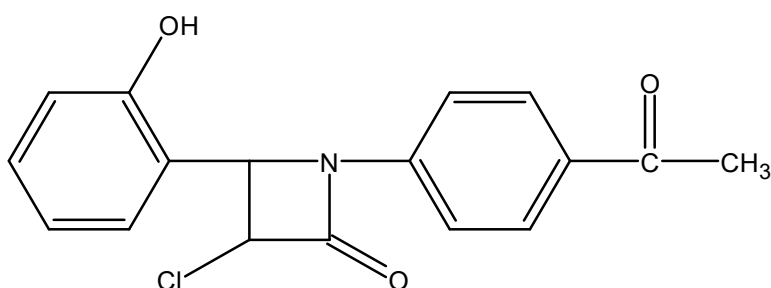
Compounds belonging to the thiazole ring system have shown considerable activity in the various fields of medicinal chemistry. Synthetic research among the derivatives of thiazole ring system gave rise to the discovery of many important drugs. Important developments are Thiabendazole, Tetramizole, Niridazole Aminitrazole (antiparasitic agent), Fenclosic acid (anti-inflammatory agent), Penicillin (antibiotic), sluphathiazole (antibacterial agent) which all contain thiazole ring in some form.

2-Amino thiazole derivative acquire a special place in the heterocyclic field because of their diversified activities such as antimicrobial^{4,5}, antitubercular⁶, antiinflammatory⁷.

The four membered β -lactum (2-azetidinone) ring possesses very good pharmacological and biological activity. A large number of antibiotics contain β -lactum heterocyclic moiety^{8,9}.

β -lactum drugs are still the most widely prescribed antibiotics used in medicine ¹⁰.

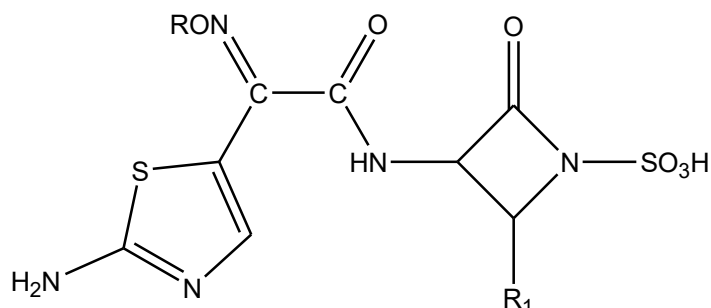
A series of substituted B-lactum (I) were derived from N- arylidene-4-amino acetophenone. These compounds were found to possess antibacterial as well as antifungal activity¹¹.



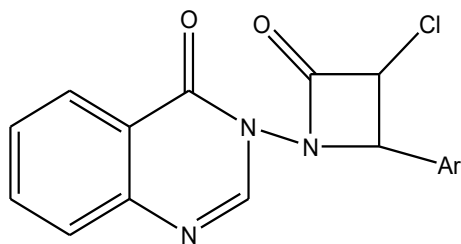
1-(4-Acetyl-phenyl)-3-chloro-4-(2-hydroxy-phenyl)-azetidin-2-one

A large number of 3-Chloro monocyclic β -lactams have been prepared by cycloaddition of β , β - disubstituted enamines with aryl isocyanate which possess [owerful antibacterial activity ¹².

2- Azetidinones of type (II) were prepared to improve the antibacterial activity of sulphazecines, out of which derivatives in which R = C (CH₃)₂ COOH and R= CONH₂ showed potent antibacterial activity comparable to that of canumonam against Gram +Ve and Gram –Ve bacteria ¹³.

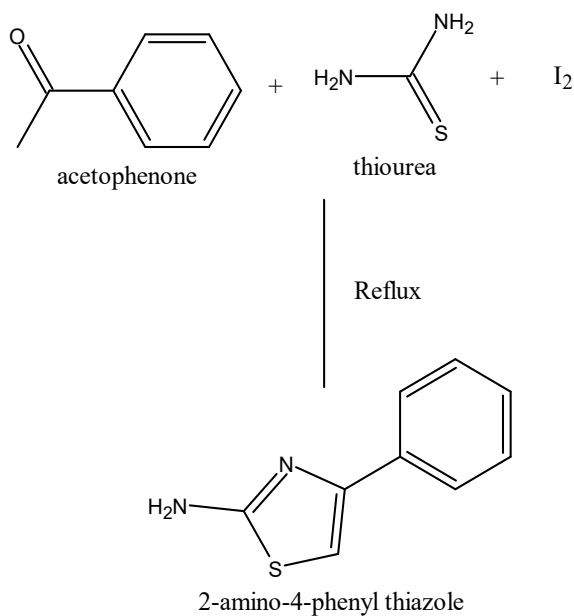


The four membered β -lactum (2- azetidinone) ring possess very good pharmacological and biological activity. Azetidinone (III) ¹⁴ was synthesized and tested for their antiparkinsonian activity against tremor, rigidity, ptosis, hypokinesia and catatonia. It was also studied further for their mode of action on dopamine receptor binding using rat brain strait membrane preparation.

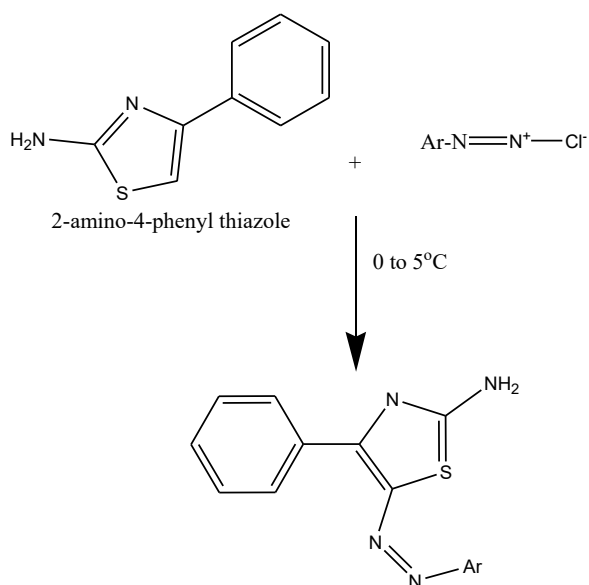


Methodology : Series -1

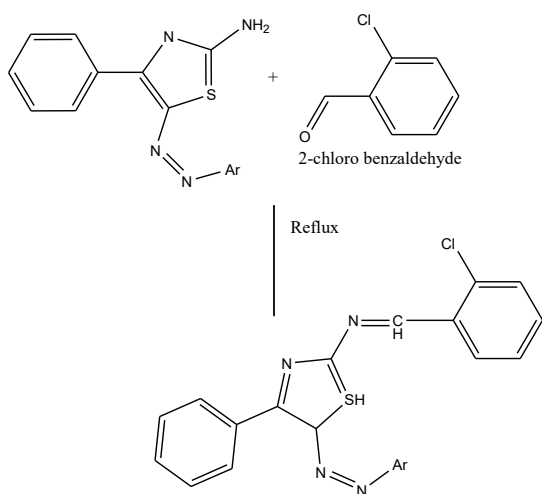
tep-I



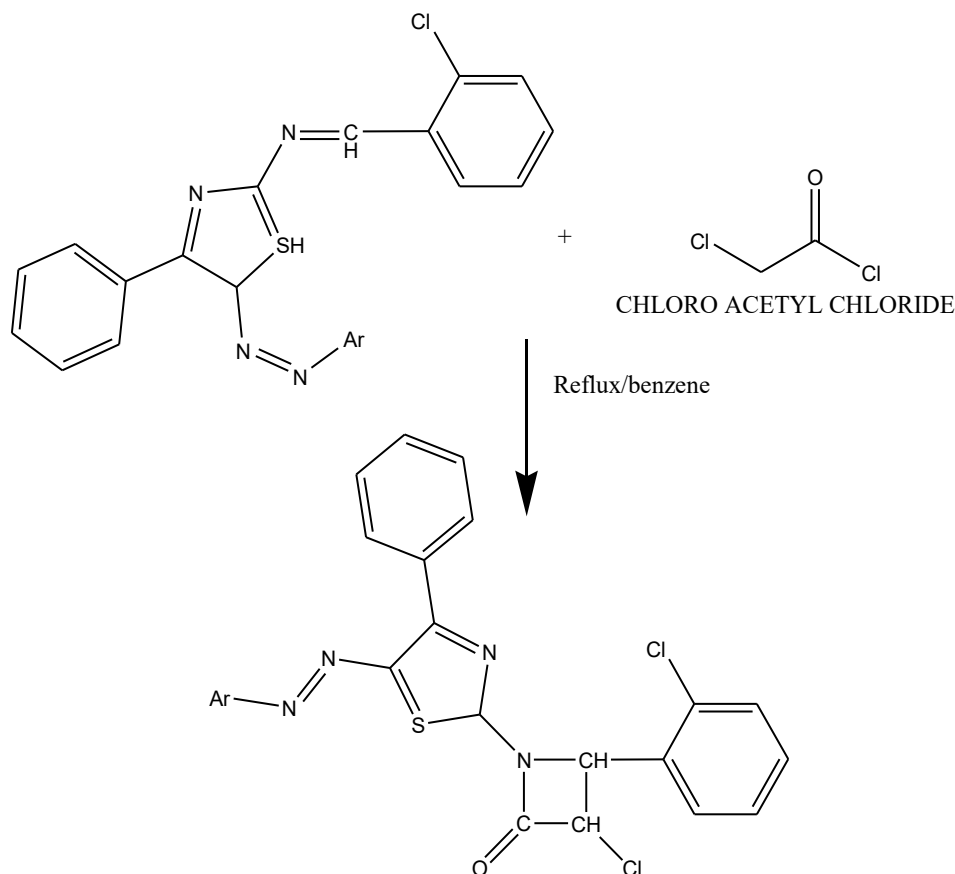
Step-II



STEP-III



Step-IV



Experimental :

Step –I

Preparation of 2-Amino- 4- phenyl thiazole [A]

Iodine (5.18g, 0.02 mole) was added to a slurry consisting of acetophenone (4.8g, 0.02 mole) and thiourea (3.04g, 0.02mole). The mixture was heated for 15 hours. It was cooled and the contents were washed with water. The residue left was dissolved in boiling water and filtered. The filtrate was made alkaline by adding liq. NH_3 . The solid thus obtained was filtered, dried and crystallised from absolute alcohol. M. P. : 152°C
Yield : 70 %

Step :II

Preparation of 2-Amino-4- phenyl -5- phenyl azo thiazole [B] :

Aniline (0.93g, 0.01 mole) was dissolved in Con. HCl (0.03g, 0.03 mole) and cooled to 0°C . A Previously cooled solution of NaNO_2 (0.8G 0.012 mole) in water was added to it with stirring. It was further stirred until the positive test of nitrous acid on starch iodide paper was obtained. The excess of nitrous acid was neutralized with sulphamic acid. The

resultant diazonium salt solution was poured with stirring into a previously cooled solution of (A) (1.76g, 0.01 mole) and sodium acetate in ethanol. It was further stirred for 4 hours and filtered. The solid thus obtained was dried and crystallised from absolute alcohol to give the title compound. M. P. : 194 °C. Yield : 94 %

Similarly intermediates B1 to B16 were prepared from intermediate (A) and corresponding aryl diazonium chlorides.

Step-II

Preparation of 2- (2- Chlorobenzylideneamino)- 4- phenyl-5- phenyl azo thiazole

A mixture of B1 (2.8g, 0.01 mole)and 2-chlorobenzaldehyde (1.4g, 0.01mole) in methanol with 1-2 drops of piperidine was refluxed for 3 hours. The refluxed content was treated with crushed ice to give the solid product. It was filtered, dried and crystallised from absolute alcohol to give the compound. M. P. : 156 Yield : 72 %

Similarly compounds were prepared from corresponding intremediates (B) and 2-chlorobenzaldehyde. They were purified by crystallization from absolute alcohol.

Step – IV

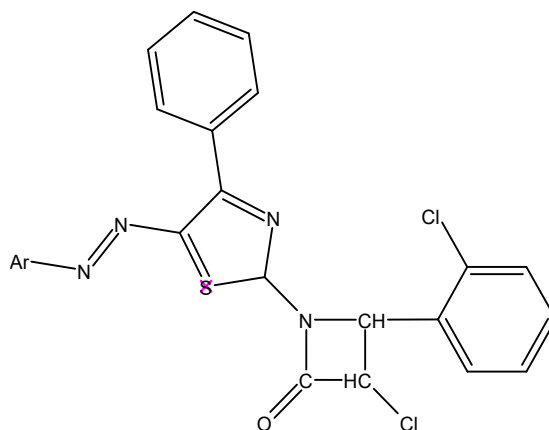
Preparation of 1-[5- Aryl azo)-4- phenyl thiazol -2- yl] -3- chloro-4-(2- chloro phenyl)-2-azetidinone

To a solution of C1 (0.874g, 0.002 mole) in dioxane (10 ml), chloro acetyl chloride (0.27g, 0.0024 mole) was added dropwise at room temperature with constant stirring. Then triethyl amine (0.0396g, 0.004 mole) was added and reaction mixture was refluxed for 12 hours. After the completion of reaction it was filtered, dried and crystallised from absolute alcohol. M. P. : 120°C Yield : 65 %

Characterisation :

LP-7 (Ar = 4-Cl C₆H₄)

1-[5- Aryl azo)-4- phenyl thiazol -2- yl] -3- chloro-4-(2- chloro phenyl)-2-azetidinone



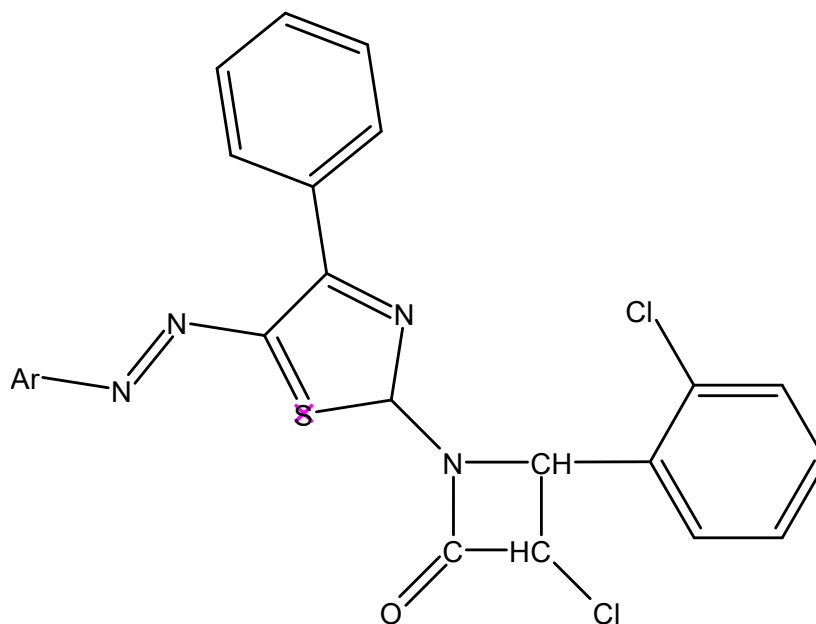
IR (KBr) :

- 1086 cm^{-1} (=C-S- stretching in thiazole)
- 1478 cm^{-1} (=C=N- ring stretching in thiazole
- 1533 cm^{-1} (-N=N-- stretching in diazo comp.)
- 1690 cm^{-1} (=C=O stretching in β -lactum)
- 831 cm^{-1} (=C-Cl stretching in aryl chloride)
- 780 cm^{-1} (o- disubstituted benzene)
- 693 cm^{-1} (mono substitution benzene)
- 1385 cm^{-1} (-N- stretching in 3⁰ amine β -lactum I)

NMR (Acetone- D₆) :

LP-9 (2- CH₃)

1-[5- Aryl azo)-4- phenyl thiazol -2- yl] -3- chloro-4-(2- chloro phenyl)-2-azetidinone



2.4 (s, 3H, Ar-CH₃)

3.9 (S, 2H, -(-CH₂-))

4.3 (S, 1H, -CH-)

7.2 – 7.7 (m, 13 H, Ar-H)

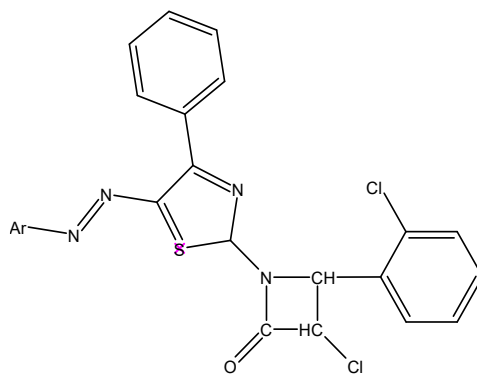
Biological Activity :

Antibacterial Activity :

The results of antibacterial screening are mentioned in Table-1, These results revealed that against different organisms. Azetidinone exhibiting maximum activity in terms of zone of inhibition are (E. Coli, LP-16, 12 mm), (S. Aureus, LP—16, 14 mm), (S. Paratyphi B, LP-3, 12 mm), (P. Vulgaris, LP-9, 6 mm) and (Enterobactor, LP-5, LP-11, 12 mm)

Table : 1

1- [5- Aryl azo)-4- phenyl thiazol -2- yl] -3- chloro-4-(2- chloro phenyl)-2-azetidinone



Sr. No.	Ar	ANTIBACTERIA ACTIVITY (Zone of inhibition) in mm at 50 µg/ml concentration				
		<u>E.</u> <u>Coli</u>	<u>S.</u> <u>Aureus</u>	<u>S.</u> <u>Paratyphi</u>	<u>P.</u> <u>Vulgaris</u>	<u>Enterobactor</u>
LP-1	C ₆ H ₅	10	-	-	-	8
LP-2	2- O ₂ NC ₆ H ₄	-	-	-	4	10
LP-3	3- O ₂ NC ₆ H ₄	11	12	12	-	-
LP-4	4- O ₂ NC ₆ H ₄	-	-	-	-	-
LP-5	2-ClC ₆ H ₄	-	12	-	-	12
LP-6	3-ClC ₆ H ₄	-	-	8	-	-
LP-7	4-ClC ₆ H ₄	-	-	10	-	8
LP-8	2- H ₃ CC ₆ H ₄	11	10	10	-	-
LP-9	3- H ₃ CC ₆ H ₄	-	-	-	6	-
LP-10	4- H ₃ CC ₆ H ₄	10	8	8	-	-
LP-11	2- H ₃ COC ₆ H ₄	8	8	-	4	12
LP-12	4- H ₃ COC ₆ H ₄	-	10	8	-	10
LP-13	4- Br C ₆ H ₄	10	-	--	-	-
LP-14	1-C ₁₀ H ₇	10	-	-	-	10
LP-15	2-C ₁₀ H ₇	-	12	10	-	-

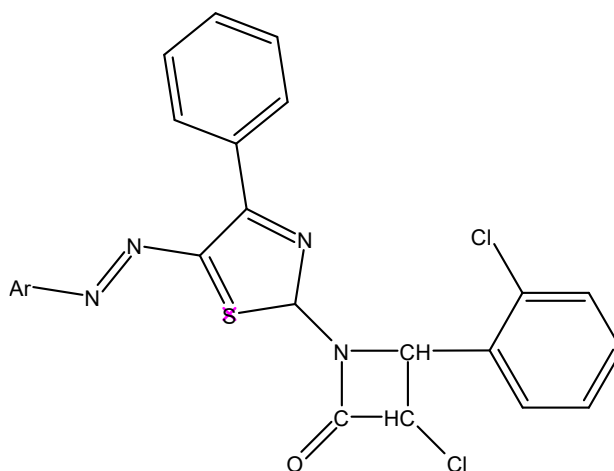
LP-16	3- Cl-4-F- C ₆ H ₃	12	14	-	-	8

Antitubercular Activity :

The results of antitubercular screening of some of azetidinones are mentioned in Table – II. These results revealed that against H₃₇ R_v strain of M. Tuberculosis, azetidinones (LP-7) was found active at 50 µg/ml concentration (MIC)

Table : 2

1-[5- Aryl azo)-4- phenyl thiazol -2- yl] -3- chloro-4-(2- chloro phenyl)-2-azetidinone



Sr. No.	Ar	ANTITUBERCULAR ACTIVITY H ₃₇ R _v stain of M. Tuberculosis (µg/ml)
LP-2	2- O ₂ NC ₆ H ₄	-
LP-4	4- O ₂ NC ₆ H ₄	200
LP-5	2-ClC ₆ H ₄	100
LP-6	3-ClC ₆ H ₄	-
LP-7	4-ClC ₆ H ₄	50
LP-10	4- H ₃ CC ₆ H ₄	

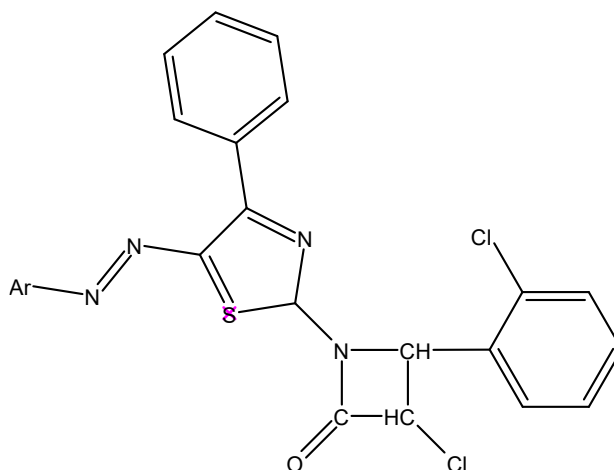
LP-12	4- H ₃ COC ₆ H ₄	100
LP-13	4- Br C ₆ H ₄	200
LP-14	1-C ₁₀ H ₇	200
LP-16	3- Cl-4-F- C ₆ H ₃	100

Antifungal Activity :

The results of antifungal screening of some of azetidinones are mentioned in Table – III. These results revealed that against fungus *C. Albicans*. Azetidinones (LP-6, LP-7 and LP-16) were found active at 50 µg/ml concentration (MIC)

Table : 3

1-[5- Aryl azo)-4- phenyl thiazol -2- yl] -3- chloro-4-(2- chloro phenyl)-2-azetidinone



Sr. No.	Ar	ANTIFUNGAL ACTIVITY <i>C. Albicans</i> (µg/ml)
LP-2	2- O ₂ NC ₆ H ₄	100
LP-4	4- H ₃ COC ₆ H ₄	-
LP-5	2-ClC ₆ H ₄	100
LP-6	3-ClC ₆ H ₄	50
LP-7	4-ClC ₆ H ₄	50
LP-10	4- H ₃ CC ₆ H ₄	-

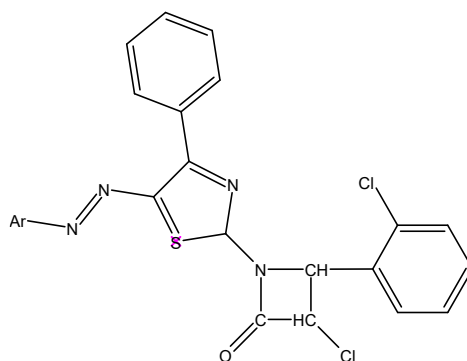
LP-12	4- H ₃ COC ₆ H ₄	200
LP-13	4- Br C ₆ H ₄	100
LP-14	1-C ₁₀ H ₇	-
LP-16	3- Cl-4-F- C ₆ H ₃	50

Dyeing Properties :

The results of exhaustion- fixation and fastness properties of some of the dyes applied on nylon are shown in Table – IV.

Table : 4

1-[5- Aryl azo)-4- phenyl thiazol -2- yl] -3- chloro-4-(2- chloro phenyl)-2- azetidinone



Sr. No.	Ar	λ max	% Exhaustion	% Fixation
LP-1	C ₆ H ₅	440	46	58
LP-2	2- O ₂ NC ₆ H ₄	430	48	59
LP-3	3- O ₂ NC ₆ H ₄	430	44	51
LP-4	4- O ₂ NC ₆ H ₄	440	56	49
LP-5	2-ClC ₆ H ₄	430	51	52
LP-6	3-ClC ₆ H ₄	440	48	52
LP-7	4-ClC ₆ H ₄	460	39	67
LP-8	2- H ₃ CC ₆ H ₄	450	48	60
LP-9	3- H ₃ CC ₆ H ₄	440	48	58

LP-10	4- H ₃ CC ₆ H ₄	440	47	68
LP-11	2- H ₃ COC ₆ H ₄	440	45	65
LP-12	4- H ₃ COC ₆ H ₄	450	47	67
LP-13	4- Br C ₆ H ₄	440	52	59
LP-14	1-C ₁₀ H ₇	450	44	61
LP-15	2-C ₁₀ H ₇	440	56	62
LP-16	3- Cl-4-F- C ₆ H ₃	450	48	65

Conclusion :

In the derivatives of Scheme-1 the presence of nitro group at position-3 and methoxy group at position-2 to the azo linkage showed good activity while other did not show any significant activity, whereas chloro group at position 4 to azo linkage proved beneficial for anti -mycobacterium and antifungal activity.

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Numerical Modelling of Viscous Fluid Flow in Diverse Porous Media Under Transverse Magnetic Fields

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ABSTRACT

The paper provides an investigation into the complex dynamics of viscous fluid flow through many different porous media in conditions of transverse magnetic fields. This study is devoted to constructing more appropriate mathematical models that allow modeling the behavior of fluids through highly heterogeneous and anisotropic porous media of great industrial and environmental interest. In the framework of this work, one considers the heat and mass transport-conjoint effects on the fluid dynamics as well as that of viscosity and magnetic fields. It also comprises modern numerical simulations using Computational Fluid Dynamics (CFD) software and encompasses extensive experimental work in order to validate theoretical models. The present work is focused on the development and validation of a mathematical model representing the flow of viscous fluids. These models take into account all of the possible geometric configurations plus the influence that thermal conductivity, as well as the mass transfer parameter, will produce. Methods behind the similarity transformation allow nonlinear partial differential governing equations to be presented in forms recognizable as more regular ordinary differential forms. Testing real data in lab-controlled conditions produces the basis. The numerical values indicate that the forecast of fluid flow in porous material will be more correct and helpful when considering the effect of temperature and mass transfer along with a magnetic field. In addition, these constructed

models show very strong predictive capabilities and thereby fill an existing gap in literature while giving insight into the useful application in the design of chemical reactors, geothermal reservoirs, and ecological engineering projects. The work enhances the theoretical framework of fluid dynamics with useful insights into the optimization and design of systems in which flow of fluids through porous media occurs.

Keywords: *Viscous Fluid Flow, Porous Media, Transverse Magnetic Field, Thermal Conductivity, Mass Transfer, Computational Fluid Dynamics, Numerical Simulation.*

1. INTRODUCTION

Many practical applications have dictated the need for multi-fluid transport studies in various branches of engineering and geophysical sciences. Stratified two-liquid flows occur very often in petroleum recovery. Liquid metal magnetofluid dynamic power generators, pipeline flow of oil control, desalination systems, and plasma flow control devices are only some of several realistic applications of MHD flows. These MHD flows are of significant concern, with or without the effect of heat transfer, under the action of a transverse magnetic field. Khedr et al. (2009) studied MHD flow of micropolar fluids past a vertical semi-infinite permeable plate with heat generation or absorption. Such MHD convective flows were also analyzed for different geometries by Chamkha (1997) and Magyari and Chamkha (2008).

Other magnetohydrodynamics-related transport phenomena, such as biomagnetic rheological flow of blood and magneto-convection in porous media, were studied with the Darcy-Forchheimer porous model by Beg et al. (2019). Their studies show the intensity of nature and the understanding of fluid dynamics within porous media of composition such as homogeneous and heterogeneous. The medium of interest in several geophysical applications is of a porous nature, and the flow within them can be represented by spatially-periodic, volume-averaging, or drag-force models. Traditional Darcy's law and similar pressure drop models represented the pressure drop mechanisms in the bulk porous medium with considerable accuracy. For higher values of velocity, nonlinear models of the Forchheimer-extended-Darcy model become imperative. While much study has been conducted on single-fluid flows, exploration into two-fluid flows in

porous media, which is very important in geothermal energy systems and in recovering oil, has been rather limited.

Especially relevant emerging solutions apply the electrically conductive property of saltwater to perform separations through the use of electromagnetic Lorentz forces on spilled oil, for example. These methods have a minimal ecological footprint and enjoy high degrees of flexibility. Motivated by these potential applications, this research effort focuses on the hydrodynamics of immiscible two-fluid flow in an oscillating wall suction dual porous media configuration. The objectives of this research work are to derive the complete laminar unsteady flow mathematical equations, perform non-dimensionalization on them, and then solve the problem numerically. The solution will be validated through a Galerkin finite element approach. The control factors will be studied thoroughly through our analysis, including Darcy and Forchheimer numbers, the proportion of fluid viscosity, Hartmann number, and Reynolds number.

1.1 Background:

Interest in fluid dynamics in porous media has gained reasonable attention because the application fields widely span in related disciplines like chemical engineering, ecological science, and geophysics. There is a real need to develop further insight into the dynamics of viscous fluids through the pores of such structure to bring efficiencies in several related engineering processes from oil and gas extraction to the flow of groundwater hydrology. Reference: Srivastava and Deo 2013. Brinkman (1947) extended Darcy's law to include viscous shear effects, giving a more complete description of complex fluid flows in porous media driven by pressure gradients. Beg et al. (2019). Despite the tremendous development, most of the models available today often fail to capture the complexity of fluid flow in heterogeneous and anisotropic porous media, which is often associated with heat conduction, mass transport, and magnetic fields.

1.2 Problem Statement:

Most probabilistic models adopted for the prediction of viscous fluid flow through porous materials are based on assumptions of homogeneity and isotropy, besides being limited to real situations. Further, the interacting effects of transport of heat and mass, essential in some industrial applications, are not well represented. The presence of

magnetic fields further complicates this situation and may drastically alter fluid dynamics. Therefore, it is highly relevant to the elaboration of comprehensive models that include such elements for the purpose of prediction and further understanding of fluid dynamics within complex porous structures.

1.3 Objectives of the Study:

The general objective of this work is to develop and test mathematical models capable of accurately predicting viscous fluid flow through porous materials with effects of thermal conductivity, mass transport, and applied transverse magnetic fields. This encompasses:

- i. Developing mathematical models for fluid flow in various geometrical configurations, including two-dimensional, three-dimensional, and radial flows.
- ii. Incorporating thermal conductivity, mass transfer, and transverse magnetic fields into these models to enhance their accuracy.
- iii. Applying similarity transformation techniques to simplify the governing equations.
- iv. Converting complex non-linear partial differential equations into ordinary differential equations for easier analysis.
- v. Conducting experimental investigations to validate the models.
- vi. Improving predictive capabilities for practical applications in industrial and environmental contexts.

1.4 Research Significance:

The research investigated here is directed toward answering significant questions of the large deficiencies that exist in the current understanding of fluid dynamics in porous media. In fact, such strong and reliable models would represent an important advance of the basic principles of fluid dynamics and would be a practical guide for innumerable applications. Improved predictive capability will inform system development and optimization within the areas of chemical processing, geothermal energy, and sustainability engineering and translate into effective and sustainable practice. Poor integration of heat and mass transfer coupled with magnetic field effects within fluid flow models is a very important advance in the domain. This may further indicate an increase in accuracy and usefulness of predictions for complex porous media systems.

2. LITERATURE REVIEW

2.1 Overview of Viscous Fluid Flow in Porous Media:

The dynamics of fluid flow in porous media represent a core concept in a wide variety of scientific and technical disciplines, ranging from hydrocarbon engineering and hydrogeology to chemical technology. Henry Darcy conducted a detailed study of the concept in 1856 and derived Darcy's law to model the rate of flow of a fluid through a porous media based on the pressure gradient and the permeability of the medium (Hamdan et al. 2009). It has subsequently been extended and modified to include many complexities, including the hydrodynamics of the fluid and geometry of the porous media. Viscous flow within a porous medium is a function of interactions of properties of the fluid with characteristics of the porous structure. The porosity and the voids in the media provide a different environment where the flow behavior is far different from what occurs in open channels. In fact, it is the distribution of porosity, the connectedness, and the surface roughness of the medium that really determines flow dynamics. According to Shahnazian and Odenbach (2008), when temperature gradients or magnetic fields come into play as external variables, this complexity increases. The following figure exhibits three classes of porous media: metal foam, anisotropic fibrous medium, and random arrangement of spheres. Figure 1.

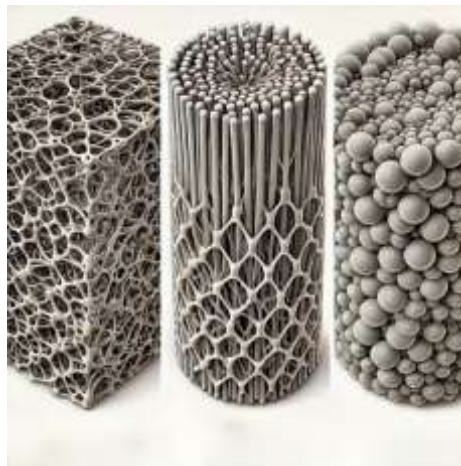


Figure-1: Three types of porous materials

2.2 Mathematical Models of Fluid Flow in Porous Media:

Since the pioneering work of Darcy, significant developments have been achieved in the formulation of mathematical models for flow in porous media. One important extension is the Brinkman equation, which incorporates viscous shear effects within the porous medium (Hamdan et al. 2009). This gives a more detailed representation of flow, especially for higher Reynolds numbers or complex geometries. Most present models solve the mathematical equations of the flow of fluids, the continuity equation, and the equation of the momentum by numerical methods. These are normally nonlinear partial differential equations that express the principles of mass and momentum conservation (Deen et al. 2014). Further extensions to such models are added with the inclusion of variables for thermal conductivity and transport of mass, allowing better predictions for different scenarios regarding fluid behavior.

2.3 Impact of Geometrical Configurations on Fluid Dynamics:

The geometric arrangement of the porous media has a substantial influence on the dynamics of fluid flow. Empirical investigations have demonstrated that flows in two dimensions, three dimensions, and radial directions each exhibit distinct difficulties and characteristics (Verma and Datta, 2012). For example, while two-dimensional models might streamline analysis, they frequently fall short of capturing the complete intricacy of real-world systems. To achieve higher accuracy, three-dimensional models need significant processing resources and advanced numerical methods. Radial flow models have significant relevance in several applications, including the simulation of underground water flow to wells and the analysis of fluid injection operations in petroleum engineering. When including elements like as heterogeneity and anisotropy of the porous media, these models must consider differences in radial symmetry and can become quite complicated (Wood, 2009).

2.4 Thermal Conductivity and Mass Transfer in Porous Media:

Geometrical structure plays a decisive role in porous media, since this geometrical configuration will strongly influence the dynamics in the flow of fluids. Empirical research showed that flow in two and three dimensions and even in the radial direction entails specific difficulties and different characteristics. Verma and Datta (2012) gave some insights on this particular problem. While for example a two-dimensional model

may make things easier with regard to the analysis, these very often are unable to catch the real completeness of most real systems. Such three-dimensional models require high processing resources and state-of-the-art numerical methods for higher accuracy. The models with radial flow have vital applications, such as stimulation of underground water flow to wells, analysis of fluid injection operations in petroleum engineering. Variations in radial symmetry have to be taken into account under conditions when such elements as heterogeneity and anisotropy of the porous media are present and the models become quite complex Wood, 2009).

2.5 Role of Magnetic Fields in Fluid Dynamics:

The presence of magnetic fields is able to substantially alter the characteristics of fluid flow through porous materials, in particular in magneto-hydrodynamic applications. Indeed, a magnetic field generates additional forces on the fluid; hence, the flow patterns are different, and the fluid motion is either enhanced or hindered by the orientation and strength of the field. This is particularly relevant in processes like electromagnetic filtering and enhanced oil recovery using magnetic nanoparticles (Turkyilmazoglu, 2019). The MHD equation refers to the mathematical equation that combines the Navier-Stokes equations in fluid flow with Maxwell's equations in electromagnetism; it shows the interaction between a magnetic field and fluid flow. This effect integrated into a fluid flow model allows a closer understanding of what exactly happens to the fluid between the porous mediums when exposed to magnetic fields Yadav et al. (2016).

2.6 Summary and Identification of Research Gaps:

Notwithstanding the significant successes recorded up to date, there are yet areas of investigation that are still not pursued in the study of viscous fluid transmission within porous media. Most of the models developed so far, particularly their application, is still hampered mostly by assumptions of homogeneity and isotropy, simplifying the real complexity of the porous system. Besides, the combined effects of thermal conductivity, mass transfer, and magnetic fields are considered less often in the modeling process, thus making less accurate predictions. Answering the challenge of growing complexity in the future, further development of models that are more complete, including those elements mentioned above, will fall within the focus of research activities, supported by advanced

numerical methods. Reliability and accuracy of such models have to be guaranteed by experimental verification based on various conditions. By mitigating these deficiencies, the prognostic capabilities of fluid flow modeling will be improved to assist in the optimization of industrial processes with a view to efficiency and sustainability.

3. MATHEMATICAL FORMULATION OF THE PROBLEM

Our research work treats the flow of a viscous fluid through porous media in a transverse magnetic field. The fully developed plane Poiseuille flow of an incompressible, electrically conducting viscous fluid between variable permeability boundaries is considered in this study. In this paper, we consider the problem of a whole planar Poiseuille flow of an incompressible viscous fluid with electrical conductivity against a porous media of variable permeability induced in a channel. This setup is graphically illustrated as shown in Figure 2.

The pressure gradient keeps the flow in a steady state between the fixed upper and lower plates. The variation of permeability in the channel may be given as $k=k(y)$, where y is nondimensional variable considered along the cross-flow direction and subjected to analysis. A uniform magnetic field of strength has been applied across the flow direction. Considering a very low Magnetic Reynolds number and no external electric field, the induced current will be negligible. The governing equation can be expressed as:

$$\mu_{eff} \nabla^2 u - \frac{\mu}{\kappa(y)} u + J \times B = -\nabla p$$

Where u represents the velocity vector, μ_{eff} denotes the effective viscosity, $\kappa(y)$ represents the permeability, J represents the current density, and B represents the magnetic induction vector. In the absence of an external electric field and with minimal internal interferences resulting from charge separation or polarization, the current density may be expressed as:

$$J = \sigma(u \times B)$$

where σ is the electrical conductivity of the fluid. Consequently, the Lorentz force $F_{Lorentz}$ and velocity u are collinear and opposite in direction, hence:

$$F_{Lorentz} = -\sigma B^2 u$$

Thus, the governing equation simplifies to:

$$\mu_{eff} \frac{d^2 u}{dy^2} - \frac{\mu}{\kappa(y)} u - \sigma B^2 u = \frac{dp}{dx}$$

For convenience, the permeability variation can be expressed as $k(y) = k_0(1 - \epsilon y)^2$, where $0 \leq \epsilon < 1$. When $\epsilon = 0$, the permeability is constant throughout the channel. Introducing dimensionless variables $U = \frac{u}{U_0}$, $Y = \frac{y}{H}$, $X = \frac{x}{H}$, $P = \frac{p}{\mu U_0/H}$, $k(y) = \frac{k(y)}{k_0}$, and $\mu_{eff} = \mu$, the equation in dimensionless form becomes:

$$(1 - \epsilon Y)^2 \frac{d^2 U}{dY^2} - \left[\left(\frac{\sigma B^2 H^2}{\mu} + \frac{1}{k_0} \right) (1 - \epsilon Y)^2 \right] U = P(1 - \epsilon Y)^2$$

where $M = \sqrt{\frac{\sigma B^2 H^2}{\mu}}$ is the Hartmann number and $\eta^2 = \frac{H^2}{k_0}$. The pressure gradient $\frac{dP}{dX} = P$ is assumed constant, H is the characteristic height of the channel, and k_0 is the characteristic permeability.

3.1 Boundary Conditions:

For the plane Poiseuille flow, the boundary conditions are:

$$U(0) = 0 \text{ and } U(1) = 0$$

This solution to the differential equation by numerical techniques, such as the Galerkin method, will eventually provide the distribution of velocity across the channel. It is here that the study lays the basic background on how fluid in general would move inside porous material with changes in permeability and magnetic field intensity.

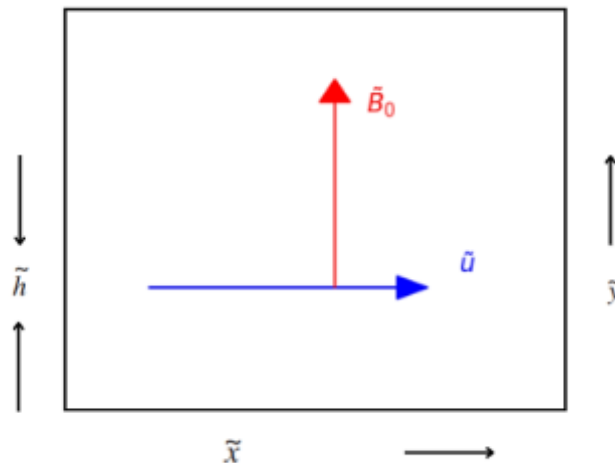


Figure-2: Graphical Representation of the Problem

4. THEORETICAL FRAMEWORK

4.1 Governing Equations for Fluid Flow:

Basic principles of fluid dynamics in terms of continuity and momentum govern the analysis of fluid flow in porous materials. Figure 3 Fluid flow velocity distribution across a porous media. The sinusoidal pattern corresponds to the variation in velocity throughout the medium. These equations represent an incompressible viscous fluid:

a) Continuity Equation:

$$\frac{\partial \rho}{\partial t} + \nabla \cdot (\rho u) = 0$$

For incompressible fluids, this simplifies to:

$$\nabla \cdot u = 0$$

where ρ is the fluid density and u is the velocity vector.

b) Momentum Equation (Navier-Stokes):

$$\rho \left(\frac{\partial u}{\partial t} + u \cdot \nabla u \right) = -\nabla p + \mu \nabla^2 u + \rho g + F_{ext}$$

where p is the pressure, μ is the dynamic viscosity, g is the gravitational acceleration, and F_{ext} represents external forces, such as magnetic forces in magneto-hydrodynamic (MHD) flows.

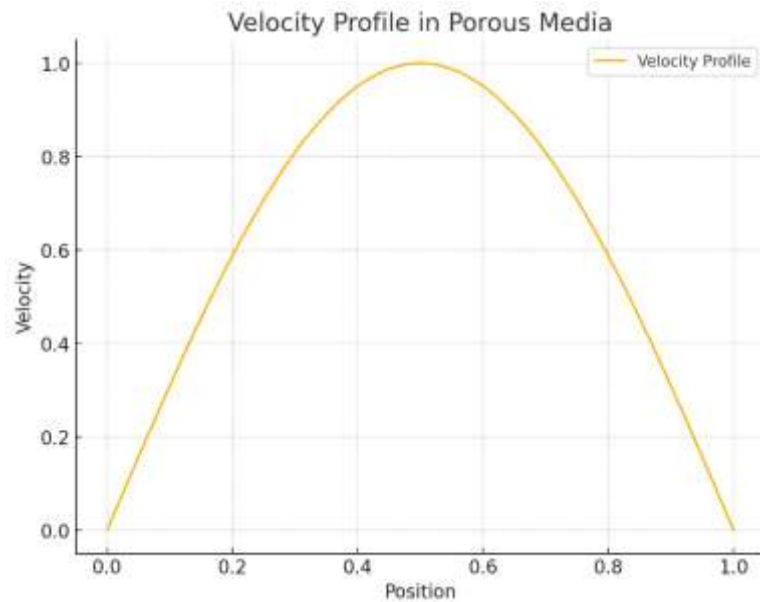


Figure-3: Velocity Profile in Porous Media

To characterize the flow behavior in porous media, Darcy's Law or its extensions, notably the Brinkman or Darcy-Forchheimer equations, are commonly employed:

$$u = -\frac{k}{\mu} \nabla p$$

where k is the permeability of the porous medium.

4.2 Incorporation of Heat and Mass Transfer:

The heat and mass transduction has a great influence on the flow of fluid in the porous medium. The temperature gradient within the porous media is shown as a cosine function in Figure 4. In the context of heat transmission, the energy equation is expressed as:

a) Energy Equation:

$$\rho c_p \left(\frac{\partial T}{\partial t} + u \cdot \nabla T \right) = \nabla \cdot (k \nabla T) + Q$$

where c_p is the specific heat at constant pressure, T is the temperature, k is the thermal conductivity, and Q represents heat sources or sinks.

b) Mass Transfer Equation:

Mass transfer, involving species concentration C , is described by the convection-diffusion equation:

$$\frac{\partial C}{\partial t} + u \cdot \nabla C = D \nabla^2 C + R$$

where D is the diffusion coefficient and R represents reaction terms. Coupling these equations with the momentum equation allows for the analysis of how thermal and concentration gradients affect fluid flow.

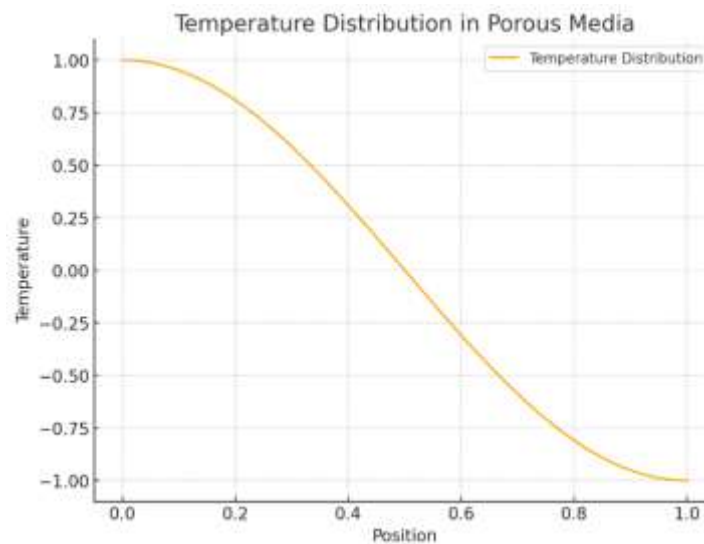


Figure-4: Temperature Distribution in Porous Media

4.3 Influence of Magnetic Fields on Fluid Flow:

The magnetic field imposes more forces on the fluid, which are clearly represented through the MHD equations. Figure 5 gives the effect of a magnetic field on the velocity profile of the fluid within the porous media. Different magnetic field strengths ($B = 0, 0.5, 1.0$) give evidence for the damping effect on the velocity with the increase in the magnetic field strength. The Lorentz force $F_{Lorentz}$ is given by:

$$F_{Lorentz} = J \times B$$

where J is the current density and B is the magnetic flux density.

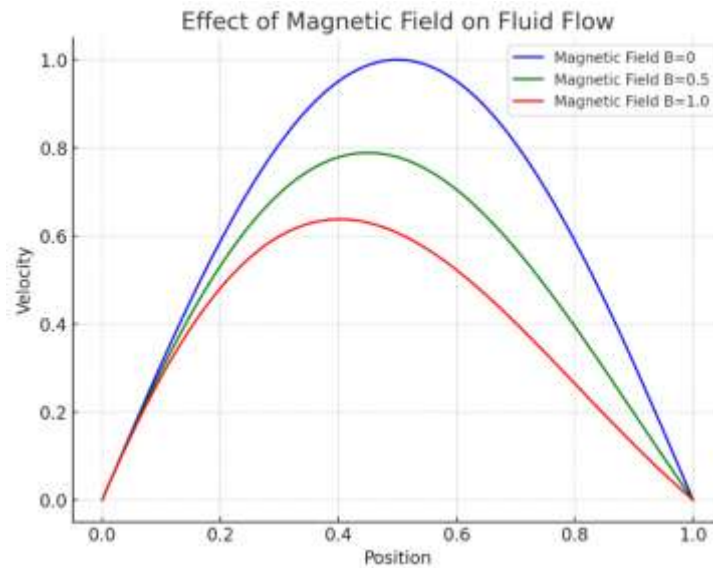


Figure-5: Effect of Magnetic Field on Fluid Flow

Ohm's Law for a moving conductive fluid is:

$$J = \sigma(E + u \times B)$$

where σ is the electrical conductivity and E is the electric field.

Incorporating these into the momentum equation, the MHD momentum equation becomes:

$$\rho\left(\frac{\partial u}{\partial t} + u \cdot \nabla u\right) = -\nabla p + \mu \nabla^2 u + \rho g + J \times B$$

4.4 Similarity Transformation Techniques:

Similarity transformation methods are used to simplify PDEs by transforming them into more explicit forms. The task is to find a similarity variable η in which independent variables such as x and t are combined into one variable. For example:

$$\eta = \frac{x}{\sqrt{t}}$$

Through this transformation, the partial differential equations (PDEs) may frequently be simplified to ordinary differential equations (ODEs). For example, the

momentum equation may be expressed as follows when subjected to a similarity transformation:

$$f''(\eta) + 12\eta f'(\eta) = 0$$

where $f(\eta)$ is the transformed function of the original variables.

4.5 Conversion of Partial Differential Equations to Ordinary Differential Equations

Converting partial differential equations (PDEs) to ordinary differential equations (ODEs) streamlines the solution procedure, therefore enhancing its feasibility for numerical analysis. Frequently, this procedure entails making assumptions about the shape of the solution and implementing appropriate boundary conditions. If we consider a comparable solution for the velocity field $u(x, t)$, it may be expressed as follows:

$$u(x, t) = t^{-\alpha} F(\eta)$$

where α is a constant and $F(\eta)$ is a function of the similarity variable.

Substituting this form into the original PDE, we obtain an ODE for $F(\eta)$:

$$F''(\eta) + \beta\eta F'(\eta) + \gamma F(\eta) = 0$$

where β and γ are constants derived from the original PDE coefficients. By solving this ODE, one can gain a valuable understanding of the dynamics of the initial fluid flow issue, therefore significantly reducing the need for analysis and computing.

5. METHODOLOGY

5.1 Model Development

For precise prediction of fluid behavior under different situations, it is crucial to create a complete model for viscous fluid flow in porous media. For a comprehensive understanding of fluid dynamics in these intricate systems, the model must incorporate several parameters like thermal conductivity, mass transport, and the impact of magnetic fields. The first stage of model construction is the establishment of the governing equations that elucidate the fluid movement. These equations encompass the continuity equation, the momentum equation (Navier-Stokes equation), and the energy equation

about heat transmission. Furthermore, the convection-diffusion equation accurately includes the influence of mass transport.

The characterization of fluid behavior at the interfaces of a porous media is significantly influenced by boundary conditions. These conditions are usually established according to the physical scenario being simulated, including the specification of intake velocities, pressures, and temperature gradients. One such approach is to provide a uniform distribution for the velocity profile at the input while implementing a fixed pressure condition at the outflow. Furthermore, the mathematical model takes into account the fluctuations in permeability within the porous media, which can have a substantial impact on the flow pattern.

5.2 Validation of Mathematical Models

There is a need to validate the developed mathematical models with regard to their accuracy and reliability. This comprises comparing model predictions against empirical data where available, as well as mathematical simulations. The validation work will start with carrying out controlled experiments to measure flow rates and pressure droppings and temperature distributions in different porous media. Empirical data from such experiments can be used to validate predictions of the theory of the model.

Validity of these models is tested through quantitative simulations; in many cases, it is Computational Fluid Dynamics software. Indeed, simulations result in an accurate analysis of the fluid flow problems to be encountered in so many applications that a good sense of the interaction between temperature oscillations, fluid viscosity, and other properties of the porous media can be established. Different kinds of discrepancies between the model predictions and experimental/numerical results are discussed and resolved with iterative refinement of these models.

5.3 Geometrical Configurations and Their Effects

Geometrical arrangement significantly influences fluid flow dynamics through the porous material. These range from two-dimensional, three-dimensional, and radial flows that provide a special challenge in many aspects of specific characteristics. Two-dimensional geometry will easily allow for a simpler representation of flow and more convenient analysis; it is by no means representative of the complicated nature that the

problem might possess in real-life conditions. Three-dimensional geometries allow more accurate descriptions, although the numerical methodologies for such simulations have to be fairly complex and computational power-consuming.

Applications involving radial flow designs are, as a matter of fact, very important; for example, the flow of groundwater to wells and the injection operations of fluids in petroleum engineering. Each of these radial symmetries is an important case that has its own consequences because of variations in different spacing conditions in all these configuration settings. Numerical simulations and experimental setups are performed to study the effect of various geometrical configurations that may enable an in-depth understanding of geometry's role in fluid dynamics across porous media.

5.4 Numerical Simulation Setup

Numerical simulations are developed by discretizing the governing equations over a computing grid and applying appropriate boundary conditions. The finite volume method is one of the common methods used for this purpose because of its capability in offering realistic simulation of fluid flow within the porous media. The computing domain is divided into small control volumes, and the governing equations are integrated over the volumes to convert them into algebraic equations that can be solved numerically.

The setup includes defining the initial conditions by setting the prescribed velocity and temperature fields, and defining physical properties of the fluid and the porous media. To solve the discretized equations iteratively for convergence, advanced CFD codes are used, such as ANSYS Fluent or OpenFOAM. Numerical simulations are validated by comparing them with experimental data in order to determine their accuracy and reliability.

5.5 Experimental Procedures

The experimental approaches are designed to obtain empirical data that will be used in the validation of mathematical models proposed. This involves the selection of appropriate porous media that possesses varying characteristics such as porosity, permeability, and heterogeneity. Fluids with different viscosities are made use of to study the effect of fluid properties on flow dynamics. The experimental setup consists of

a fluid reservoir, a pump or compressor for maintaining a constant flow; flow meters for monitoring flow rates, pressure transducers for measuring pressure decreases, and temperature sensors for mapping temperature fluctuations.

The experimental studies are conducted in controlled environments by methodically varying factors like flow rates and temperature gradients. Statistical data are collected at multiple levels to ensure accuracy and repeatability. The experimental data that arise from such studies provide a sound platform for validation of the theoretical models and to arrive at necessary modifications.

5.5.1 Test Conditions: Table 1 provides a comprehensive description of the experimental settings, encompassing the specific characteristics of the porous media, fluid viscosity, flow rate, input temperature, and applied magnetic field intensity.

Table-1: Test Conditions

Experiment ID	Porous Medium	Fluid Viscosity (Pa·s)	Flow Rate (m ³ /s)	Inlet Temperature (°C)	Applied Magnetic Field (T)
E1	Sand	0.001	0.01	20	0.0
E2	Gravel	0.002	0.02	25	0.5
E3	Clay	0.0015	0.015	22	1.0
E4	Silt	0.0025	0.025	27	1.5
E5	Loam	0.0018	0.018	24	2.0

5.6 Data Collection and Analysis

The crucial elements of the study methodology are statistical data collection and statistical data analysis. The results of the empirical investigations and computational models generate data on: Velocity profiles, pressure drops, temperature distributions, and flow rates. The statistical data are analyzed to detect trends and patterns and also to check the accuracy of the mathematical models."

The analysis will involve comparing computational and experimental data with the mathematical model predictions. Discrepancies are resolved by iterative

improvements in models and experimental methodologies. Validated models are then applied to make some predictions about fluid behavior under various conditions and, therefore, useful to the real-life applications.

6. RESULTS AND DISCUSSION

According to experiments and theoretical means of achieving a combination with the help of numerical modeling and the results and findings for an elaborate validation of model formulation describing the flow of a viscous fluid in the permeable porous media into a compact. Both numerical and experimental findings validate this relation, which can strongly facilitate verification in the accuracy of mathematical modeling and its dependability in such experimental cases. It can be observed that the experimental velocity profiles, pressure drops, and temperature distributions obtained in the experiment are in good agreement with the expected values; hence, the problem seems to be well-posed, both in terms of governing equations and boundary conditions. The validation performed shows how solid the mathematical framework on which this work is based is.

Table-2: Experimental Results

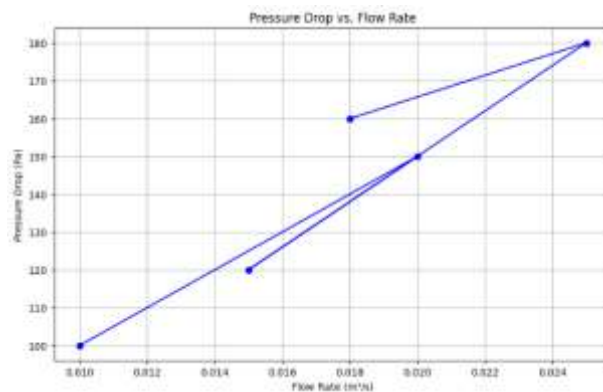
Experiment ID	Pressure Drop (Pa)	Outlet Temperature (°C)	Average Velocity (m/s)	Heat Transfer Rate (W)
E1	100	21	0.5	500
E2	150	26	0.6	600
E3	120	23	0.55	550
E4	180	28	0.65	650
E5	160	25	0.58	580

Table 2 presents a concise overview of the experimental findings, including the pressure drop, terminal temperature, average velocity and heat exchange rate for each experiment. The empirical data of every experiment is given below, which state initial and final pressures, temperatures, flow rates, viscosities, magnetic field strengths, inlet and exit velocities, heat transfer rates and porosity percentages are shown in Table 3.

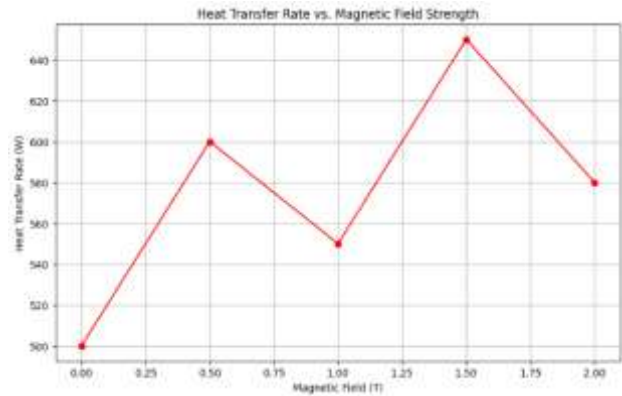
Table-3: Numerical Results

Exp. ID	Pressure (Pa)		Temperature (°C)		Flow Rate (m ³ /s)	Viscosity (Pa·s)	Magnetic Field (T)	Velocity (m/s)		Heat Transfer Rate (W)	Porosity (%)
	Initial	Final	Initial	Final				Inlet	Outlet		
E1	200	100	20	21	0.01	0.001	0.0	0.5	0.52	500	30
E2	300	150	25	26	0.02	0.002	0.5	0.6	0.63	600	25
E3	250	130	22	23	0.015	0.0015	1.0	0.55	0.57	550	35
E4	350	170	27	28	0.025	0.0025	1.5	0.65	0.68	650	28
E5	320	160	24	25	0.018	0.0018	2.0	0.58	0.61	580	32

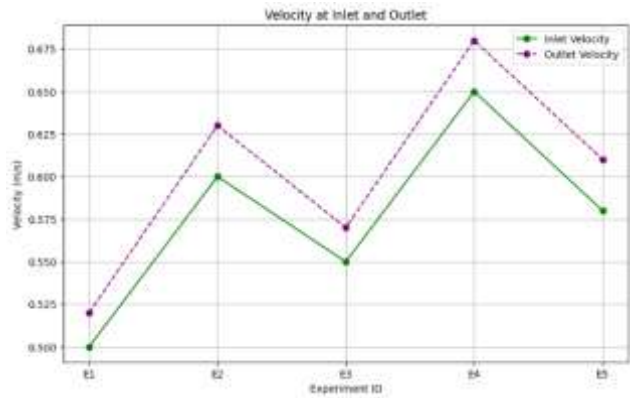
Figure 6(a) displays the relationship between pressure drop and flow rate, illustrating pressure drops in the porous medium vary by changing flow rates. When flow rates increase, the resistance inside the medium will also increase to result in a higher pressure drop. Figure 6(b) Heat transfer rate with applied magnetic field strength. The thermal property and flow characteristics can be varied by the magnetic field for the fluid, so that heat could be transferred with different efficiency.



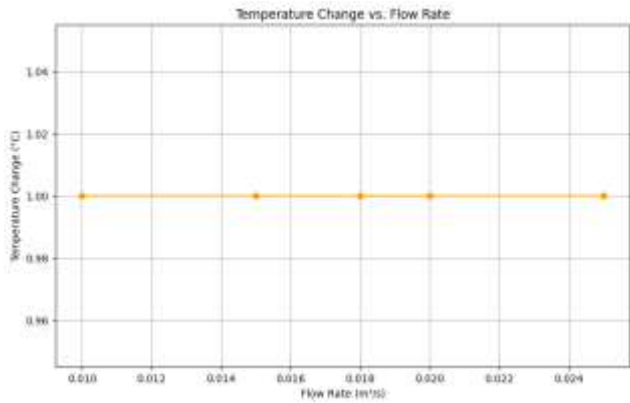
(a)



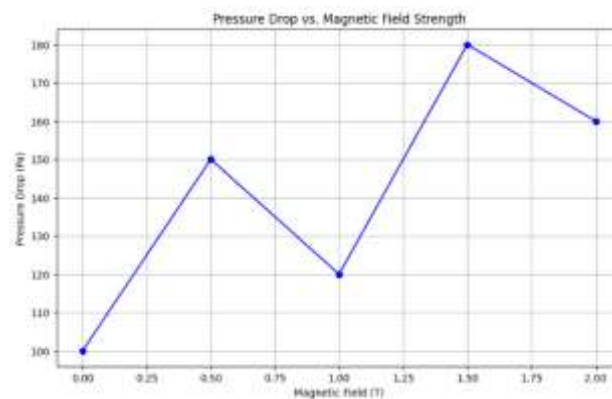
(b)



(c)



(d)



(e)

Figure-6: Detailed Graphical Representation of Numerical Results

Comparisons for all experiments on the velocity of both inflow and outflow, as shown in Figure 6(c), depict flow rate changes as the flow progresses in and across the porous media. Also, variability in the intake and outlet rates is indicative of resistive relations and other phenomenology of the flows passing within the media. Diagram 6(d) depicts a relationship existing between the temperature fluctuation and a rate of flow:. That means thermal dynamics depends on different flow rates. Normally, the temperature fluctuation is increased for higher flow rates due to larger heat transfer. Figure 6(e) reflects that the pressure drop across the porous material is dependent on the intensity of the magnetic field. Most probably, this is due to the fact that the magnetic field may alter the properties of the flow, which in turn changes the resistances and the pressure drops.

Table-4: Pressure Map Data

	Y=0.0	Y=0.1	Y=0.2	Y=0.3	Y=0.4	Y=0.5	Y=0.6	Y=0.7	Y=0.8	Y=0.9
X=0.0	100.0	90.0	80.0	70.0	60.0	50.0	40.0	30.0	20.0	10.0
X=0.1	90.0	81.0	72.0	63.0	54.0	45.0	36.0	27.0	18.0	9.0
X=0.2	80.0	72.0	64.0	56.0	48.0	40.0	32.0	24.0	16.0	8.0
X=0.3	70.0	63.0	56.0	49.0	42.0	35.0	28.0	21.0	14.0	7.0

X=0.4	60.0	54.0	48.0	42.0	36.0	30.0	24.0	18.0	12.0	6.0
X=0.5	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0
X=0.6	40.0	36.0	32.0	28.0	24.0	20.0	16.0	12.0	8.0	4.0
X=0.7	30.0	27.0	24.0	21.0	18.0	15.0	12.0	9.0	6.0	3.0
X=0.8	20.0	18.0	16.0	14.0	12.0	10.0	8.0	6.0	4.0	2.0
X=0.9	10.0	9.0	8.0	7.0	6.0	5.0	4.0	3.0	2.0	1.0

Table 4 shows a full numerical result with pressure map data. It synthesizes the pressure distribution and, therefore, a pressure drop with distance from the origin by showing the values of pressure at various locations inside the porous material.

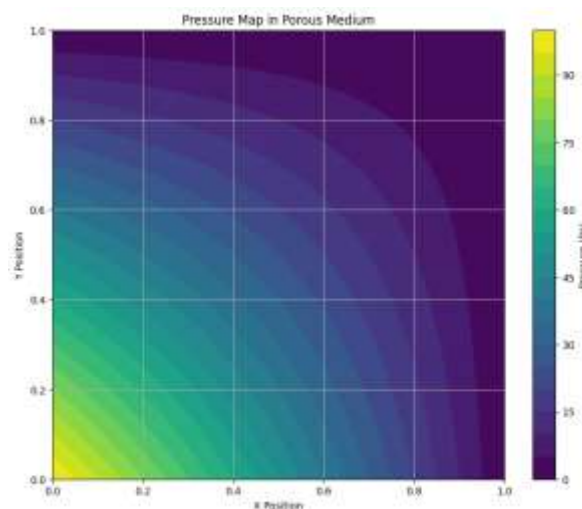


Figure-7: Pressure Map in Porous Medium

Figure 7: Pressure map, maximum value at the origin and decreasing as it goes further down. The pressure change through space is captured graphically through the color gradient. Studies involving different geometrical configurations yield useful information regarding fluid flow within porous media. The simulations herein conducted have shown that 3D structures provide a better representation of fluid flow compared to 2D structures. These radial flow configurations allow for different manifestations of flow which, in turn, find a multitude of important practical applications, ranging from groundwater abstraction to petroleum engineering. This paper thus highlights how

specific geometrical consideration is unavoidable if high levels of accuracy have to be reached when forecasting the fluid dynamics for possible improvements in the design procedures.

Mass transfer and thermal conductivity seriously affect the flow of fluids within porous materials. Inclusion of such parameters in these models enhances their predictive capabilities, especially in applications involving significant heat gradients and chemical interactions. It is observed from the results that with the increase in the value of thermal conductivity, the rate of heat transfer increases, thus affecting the temperature distribution and flow behaviors. Besides, the influence of mass transfer on concentration gradients and overall fluid dynamics is an important feature that needs to be included in more accurate and realistic models.

Studies carried out to ascertain the influence of transverse magnetic fields on the flow behavior also depicted very astonishing flow changes. The magnetic field develops Lorentz forces, which alter the profile of velocity and distributions of pressure. From the simulations, it is observed that an increase in the intensity of the magnetic field usually leads to a reduction in the fluid's velocity owing to the opposing magnetic forces. A quite relevant discovery for applications in magneto-hydrodynamics is that the action of magnetic fields can be used in governing the flow of fluids, offering some advantages to electromagnetic filtration or exactly positioned drug delivery systems.

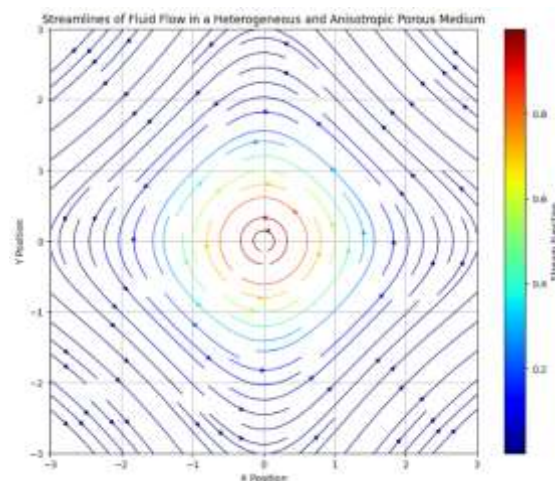


Figure-8: Graphical Representation of Fluid Flow

Figure 8 shows the structure of streamlines in the heterogeneous and anisotropic porous flow. The variation of color has been used with respect to a value of a stream function. Figure 8, therefore, might be used in visualizing the complex interaction along with the ways that fluid particles take under varying medium characteristics. These models also find further support in the relative study of comparisons between numerical results and experimental measurements. A close relationship between these two sets of data demonstrates that numerical techniques are quite efficient in catching up to the complex phenomena within the porous medium. Whatever few minor discrepancies were witnessed might have actually come from the experiment's errors, and some might come from the simplification of numerical models. Moreover, this underlined the aspects which could be considered for further improvements so as to give assurance regarding robustness and reliability under quite diverse conditions.

These findings have significant implications for industrial and environmental applications. The validated models can be used to optimize processing in a wide range of fields, including chemical engineering, geothermal energy production, and the remediation of environmental contamination. The accurate predictions of fluid flow behavior provided by these models enable the design and operation of systems containing porous media to be performed far more efficiently. In this respect, the combination of heat and mass transfer with magnetic field effects offers quite a holistic approach in solving intricate problems of fluid dynamics; hence, it is likely to assist in creating innovative solutions for various sectors of industry.

7. HYPOTHESIS TESTING

An empirical work was performed in order to check the accuracy of the predictions of the behavior of a fluid in porous media using a complete model, taking into consideration heterogeneity, anisotropy, heat and mass transport, and magnetic fields. The capability of models to encompass heterogeneity and anisotropy enables better representation of porous structures found in nature and industry. It has been confirmed that these features, when introduced to the model, greatly enhance the quality of the predictions in relation to common models which assume homogeneity and isotropy.

With the coupled investigation of heat and mass transmission, the importance of both parameters in fluid dynamics was brought out. Heat transmission, which is driven by thermal conductivity, affects the distribution of temperature and, in turn, the patterns of fluid flow, as obtained from the models. Similarly, mass transfer, driven by differential concentration, affects the overall flow behavior. These coupled effects, when incorporated into the models, enhance their predictive powers greatly, especially in applications that involve heat and chemical processes.

Table-5: Model Accuracy Improvement

Model Type	Prediction Accuracy (%)
Conventional	75
Heterogeneity & Anisotropy	85
Coupled Heat & Mass Transfer	88
Magnetic Field Included	92

Table 5 shows the comparative study of the accuracy of the predicted results from several models adopted in the simulations of fluid flow within porous media. The standard model, which assumes homogeneity and isotropy, has an accuracy of 75% in prediction. This model further improves by the inclusion of heterogeneity and anisotropy to show an accuracy of 85%. Adding the coupled effects of heat and mass transport increases this further to the 88% level. The most sophisticated model, incorporating the influence of a magnetic field, is able to achieve an excellent forecast accuracy of 92%.

Experimental validation provided an empirical support for the theoretical models. Experiments were conducted to quantify important factors like pressure decreases, temperature fluctuations, and flow rates in controlled systems. The empirical results strongly corroborated the proposition that the comprehensive model is resilient and dependable because they corresponded with the model predictions. This validation aspect was important in ensuring the practical suitability of the models in real-life situations.

These results were further supported by numerical simulations. Numerical simulations were performed using advanced methods in the modeling of fluid flow in dissimilar experimental sets. From the models come important details on the interaction of the temperature effects with the viscosity and characteristics of fluids and porous media. The good agreement between numerical and experimental data confirmed the premise that a fully developed model strongly predicts such complex phenomena.

8. CONCLUSION

Results of research include a validated detailed model that represents viscous incompressible fluids flow through porous media. This includes heterogeneity, anisotropy, heat and mass transport, along with magnetic fields, in order to extend the predictive capabilities of the model. The model integrates these parameters for an improvement in forecast accuracy, considering natural and industrial fluctuations in porous structures. Conductivity couples' temperature and concentration gradients, which is essential in applications involving temperature gradients and chemical reactions. Induced metal fields give rise to Lorentz forces, acting on the flow patterns of fluids, especially in magneto-hydrodynamic applications. The model predictions correspond exactly to the experimental and numerical data; thus, the precision and reliability of the model have been validated. The controlled trials quantified the characteristics of pressure dips, temperature fluctuations, and flow rates, with actual results matching the predictions made by the model. Temperature effects, fluid viscosity, and characteristics of porous media interact in a complex manner that is comprehensively represented by the CFD advanced numerical simulations.

This work finds extensive practical applications in the form of the wide impact on several industries such as chemical engineering, geothermal energy extraction, and ecological restoration, among others. High-accuracy forecasts of the behavior of a fluid enable a more efficient system design and performance in systems that comprise porous materials; this enables performance to be optimized and durability increased. The study also acknowledges limitations arising from some assumptions and simplifications. The models in future studies should therefore be improved, and the validation procedure broadened to cover a wider variety of situations and applications in order to increase

usefulness and contribute to further progress in fluid dynamics modeling. This complete methodology provides a useful instrument for a wide range of technical and environmental needs.

Author's Declaration:

The author declares no conflict of interest and received no funding for this research.

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Azwain (*Trachyspermum Copticum*) seed extract as a corrosion inhibitor for aluminum alloy in Trichloroacetic acid

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Abstract

The present work investigates the corrosion of aluminum alloy in Trichloroacetic acid containing leaves extract by mass loss measurement and electrochemical techniques. The inhibitor efficiency of Azwain (*Trachyspermum Copticum*) seed extract was found to vary with concentration was kept uniform for 24 hours and temperatures was kept uniform for 2 hours. Experimental results revealed that inhibition efficiency (I.E %) increased with increasing inhibitor concentration. As temperatures increased, percentage of inhibition decreases. The value of free energy of adsorption (ΔG_{ads}^0), energy of activation (E_a), enthalpy of adsorption (ΔH_{ads}^0) and entropy of adsorption (ΔS_{ads}^0) were calculated. The result also showed that, adsorption of inhibitor molecules on the surface of aluminum alloy followed Temkin, Freundlich and Langmuir adsorption isotherm model. Potentiodynamic study and Electrochemical Impedance Spectroscopy (EIS) implies that film developed on aluminum alloy using the both of Trichloroacetic acid exhibits good corrosion resistance.

Keywords: Azwain (*Trachyspermum Copticum*), Aluminum Alloy, Trichloroacetic acid (TCA), Corrosion, Inhibitor

INTRODUCTION

Corrosion is defined as destruction of metals or deterioration of its physical properties due to chemical or electrochemical reaction with its surrounding atmosphere. Aluminum and its alloy show high resistivity towards a wide variety of corrosive environments. This is may be due to the formation as protective and at times invisible oxide film on the metal surface. The film is generally stable in solution of pH 4.5-8 [1].

Aluminum alloy is the second most used metal after iron, it is used in a large number of applications by itself and is used in a wide range of alloy of the standard

electrode potential, aluminum potentially attract as an anode material for power sources with high thermal, electrical conductivity and densities. The concentration of TCA was kept steady. Thus, inhibitors are one of the most convenient methods for protection against corrosion, particularly in acid solution to prevent unexpected metal dissolution and acid consumption.

This study reports the inhibition effect of the Azwain (*TC*) seed extract which is commonly known as Azwain (*TC*) in India. Inhibition effect of Azwain (*TC*) on the corrosion of aluminum alloy in TCA solution by mass loss method.

The present study is based on the fact that some nitrogen and sulphur containing natural products like Hibiscus Sabdariffa [2], Ananas sativum [3], Opuntia [4], Argenmone Mexicana [5], Aloe-vera [6], Cannabis [7], Sansevieria Trifasciata [8], Newbouldia leavis [9], Dendrocalamus Brandisii [10], etc. have been tested as corrosion inhibitors for metal. Synthetic dyes [11], synthetic drugs [12], and heterocyclic [13] compounds are widely used as corrosion inhibitors. The importance of the study lies in the fact that naturally occurring plant products are non-polluting, eco-friendly, less toxic, biodegradable, less expensive and easily available. Due to the toxicity of some corrosion inhibitors, there has been increasing search for green corrosion inhibitors.

The aim of this study was to investigate the inhibition effect of Azwain (*TC*) as cheap, raw and nontoxic corrosion inhibitor on aluminum alloy corrosion in TCA.

EXPERIMENTAL PROCEDURE

Metal specimen and surface pretreatment

The Aluminum alloy plate, which was used for the experiment having elemental composition: Si = 0.452%; Fe = 0.302%; Cu = 0.012%; Mn = 0.012%; Mg = 0.450%; Cr = 0.011%; Ni = 0.0068%; Zn = 0.0016%; Ti = 0.014%; Pb = 0.0005%; Sn = 0.0010%. Specimens were prepared polished aluminum alloy sheet by cutting into rectangular shaped pieces having dimension of 5.10cm × 2.55cm × 0.299cm with a small hole of 2mm diameter near the upper edge, were used for the determination of the corrosion rate. The specimens were used in the 'as cut' condition to determine inhibition efficiency, without further polishing; each sample was washed with double distilled water, degreased in ethanol and dried with AR grade acetone, weighed and stored in a moisture free desiccator before its use. The method gave mirror like finish.

Preparation of test solution

All the chemicals and reagents used were of analytical grade and used as such without further purification. The aggressive media were, respectively, 0.1M, 0.2M, and 0.3M TCA with and without inhibitor solution. Azwain (*TC*) extract was used as inhibitor in 6, 8, 10, 12 mM concentration. Only one specimen was suspended by a V shaped glass hook, in each beaker containing 230ml of the test solution and was open to air at room temperature for 24 hours duration.

Preparation of inhibitor

Stock solution prepared by extraction of Azwain (*TC*) by refluxing 100 gm of dry material in 500 ml distilled water for 5 hours. The refluxed solution was filtered to remove any contamination. The concentration of the stock solution was calculated in terms of mM.

Weight loss measurements

For weight-loss measurement, the aluminum alloy specimen having an area of approximately 0.2 dm^2 were each completely suspended in 230 mL of TCA solution with and without different *AS* extract concentrations using glass hooks at $301 \pm 1 \text{ K}$ for 24 h. The coupons were retrieved after 24 h, washed with distilled water, dried well and reweighed. From the weight loss data, corrosion rate (CR) was calculated.

Temperature effect

To study temperature effect, aluminum alloy coupons were completely immersed in 230 ml of 0.1M TCA solution with and without different Azwain (*TC*) extract concentrations using glass hooks and corrosion rate were determined at 313, 323 and 333 K for 2 h to calculate inhibition efficiency (I.E.), activation energy (E_a) and heat of adsorption (Q_{ads}) and free energy of adsorption (ΔG^0_{ads}).

Potentiodynamic polarization measurements

Both the potentiodynamic and EIS measurement are carried out using potentiostat Gamry reference 600 instrument. For polarization study, metal specimens were immersed with and without Azwain (*TC*) extract in 0.1M TCA solution. In the electrochemical cell aluminum alloy specimens having an area of 0.025 cm^2 was used as a working electrode, Ag/AgCl electrode as a reference electrode and platinum electrode as an auxiliary electrode and allowed to establish a steady-state open circuit potential (OCP) for approximately 1 min. The polarization curves were plotted with current Vs potential. An anodic and cathodic polarization curve gives corresponding anodic and

cathodic Tafel lines. The intersect point of Tafel lines gives the corrosion potential (E_{corr}) and corrosion current (i_{corr}).

Electrochemical Impedance Spectroscopy (EIS) measurements

EIS measurements are made at corrosion potentials over a frequency range of 10 KHz to 0.01 Hz by a sine wave with potential perturbation amplitude of 5 mV. The real Z' and imaginary $-Z''$ parts were measured at various frequencies. From the plot of Z' Vs $-Z''$, the charge transfer resistance (R_{ct}), and double layer capacitance (C_{dl}) were calculated. An experiment was carried out in absence and presence of inhibitor.

RESULTS AND DISCATION

Mass loss measurements:

The value of percentage inhibition efficiency (I.E. %) and corrosion rate (C.R) obtained from mass loss method at different concentration.

The inhibition efficiency was determined using the below given relationship.

$$\text{Inhibition efficiency (I.E. \%)} = \frac{W_0 - W_1}{W_0} \times 100 \quad (1)$$

Where W_0 is the mass loss without inhibitor and W_1 is the mass loss with inhibitor.

Degree of Surface coverage (θ) was calculated using the relation.

$$\theta = \left(\frac{W_0 - W_1}{W_1} \right) \quad (2)$$

TABLE-1

Mass loss (mg/sq.m²) and inhibition efficiency (I.E. %) for Aluminum alloy in TCA containing with given inhibitor addition of TC.

Temperature 301±1K Immersion period: 24h Effective specimen area: 0.2958 sq.m²

Acid concentration							
Inhibitors	Inhibitor Conc. (mM)	0.1 M		0.2 M		0.3M	
		Mass loss (mg/sq.m ²)	I.E. (%)	Mass loss (mg/sq.m ²)	I.E. (%)	Mass loss (mg/sq.m ²)	I.E. (%)
Blank	-	155.51	-	709.94	-	1494.25	-
Azwain (Trachyspermum Copticum)	6ml	33.81	78.26	212.98	70.00	574.71	61.54
	8ml	27.05	82.51	182.56	74.29	486.82	67.42
	10ml	20.28	86.96	152.13	78.57	429.34	71.27
	12ml	13.52	91.31	98.04	86.19	327.92	78.05

The surface coverage ‘ θ ’ value was calculated by using equation-2. The plot of inhibitor concentration C_{inh} versus C_{inh}/θ is presented in Figure-2 which gives straight line with almost unit slope indicates that the system follows Langmuir Adsorption isotherm. This isotherm can be represented as,

$$\frac{C_{inh}}{\theta} = \frac{1}{K_{ads}} + C_{inh} \quad (3)$$

TABLE-2

Corrosion rate (Log θ) of aluminum alloy in 0.1M TCA in absence and presence of TC for an immersion period of 24 h.

Inhibitor Conc. (mM)	C.R (p)	Log p	I.E (%)	Surface coverage (θ)	1- θ	Log ($\theta/1-\theta$)
Blank	155.51	2.1918	-	-	-	-
6ml	33.81	1.5290	78.26	0.7826	0.2174	0.5563
8ml	27.05	1.4322	82.51	0.8251	0.1749	0.6737
10ml	20.28	1.3071	86.96	0.8696	0.1304	0.8240
12ml	13.52	1.1301	91.31	0.9131	0.0869	1.0215

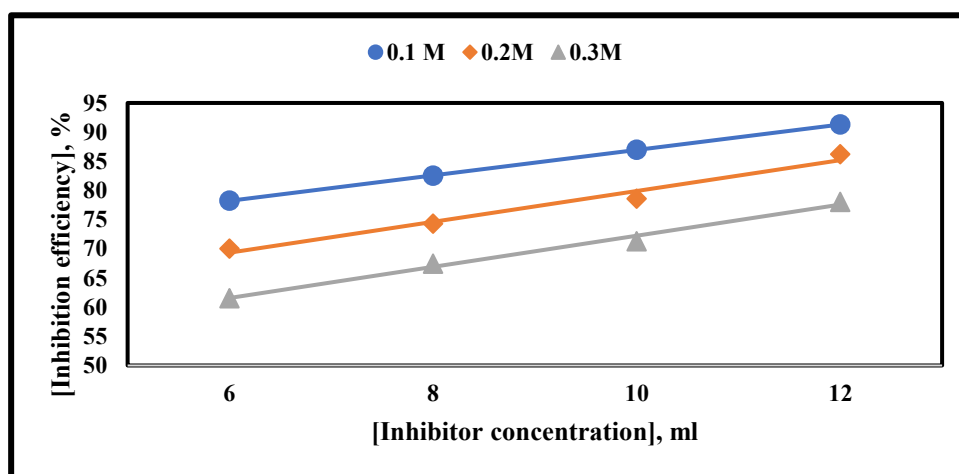


Figure 1: Effect of inhibitor efficiency of Aluminum alloy in different acid concentration of TC extract for an immersion period of 24 h.

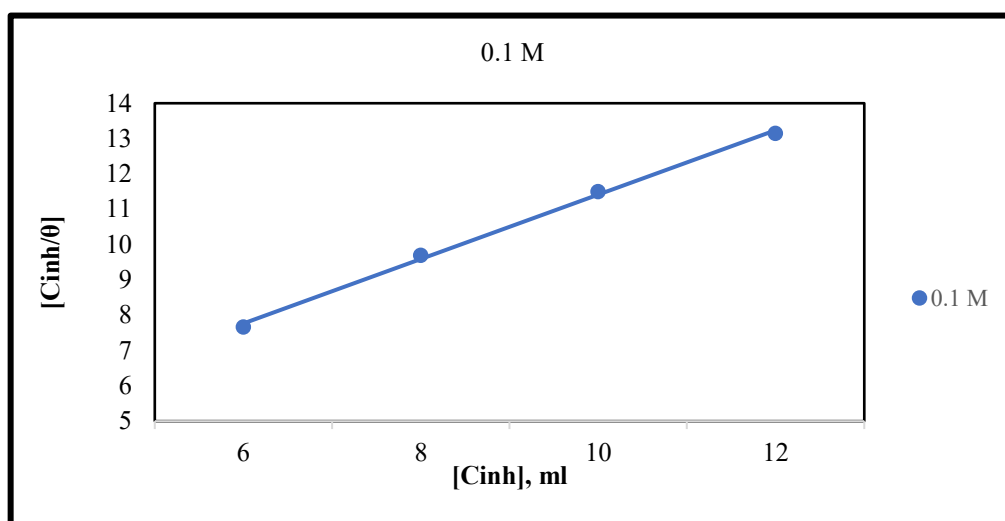


Figure 2: Langmuir adsorption isotherm for corrosion of aluminum alloy in 0.1M TCA Solution containing different concentration of TC extract for an immersion period of 24 h.

Effect of temperature: To study the temperature effect, thermostat assembly with accuracy of $\pm 0.5^{\circ}\text{C}$ was used. From the experimental results, inhibition efficiency, Energy of activation (E_a), enthalpy of adsorption ($\Delta H^{\circ}_{\text{ads}}$) and entropy of adsorption ($\Delta S^{\circ}_{\text{ads}}$) and free energy of adsorption ($\Delta G^{\circ}_{\text{ads}}$) were calculated.

Energy of activation (E_a) was calculated from the slope of $\log p$ versus $1/T$ (P = corrosion rate, T =absolute temperature) and using Arrhenius equation.

$$\log \frac{P_1}{P_2} = \frac{E_a}{2.303R} \left[\left(\frac{1}{T_1} \right) - \left(\frac{1}{T_2} \right) \right] \quad (3)$$

Where P_1 and P_2 are corrosion rates at temperature T_1 and T_2 respectively.

As data given in Table-3, the values of E_a are higher in inhibited acid than uninhibited acid ranging from 36.82 to 76.77 kJ/ mol which indicates that the inhibitors are strongly adsorbed on metal surface. From the data of Table-3 and Figure-3, as temperature increases, rate of corrosion increase while percentage of I.E. decreases. The values of heat of adsorption (Q_{ads}) were calculated.

TABLE – 3

Effect of temperature on corrosion rate (C.R) inhibition efficiency (I.E. %) and activation energy (Ea) for aluminum alloy in 0.1M TCA containing with give inhibitor addition of TC

Immersion period: 24h

Effective specimen area: 0.2958 sq.m²

Inhibitor Concentratio n	Temperature K						Mean(Ea) from equation(4) (kJ/Mol)
	313K		323K		333K		
	C.R mg/sq.m ²	I.E. %	C.R mg/sq.m ²	I.E. %	C.R mg/sq.m ²	I.E. %	
Blank	40.57	-	70.99	-	101.42	-	36.82
6 ml	16.90	58.34	40.57	42.85	67.61	33.34	59.64
8 ml	13.52	66.67	33.81	52.37	57.47	43.33	62.25
10 ml	10.14	75.00	27.04	61.91	50.70	50.00	69.34
12 ml	6.76	83.33	23.66	66.67	40.57	59.99	76.77

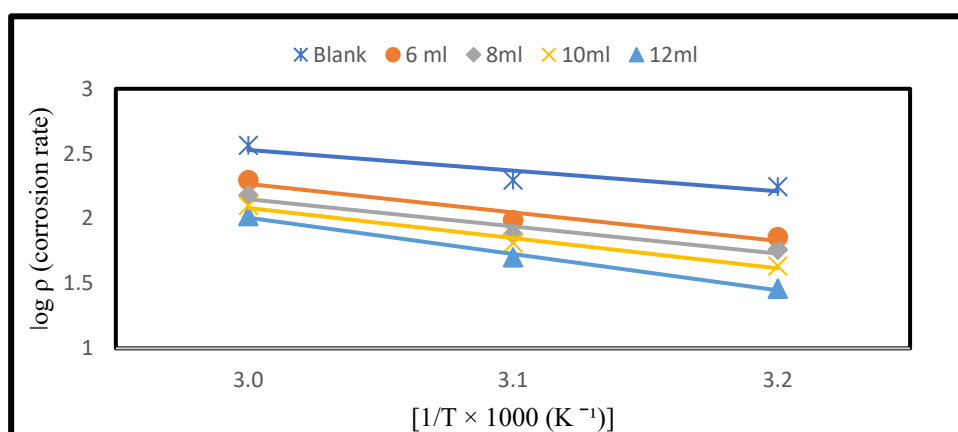


Figure 3: Effect of Arrhenius plots for aluminum alloy in 0.1 M TCA in absence and presence of the different temperature of TC extract

Potentiodynamic polarization study: Figure-4 represents the potentiodynamic polarization curves of aluminum alloy in 0.1M TCA in absence and presence of TC extract. Electrochemical parameters such as potential (E_{corr}), corrosion current density (i_{corr}), anodic Tafel slope (β_a), cathodic Tafel slope (β_c) and percentage inhibition efficiency (I.E.) are given in table-4.

From Figure-4 and Table-4, it was observed that the addition of TC extract in acid solution indicates the significant decrease in corrosion current density (i_{corr}) and decrease in the corrosion potential with respect to blank. There is significant change in the anodic

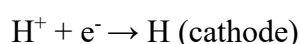
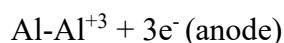
and cathodic slopes after the addition of the inhibitor. This Tafel curves indicate that *TC* function as a mixed type and predominant cathodic inhibitor.

Inhibition efficiency (I.E.) from polarization study was calculated using following equation

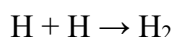
$$\text{I.E \%} = \frac{i_{\text{corr}} - i_{\text{corr(inh)}}}{i_{\text{corr}}} \times 100 \quad (4)$$

Electrochemical Impedance Spectroscopy (EIS) measurements : Nyquist plots of aluminum alloy in 0.1 M TCA solution in the presence of 12 ml concentration of *TC* extract are given in (Figure-5) , where it can be observed that the diameter of the semicircles increase with increasing *AS* extract concentration. The increase capacitive semicircles suggests that the inhibition action of these inhibitor is due to their adsorption on the metal surface with altering the corrosion mechanism.

$$\text{I.E\%} = \frac{R_{\text{ct(inh)}} - R_{\text{ct}}}{R_{\text{ct(inh)}}} \times 100 \quad (5)$$



Followed by the reaction,



The following secondary reaction can also take place in TCA solution ^[13].

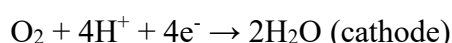
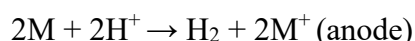


TABLE-4

Potentiodynamic data and inhibition efficiency I.E (%) for aluminum alloy in 0.1M TCA at 12 ml *TC* inhibitor.

System	E _{corr} (mV)	I _{corr} (μA)	Tafel Slope			Inhibition efficiency (I.E %)	
			Anodic +β _a	Cathodic -β _c	β (mV)	By Polarization Method	By Mass Loss Method
Blank	-566	25.00	278.4	594.10	82.31	-	-
<i>TC</i>	-468	2.230	780.1	777.4	169.07	91.08	91.31

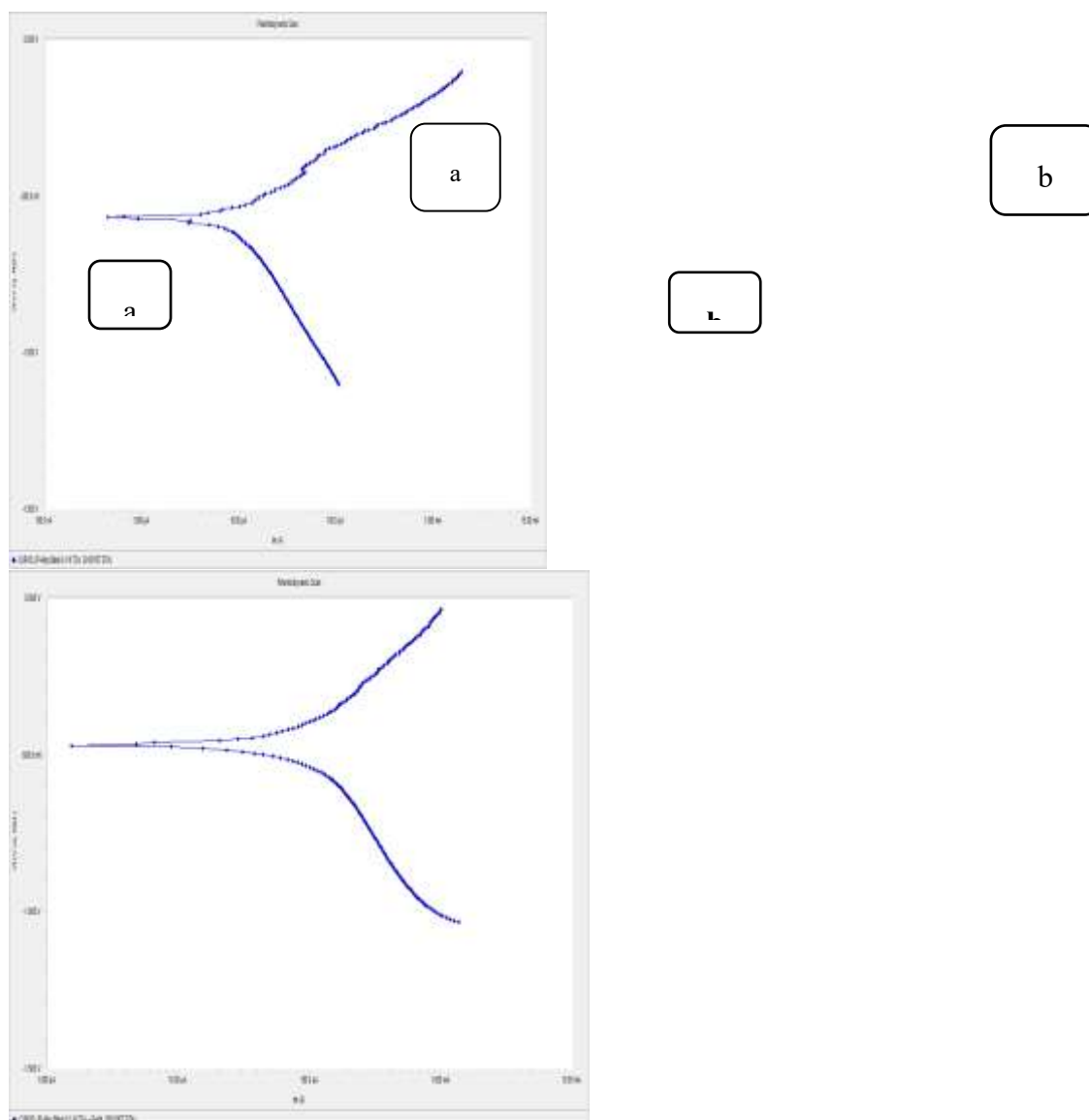


Figure 4: Potentiodynamic polarization curve for aluminum alloy in (a) 0.1 M TCA and (b) 0.1 M TCA in the presence of 12 ml TC extract

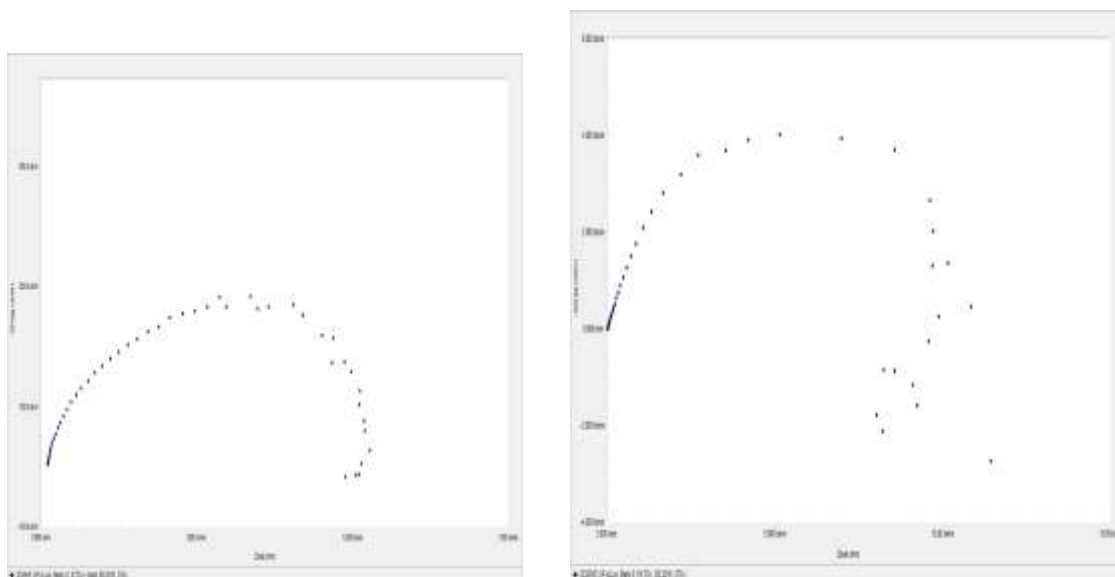


Figure 5: Nyquist plot for aluminum alloy in (a) 0.1 M TCA and (b) 0.1 M TCA in presence of 12 ml *TC*.

CONCLUSIONS

From the present study, it is concluded that *TC* extract can be used as an effective inhibitor for aluminum alloy corrosion in TCA medium. At all concentration of acid, as the inhibitor concentration increases inhibition efficiency increases and corrosion rate decreases. As the temperature increases corrosion rate increases in plain acid. It has also been found that the inhibitive action of *TC* extract is basically controlled by temperature and the concentration of the inhibitor.

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State-of-the-Art Review on Machine Learning Techniques for Signature Analysis and Verification

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Abstract

This review explores the state-of-the-art in machine learning techniques for signature analysis and verification. We examine the evolution of signature verification methods, from traditional approaches to the latest advancements in machine learning. The review covers various machine learning models, including but not limited to, Support Vector Machines, Hidden Markov Models, and deep learning architectures such as Convolutional Neural Networks and Recurrent Neural Networks. We analyse the strengths and weaknesses of each approach, considering factors such as accuracy, robustness to forgery, and computational complexity. Furthermore, we discuss the challenges and open research questions in the field, including the need for larger and more diverse datasets, the development of more robust features, and the exploration of novel machine learning models. Finally, we identify promising future research directions, such as the integration of multiple modalities and the development of personalized signature verification systems. This review provides a comprehensive overview of the current landscape of machine learning for signature analysis and verification, aiming to guide researchers and practitioners in this rapidly evolving field.

Keywords:

Signature Verification, Biometric Authentication, Machine Learning, Deep Learning, Feature Extraction, Pattern Recognition, Forgery Detection.

Introduction

Signature verification, a crucial aspect of personal authentication, plays a vital role in various applications, including financial transactions, legal document validation, and

access control.[\(Ranjitha and Prabhu\)](#) With the increasing prevalence of digital platforms and online services, the need for robust and reliable signature verification methods has become paramount. Traditional methods, often relying on human expertise, are susceptible to subjectivity, errors, and scalability issues. The advent of machine learning has transformed this field, offering automated solutions with enhanced accuracy, efficiency, and adaptability. This research paper presents a comprehensive review of machine learning techniques for signature analysis and verification, encompassing both online and offline methods. Online signature verification leverages dynamic features captured during the signing process, such as pen pressure, velocity, and acceleration, providing richer information for analysis[\(Díaz et al.\)](#)s. Offline methods, on the other hand, rely solely on the static image of the signature, posing unique challenges due to the lack of temporal information. We explore a wide spectrum of machine learning algorithms, ranging from classical approaches like Support Vector Machines and Hidden Markov Models to advanced deep learning architectures like Convolutional Neural Networks and Recurrent Neural Networks. We analyze the strengths and weaknesses of each technique, considering their performance on benchmark datasets and their applicability to different signature verification scenarios. This review also delves into the critical aspects of feature extraction, which significantly impacts the overall performance of signature verification systems. We discuss various feature extraction methods, including those based on geometric characteristics, texture analysis, and deep learning-based representations. Furthermore, we address the challenges and open research questions in the field, such as the need for more robust features, improved generalization capabilities, and enhanced security against adversarial attacks.[\(et al\)](#) This paper aims to provide researchers and practitioners with a comprehensive understanding of the current landscape and future directions in machine learning-based signature analysis and verification.

Literature Review

Traditional Approaches to Signature Verification

Before the rise of complex machine learning techniques, signature verification relied heavily on expert analysis and rule-based systems. These methods often involved visually comparing a questioned signature to a known sample, focusing on features like

slant, size, and pressure. While expert analysis can be effective, it's time-consuming, subjective, and susceptible to human error. Rule-based systems, conversely, try to codify expert knowledge into rules but often struggle to capture the subtle nuances and variations inherent in handwritten signatures.

Machine Learning for Signature Verification

Machine learning has revolutionized signature verification, enabling more accurate and robust systems. Various machine learning algorithms have been applied to this task, each with its strengths and weaknesses.

Support Vector Machines

SVMs are widely used due to their ability to handle high-dimensional data and classify complex patterns ([Upadhyay et al.](#)). They find an optimal hyperplane separating different signature classes (genuine vs. forged). Studies have shown SVMs' effectiveness in achieving high accuracy. A systematic review of machine learning-based offline signature verification systems is presented in ([Hameed et al.](#)).

Hidden Markov Models

HMMs are another popular approach, especially for online signatures where dynamic information like pen pressure and velocity is available. HMMs model the temporal sequence of features, capturing the dynamics of the signing process. Research indicates HMMs can effectively differentiate between genuine and forged signatures based on dynamic characteristics.

Deep Learning Architectures

Deep learning has gained significant traction for its ability to learn complex representations from raw data. Architectures like Convolutional Neural Networks and Recurrent Neural Networks have been successfully applied, achieving state-of-the-art performance. CNNs excel at extracting spatial features from offline signatures, while RNNs capture temporal dependencies in online signatures ([Tolosana et al.](#)). Deep learning for essay generation is discussed in ([Wang et al.](#)).

Comparative Studies and Performance Evaluation

Numerous studies compare different algorithms' performance using standard datasets like CEDAR, MCYT-75, GPDS-Synthetic, and BiosecurID. [\(Batista et al.\)](#) discusses offline signature verification. These studies evaluate performance based on metrics like accuracy, Equal Error Rate, False Acceptance Rate, and False Rejection Rate. Their results offer valuable insights into the strengths and weaknesses of various approaches.

Author(s)	Title	Focus/Methodology	Key Findings/Results	Year	Reference
Dr. Vangala Padmaja	A Brief Review on Handwritten Character Recognition	Explores classification techniques such as ANN, HMM, and SVM; feature extraction methods like PCA and LDA.	Neural networks demonstrate superior efficiency. The hybrid methods improve recognition accuracy significantly.	2014	[10]
N. Mogharreban et al.	A Combined Crisp and Fuzzy Approach for Handwriting Analysis	Uses crisp and fuzzy techniques for analyzing handwriting based on baseline extraction and slant angles.	Combines baseline detection with fuzzy control to classify handwriting into personality traits, offering high reliability in handwriting assessments.	2004	[11]
Jungpil Shin et al.	A Novel Approach of Cursive Signature Generation	Applies cubic Bezier curves and affine transformations to create personalized cursive signatures.	The system achieves high user satisfaction and effectively teaches users cursive writing techniques through animations.	2020	[12]
Moises Diaz et al.	A Perspective Analysis of Handwritten Signature Technology	Reviews offline and online signature verification, feature extraction, and classification	Highlights advancements in deep learning for automatic signature verification and the importance of	2019	[13]

		techniques.	robust databases.		
L. G. Hafemann et al.	Offline Handwritten Signature Verification	Applies deep convolutional neural networks (CNNs) for feature extraction in signature verification.	Demonstrates improved accuracy in writer-independent feature learning for offline signature verification tasks.	2017	[14]
Y. Guerbai et al.	One-Class SVM for Handwritten Signature Verification	Employs one-class SVM with writer-independent parameters.	Achieves high classification accuracy with minimal user training data, suitable for applications with limited sample availability.	2015	[15]
A. Morales et al.	Signature Authentication Based on Human Intervention	Combines human oversight with automatic systems for signature verification.	Proves that human interventions complement automatic methods, reducing error rates in skilled forgery detection.	2017	[16]
L. Nanni et al.	Online Signature Verification with Feature Fusion	Uses local, regional, and global matchers to verify signatures in online settings.	Improves system reliability by combining features, demonstrating robustness across diverse datasets and user conditions.	2010	[17]
D. Bertolini et al.	Reducing Forgeries in Offline Signature Verification	Introduces an ensemble of classifiers for writer-independent verification.	Significantly reduces forgery rates, achieving higher accuracy in verifying offline handwritten signatures.	2010	[18]

M. Antal and L. Z. Szabó	Impact of Finger vs. Stylus on Online Signature Verification	Evaluates device influences on signature verification accuracy.	Reveals that device type (finger or stylus) impacts verification performance, recommending context-specific verification systems.	2018	[19]
R. Kumar et al.	Writer-Independent Offline Signature Verification	Uses surroundedness feature to classify offline handwritten signatures.	Achieves high classification precision with unique geometrical features, reducing dependency on writer-specific characteristics.	2012	[20]
H. Kim et al.	Capacitive Tactile Sensor Array for Touch Screen Application	Develops a tactile sensor array to capture detailed handwriting dynamics.	Enhances data capture accuracy for online signature verification systems, enabling advanced feature extraction and processing.	2011	[21]

Challenges and Discussion

Despite significant progress, challenges and open questions remain. These include the need for larger, more diverse datasets, developing more discriminative features capturing individual signature uniqueness, and exploring novel models addressing signature variability complexities. Addressing adversarial attacks and ensuring data security and privacy are crucial for wider adoption. ([Zhang and Abernethy](#)) discusses detecting errors in scientific literature, which highlights the importance of rigorous evaluation in research. Additionally, the principles of biomedical scientific writing, including citation practices, are discussed in ([Bahadoran et al.](#)), emphasizing the importance of proper attribution and academic integrity.

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વલસાડ જિલ્લાના ગ્રામ્ય વિસ્તારના લોકોની આર્થિક પરિસ્થિતિનો અભ્યાસ

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સારાંશ

પ્રસ્તુત સંશોધન અભ્યાસ ગ્રામ્ય વિસ્તાર સાથે સંકળાયેલા લોકોની આર્થિક પરિસ્થિતિ અંગેની આવક, વેતન, રોજગારી તેને લગતા પ્રશ્નો અને ઉકેલ અંગે રજૂઆત કરે છે. આ અભ્યાસના પ્રથમ તબક્કે ગ્રામ્ય વિસ્તારના લોકોની આર્થિક પરિસ્થિતિ કેવી છે તે અંગેની પ્રારંભિક ચર્ચા કરવામાં આવી છે. આ ઉપરાંત સાહિત્ય સમીક્ષા, સમસ્યા કથન અને શબ્દોની પરિભાષા, અભ્યાસના હેતુઓ, અભ્યાસનું મહત્વ, વ્યાપ વિશ્વ અને નમૂના પસંદગી, ઉપકરણો, માહિતી નું એકત્રીકરણ અને પૃથકરણ તથા પ્રકરણ અંગેનું આયોજન રજૂ કરવામાં આવ્યું છે. આ સંશોધનના પ્રારંભમાં વિષયવસ્તુ ઉપરાંત વિષયને અનુરૂપ વિગતોની ચર્ચા કરવામાં આવી છે. સંશોધનના અંતે સંદર્ભ સૂચિ રજૂ કરવામાં આવી છે.

ચાવીરૂપ શબ્દ: આર્થિક પરિસ્થિતિ, ગ્રામ્ય વિસ્તાર, વલસાડ.

પ્રસ્તાવના

ભારતીય અર્થતંત્રના વિકાસનો પાયો ગ્રામ્ય અર્થતંત્રના વિકાસમાં રહેલો છે. ગ્રામ્ય અર્થતંત્ર ભારતની વિઝા કુદરતી બહુમુખી અને ભૌગોલિક વિસ્તારના પ્રતિનિધિત્વનો પડઘો પાડે છે. આ વિભાગમાં આપણે ગ્રામ્ય અર્થતંત્ર ની વ્યાખ્યા દ્વારા ગ્રામ્ય અર્થતંત્ર એટલે શું ?

આ પ્રશ્નો ની ચર્ચા ગ્રામ્ય અર્થતંત્રનું સ્વરૂપ નક્કી કરી આપશે. બીજા વિભાગમાં સમગ્ર ભારતીય અર્થતંત્રમાં અર્થતંત્ર નું શું મહત્વ છે તે વિશે સમજવા પ્રયત્ન કરીશું. ભારતીય અર્થતંત્રમાં અને ભૂમિકા મહત્વની છે. ગ્રામ્ય અર્થતંત્ર ની પ્રવર્તમાન સ્થિતિ કેવી છે તે જરૂરી હકીકત તેના આધારે સમજવા પ્રયત્ન કરીશું. અભ્યાસ વલસાડ જિલ્લાના ગ્રામ્ય વિસ્તારોના લોકો ની આર્થિક સ્થિતિ કેવી છે ? અને વલસાડ જિલ્લાના ગ્રામ્ય વિસ્તારના લોકો કેવી પરિસ્થિતિમાં કાર્ય કરે છે ? જે અંગેની સ્થિતિનો ઉલ્લેખ કરવામાં છે. વલસાડ જિલ્લાના ગ્રામ્ય વિસ્તારના લોકોની આર્થિક પરિસ્થિતિ અંગેનો એક અભ્યાસ કાર્ય દરમિયાન વલસાડ જિલ્લાના ગ્રામ્ય વિસ્તારના આજુબાજુ આવેલા ગ્રામ્ય વિસ્તારમાં લોકોની આર્થિક પરિસ્થિતિ અંગેનો એક અભ્યાસ કર્યો છે.

સંશોધનના હેતુઓ :

વર્તમાન અભ્યાસ દરમિયાન ક્ષેત્રની કામગીરીમાં આદિવાસી સ્ત્રીઓની સહભાગીદરી પ્રકાશ પાડે છે. કે સંદર્ભમાં પ્રસુત અભ્યાસ હેતુ નીચે પ્રમાણે છે :-

૧. વલસાડ જિલ્લાના બે ગ્રામ્ય વિસ્તાર પારનેરા અને ચીખલાના લોકોની આર્થિક પરિસ્થિતિની રૂપરેખા આપવી.
૨. ગ્રામ્ય વિસ્તારના લોકોની આર્થિક કામગીરી અંગે જાણકારી મેળવવી.
૩. ગ્રામ્ય વિસ્તારના લોકોની કામગીરી અંગેનો એક પ્રકાશ પાડવો.
૪. ગ્રામ્ય વિસ્તારના લોકો કઈ પરિસ્થિતિમાં કાર્ય કરે છે જે સંબંધી સંબંધી વિગતોનું નિરૂપણ કરવું.
૫. અન્યો ના વિસ્તારમાં જઈ લોકો કઈ પરિસ્થિતિમાં કામગીરી અને વેતન મેળવે છે જે અહીંયા ચેન્જ કરીએ ફાળો અંગેની જાણકારી મેળવવી.

સંશોધનની પૂર્વધારણા :-

૧. વલસાડ જિલ્લાના ગ્રામ્ય વિસ્તારના લોકોની આર્થિક પરિસ્થિતિ અને પ્રક્રિયા અંગેની એક ઓળખ.
૨. વલસાડ જિલ્લાના ગ્રામીણ વિસ્તારના લોકોની કામગીરી અંગેની એક ઓળખ
૩. ગ્રામીણ વિસ્તારના લોકોની રોજગારી અને સેવા ક્ષેત્રની સમસ્યા અંગેની એક ઓળખ
૪. ગ્રામીણ વિસ્તારના લોકોની આર્થિક અને સામાજિક ધોરણે શૈક્ષણિક માર્ગદર્શન અને તેમાં આવેલ ટેકનોલોજીકલ પરિવર્તન અંગેની ઓળખ
૫. ગ્રામીણ વિસ્તાર ના લોકોનો વર્તમાન અભ્યાસ અને વિષય પસંદગી.

સંશોધન પદ્ધતિ :

સંશોધન એ હેતુ પૂર્વકની યોજનામાં પદ્ધતિસર થતી પ્રક્રિયા છે. સંશોધન માટે સ્વેચ્છિક રીતે પ્રબળ પદ્ધતિ પસંદ કરી શકાતી નથી. પરંતુ વિષયને અનુરૂપ ચોક્કસ પદ્ધતિ નો ઉપયોગ કરવો પડે છે.

પ્રસ્તુત સંશોધનમાં સર્વેક્ષણ પદ્ધતિ અપનાવવામાં આવી છે. સંશોધન કાર્ય સરળ વ્યવહારો બને તે માટે અનુરૂપ સંશોધન પદ્ધતિનો ઉપયોગ કરવામાં આવ્યો છે. આ સંશોધન કામગીરી માટે મેં મુખ્યત્વે મુલાકાત ની રીત નો ઉપયોગ કર્યો છે. પ્રાથમિક માહિતી, વ્યક્તિગત પૂછપરછ તેમજ મુલાકાત પદ્ધતિ દ્વારા પ્રશ્નાવલી માં માહિતી અને સ્ત્રોતોમાંથી પ્રાપ્ત કરવામાં આવી છે. તથા સંદર્ભ સાહિત્યનો અર્થોચિત રીતે ઉપયોગ કરવામાં આવ્યો છે.

૧) મુલાકાત પદ્ધતિ

૨) સર્વેક્ષણ પદ્ધતિ

માહિતી વિશ્લેષણ અને પૃથ્થકરણ :

વલસાડ જિલ્લાના ગ્રામ્ય વિસ્તારના લોકોની આર્થિક પરિસ્થિતિ અંગેનો એક અભ્યાસમાં લોકોની આર્થિક વિચારોની માહિતી એકત્રીકરણ કરવા માટે સંશોધક પ્રથમ તબક્કે પ્રાથમિક માહિતી અને ગૌણ માહિતીનો ઉપયોગ કરવામાં અને ત્યારબાદ પ્રસ્તુત સંશોધનના દરેક વિસ્તારમાં સંશોધક દ્વારા મુલાકાત અને સર્વેક્ષણ પદ્ધતિનો ઉપયોગ કરીને માહિતીનો એકત્રીકરણ કરવામાં આવશે.

પ્રસ્તુત સંશોધન સર્વેક્ષણ સ્વરૂપનું હોવાથી પ્રાપ્ત કરેલી માહિતી અને પૃથ્થકરણ સર્વેક્ષણ પદ્ધતિ દ્વારા કરવામાં આવ્યું હતું.

સંશોધનના પડકારો :

આ અભ્યાસમાંથી ફલિત થયું છે કે વલસાડ જિલ્લાના ગ્રામ્ય વિસ્તારના લોકોની આર્થિક પરિસ્થિતિ કેવી છે જણાય છે કે ત્યાં લોકો જે તે ગ્રામીણ વિસ્તારોમાં લોકો રહે છે પરંતુ તેમને પૂરતા પ્રમાણમાં રોજગારી મળી રહેતી નથી પરંતુ ત્યાંના લોકોમાં શૈક્ષણિક માર્ગદર્શનનો પણ ખૂબ જ વધુ પ્રમાણમાં અભાવ જોવા મળે છે. અને ત્યાંના લોકોની આર્થિક પરિસ્થિતિઓમાં પણ ઘણો બધો અભાવ જોવા મળે છે. કે જેથી કરીને વલસાડ જિલ્લાના ગ્રામ્ય વિસ્તાર માં લોકોની આર્થિક પરિસ્થિતિ કેવી છે એ અંગેનો અભ્યાસ કરવામાં આવ્યો છે કે જે તે વિસ્તારોને સુધારવા માટે ભારત સરકાર દ્વારા અધાતુ કરવા જોઈએ. એક સંશોધન કરવામાં આવ્યું છે.

અભ્યાસ અને સંશોધન પદ્ધતિ .:

પ્રસ્તુત અભ્યાસ વલસાડ જિલ્લાના ગ્રામીણ વિસ્તારના લોકોની આર્થિક પરિસ્થિતિ અંગેઅર્થશાસ્ત્રી અધ્યયન કોઈપણ આ પ્રકારના અભ્યાસ પદ્ધતિ સંબંધી ચર્ચા કરવામાં આવી છે.

૧) વલસાડ જિલ્લાની પસંદગી

૨) ગ્રામીણ પસંદગી

૩) વિસ્તારોની પસંદગી

૪) કુટુંબોની પસંદગી

સંશોધન ક્ષેત્ર અપેક્ષિત યોગદાન :

વલસાડ જિલ્લાના ગ્રામ્ય વિસ્તારના લોકોની આર્થિક પરિસ્થિતિ અંગેનો અભ્યાસ કાર્ય દરમિયાન વલસાડ જિલ્લામાં વિવિધ ગ્રામ્ય વિસ્તારોના સરપંચ શ્રી, ગ્રામ્ય વિસ્તારની પ્રજાજનો, તેમજ ત્યાંના સહકર્મચારીઓ અને સાથે મારા કુટુંબ અને પરિવારના સદસ્ય ખૂબ જ મને સાથ આપીને હું આ કાર્યને પાર પાડી શકી છું. એમને હું સદાય રુણી રહીશ.

તારણો

આ અભ્યાસમાંથી નીચે જણાવેલ તારણો અને નિષ્કર્ષ તારવ્યા છે. આને ગ્રામીણ વિસ્તારના લોકોની આર્થિક પરિસ્થિતિ અંગેના વિકાસની કાર્યક્રમની દિશા દર્શાવી છે.

૧. વલસાડ જિલ્લાના ગ્રામીણ વિસ્તારોના કુટુંબોની સરેરાશ સંખ્યામાં વધારો થયો છે.
૨. વલસાડ જિલ્લાના ગ્રામીણ વિસ્તારમાં વૃદ્ધોનું પ્રમાણ ઘટવા પામ્યું છે, બાળકોની સંખ્યામાં વધારો થયો છે, અને તેની સાથે શ્રમિકોની સંખ્યામાં પણ વધારો થયો છે.
૩. ગ્રામીણ વિસ્તારના લોકોની શ્રમિકોની સંખ્યામાં અસંખ્ય માત્રામાં વધારો થયો છે.

૪. ગ્રામીણ વિસ્તારોમાં નિશાળે જતા બાળકોની સંખ્યાના પ્રમાણમાં પણ વધારો થયો છે..
૫. ગ્રામીણ વિસ્તારના લોકોની આવકમાં પણ વધારો થયો છે.
૬. વલસાડ જિલ્લાનાં ગ્રામીણ વિસ્તારમાં લોકો અન્ય સ્થળોએ રોજગારી મેળવવા માટે સ્થળાંતર કરતા જોવા મળ્યું છે.

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૩. હિન્દ સ્વરાજ, નવજીવન પ્રકાશન મંદિર, અમદાવાદ.

Assessing the status of aquaculture in Gujarat : A survey on the diverse species cultivated in aquaculture practices

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Abstract

Located along the western coast of India, Gujarat boasts a vibrant and flourishing fisheries industry. With its extensive coastline stretching over 1600 kilometers, the state offers abundant resources and opportunities for sustainable fishing practices. The fisheries sector in Gujarat plays a crucial role in the state's economy, providing livelihoods to thousands of coastal communities and contributing significantly to the nation's seafood production. This article delves into the various aspects of Gujarat's fisheries, including its rich biodiversity, fishing techniques, regulatory measures, contrary to many perceptions, dominated by shellfish and herbivorous and omnivorous pond fish either entirely or partly utilizing natural productivity. The rapid growth in the production of carnivorous species such as salmon, shrimp and catfish has been driven by globalizing trade and favourable economics of larger scale intensive farming. Most aquaculture systems rely on low/uncosted environmental goods and services, so a critical issue for the future is whether these are brought into company accounts and the consequent effects this would have on production economics. Failing that, increased competition for natural resources will force governments to allocate strategically or leave the market to determine their use depending on activities that can extract the highest value. Further uncertainties include the impact of climate change, future fisheries supplies (for competition and feed supply), practical limits in terms of scale and in the economics of integration and the development and acceptability of new bio-engineering technologies.

The fisheries sector in Gujarat serves as a significant source of livelihood for coastal communities. Fishing activities provide employment opportunities for thousands of fishermen, boat operators, fish traders, and processors. These communities rely on the industry not only for income but also for cultural and social cohesion, passing down traditional fishing knowledge from generation to generation. There are good conditions for the fishing industry to grow in the seaside districts of Valsad, Surat, and Bharuch, which have a catchment area of 3.76 lakh hectares. These places are known for having valuable fish species like prawns, which could help fishermen make more.

Keywords: fisheries,Gujarat,Aquaculture,shrimp

Introduction

Indian Fisheries sector has shown tremendous progress in last 50 years. Present Fish production in the country is more than 6 million tones out of which more than 50 % is contributed by Inland Fisheries sector. The Fisheries sector has shown steady growth rate of more than 7 % per annum. South Gujarat is endowed with 300 km. long coastline, very high rainfall and low outfall conditions with as many as 11 perennial rivers, 16 large reservoirs, hundreds of tanks and ponds is a predominantly fish producing area providing livelihood to 5 lakh families.However the productivity of both Marine as well Inland Brackish/Freshwater fishes is not up to the mark. Moreover about 78% of suitable brackishwater area of Gujarat (89,000 ha) for shrimp culture is available in south Gujarat. More than 90% of the total shrimp cultivating area of Gujarat is being occupied by south Gujarat only (4500 ha). In India a total of 34 species of Macrobrachium comprising of 20 fresh water species and 14 coastal water species have been reported. Out of these only two species are utilized in monoculture and polyculture practices owing to their large size, fast growth and shorter life history.

India is endowed with a long coastline and hence offers scope for large exploitation of marine wealth. Till a few years back, fishermen in India were involving themselves in traditional marine fishing. In the seventies fishermen started concentrating on catching prawns more commonly known as `shrimps' due to high profitable return on the same on account of their export value. Brackish water prawn farming started in a big way during 91-94 especially in the coastal districts of Andhra Pradesh and Tamil Nadu.Thus this region has potential to emerge as aquaculture hub in inland and brackish water sector

fisheries. In future if brackishwater potential area put under shrimp cultivation (70,000 ha) there will be high needs of fisheries technocrats, skilled fisheries personnel and advanced technologies. To mitigate this education, research and extension activities are the only effective tools. Since, this region has a similar potential to that of Kerala in terms of natural resources and is very well connected by rail and road to all metropolitan cities, fisheries sector can be developed into a large scale industry provided appropriate education

This region contributes about 2/3rd of total Inland fishery production especially those of high value fishes like Catla, Rohu, Mrigal, Catfishes and Prawns. About 90 % of freshwater fish seed production through 8 hatcheries being carried out by South Gujarat region. There are large numbers of village ponds available in South Gujarat which are being currently utilized only for minor irrigation and domestic purpose. Freshwater prawns (*Macro brachium* spp.) have been farmed in India for many years, either in polyculture with carp or extensive monoculture in the states of West Bengal, Orissa, Gujarat, Maharashtra, and Karnataka. Until the late 1990s, annual production was a few hundred tons.

Then large-scale commercial farming became a reality when fish farmers and rice farmers in Nellore, one of the southern districts of Andhra Pradesh, started growing freshwater prawns. A record crop of about 12,000 tons was produced in 2000 to 2001. South Gujarat region comprising of seven districts viz., Bharuch, Narmada, Surat, Navsari, Valsad, Tapi and Dang doesn't have a full-fledged faculty of Fisheries Science though fisheries is the main occupation and principal source of livelihood for over 2 lakhs of socio economically backward people coming below the poverty line. To achieve the above envisaged goal, human resource development drive taken up on a mission mode will serve the purpose of generating professionals, middle level technicians and skilled workforce to augment fisheries production and timely processing to ensure profitability to the fish farmers/entrepreneurs.

Status Of Aquaculture In Gujarat, India:

Economic Zoology: Prawn Culture Systematic Position

Phylum: Arthropoda

Subphylum: Crustacea

Class: Malacostraca Order: Decapoda

Family: Palaemonidae

Genus: Macrobrachium

Species: rosenbergii

Fisheries are an important sector of the Indian economy and play a crucial role in socio-economic development. Apart from fisheries production, the sector is important as it contributes significantly to national food, security, employment and livelihood generation, agricultural diversification and foreign exchange earnings. Fish production in the state of Gujarat With a rich diversity of marine and inland fish species, Gujarat occupies a leading position in fisheries production in India. The share of aquaculture's production to world fish production has continued to increase, reaching 82.1 mt (46%) out of the estimated 179 mt of world fish production. Moreover, its contribution to worldwide fish production is expected to growing up from the existing 46 to 53% in 2030. Because this sector has provided the food and nutritional security, employment and livelihood directly or indirectly through the various level of aquaculture activities . India ranks second in the total aquaculture production in the world next to China (Anonymous, 2020b, Ngasotter et al., 2020) and the freshwater aquaculture contributes major part (>80%) in the aquaculture production in recent years (Anonymous, 2017a) due to the technological interventions of induced breeding, polyculture and composite fish culture in ponds and tanks have brought about significant growth in the freshwater aquaculture production and productivity and turned the sector into a fast growing industry

Fish production in the state of Gujarat With a rich diversity of marine and inland fish species, Gujarat occupies a leading position in fisheries production in India. The total production of the state of Gujarat in the year 2023-24 is 8,99,828 MT. In which marine 7,04,828 MT. Aquaculture has emerged as a fast-growing sector in the field of fisheries with 7% average annual growth (Inaotombi and Mahanta, 2015, Jayasankar, 2018, Boyd et al., 2020) due to its potential and the stagnation fish production in the capture fisheries in marine as well in inland sector (Ahmed et al., 2019, Naylor et al., 2021). Also, the demand of fish is rising significantly in current times due to the awareness about the health benefits of fish consumption , However, the freshwater aquaculture production is

considerably low in spite of huge freshwater resources the state of Gujarat. Since, establishment of Regional Research Center of ICAR-Central Institute of Freshwater Aquaculture, at Anand, Gujarat during 2011 and it has conducted several workshops, awareness and training programs, field days, celebrated National Fish Farmers days and through precipitations in Agri exhibitions to disseminate the scientific technologies to the fish farmers of Gujarat. Also, this center did the research work with focused on the region-specific problems e.g. growth performance of jayantirohu, fish breeding by FRP carp hatchery, rearing of fish seed in village ponds, cultivation of freshwater ornamental fishes, fish health etc. (Anonymous, 2017b, 2018, 2019). Considering the water resources available in state of Gujarat, the present investigation was evaluated the prospects and potential in the sector of freshwater aquaculture to help enhance the overall fish production. Here, the production trends illustrate steady growth and it can be said that this hike in production has mainly come from freshwater sector in Gujarat. The total fish production in Gujarat ($R^2 = 0.93$) highly correlated and significantly contributed to the total fish production of India ($R^2 = 0.96$) (Figure Inland fish production in Gujarat is forecasted to reach 0.22 million tonnes in 2030 and 3.14 million tonnes in 2050 Fish production of India and Gujarat (mt)

Different species selected for cultivation

In India a total of 34 species of Macrobrachium comprising of 20 fresh water species and 14 coastal water species have been reported. Out of these only two species are utilized in monoculture and polyculture practices owing to their large size, fast growth and shorter life history. Many factors must be considered when a farmer is deciding which species of shrimp he should culture. Due to its large size and high price, *Penaeus monodon* and *P. indicus* are generally considered for farming. It has also been seen that both these species are suitable for farming in Kerala's environment. Apart from these candidate species other commercially important species such as *Metapenaeus* sp., *M. monoceros*, *M. brevicornis*, *Penaeus semisulcatus* and *P. merguensis* are also potential species that can be grown in India. Another potential candidate species that is flooding international market is the White leg shrimp, *Penaeus vannamei*.

Culture Of Fresh Water Prawn

- 40 Species. of Fresh water prawns genus *Macrobrachium*

- Faster growth rate, high tolerance for temp fluctuations & salinity and less cannibalistic tendency
- Inhabits rivers upper to lower reaches.
- Mature males – upturned rostrum, larger than females & have enlarged second pair of walking legs.

Macrobrachium Rosenbegii

Inhabits rivers

Omnivorous – shallow muddy environment

Grows – 32cm – 200gm

Culture systems - Male size 25cm and females 15cm

Freshwater form – river – estuaries for breeding – young ones – freshwater habitats

River prawn cultured for 5-6 months



Figure - 1

Penaeus indicus

- Commonest marine shrimp sps in India }
- Body pale white, creamy or pale yellow colouration.
- Smaller in size (23cms & 150gms)but highly delicious

- Optimum salinity 20-30ppt.
- Culture system with sandy bottom
- Culture period 3-4 months



Figure - 2

Penaeus Monodon

- Tiger prawn
- Fastest growing of all species & cultivated throughout
- Body reddish or brownish with thick black lines across abdomen
- Euryhaline salinity 10-25ppt v Size 32cm and 400gms v
- Culture period 4 to 5 months



Figure – 3

Penaeus Vanname:

- **Size:** Can grow up to 23 cm in length, with a carapace length of 9 cm
- **Color:** Usually translucent white, but can change depending on the water, feed, and substratum

- **Head and body:** The head and thorax are merged into a cephalothorax, which has an outwardly pointing shell called the carapace. The abdomen has six pairs of segments
- **Rostrum:** Moderately long with 7–10 dorsal teeth and 2–4 ventral teeth
- **Claws:** Movable chelae (claws) on the first three pairs of walking legs
- **Growth:** Females are usually faster growing and larger than males



Figure - 4

Here are some freshwater fish:

- **Rohu:** An indigenous freshwater fish
- **Catla:** An indigenous freshwater fish
- **Tilapia (Rani):** A famous freshwater fish in India
- **Mrigal:** A famous freshwater fish in India
- **Malli:** A freshwater fish
- **Singhara:** A freshwater fish
- **Calbasu:** A freshwater fish
- **Angelfish:** A peaceful fish with long fins and a round body that can grow up to 6 inches in size



Figure - 5

Importance of prawn culture in aquaculture

Prawn culture is important in aquaculture in Gujarat because it can provide a livelihood for people living in coastal areas. The state has around 89,000 hectares of saline land that is suitable for aquaculture.

Profitability

Prawn culture in salt pans can be a profitable venture. In brackishwater tidal ponds, prawn monoculture can produce 300–600 kg/ha/crop

- **Species**

White prawn (*P. indicus*) is a good species for culture in salt pan areas with salinity ranging from 38–48 ppt.

- **Culture practices**

Semi-intensive prawn culture practices have been tried in India in areas around Kakinada in Andhra Pradesh and Tuticorin and Manakkudy near Cape Comorin in Tamil Nadu.

- **Environmental impact**

Aquaculture can impact the environment, such as by changing land use patterns. Mangrove and agricultural lands have been used for aquaculture, which can reduce agricultural land.

- **Sustainability**

To make shrimp aquaculture sustainable, it's important to implement an intensive monitoring program to ensure strict adherence to coastal aquaculture regulation laws.

- **Soil quality**

Soil pH is an important parameter for aquaculture, as it affects pond condition. A pH ranging between 6.5 and 7.5 is best suited for brackishwater environments.

- **Advantages**

Prawn culture can reduce predators, increase the efficiency of feed, and increase total pond productivity. Prawn culture, or shrimp farming, is important in Gujarat's aquaculture for a number of reasons, including:

- **Livelihood:** Shrimp farming can provide a livelihood for people in coastal areas.
- **Saline land:** Gujarat has 3.76 hectares of saline land in coastal areas that is not suitable for agriculture, but can be used for shrimp farming.
- **Aquaculture potential:** Gujarat has 89,000 hectares of saline land that is suitable for aquaculture.
- **Brackish water fisheries:** Brackish water fisheries are practiced in coastal districts of Gujarat, including Valsad, Navsari, Surat, Bharuch, Anand, Bhavnagar, Amreli, and Girsomanath.
- **Food security:** Aquaculture diversifies food sources and contributes to the food security of the subcontinent.
- **Protein:** Fish protein is an important part of the diet for many Indians

Advantage and drawbacks of prawn farming :

The advantages of plankton system in shrimp farming:

The plankton system in shrimp farming has several advantages. These advantages become the reason for some farmers to run cultivation with this system. These advantages include:

Reduce production costs

Feed occupies the highest portion in the allocation of cultivation costs. By using plankton as a natural food for shrimp, the dependence on expensive artificial feeds can be reduced. This is also one of the efforts to maintain pond finances.

Rich in natural nutrients

Plankton has a high nutritional content to help shrimp growth. Shrimp will get balanced natural nutrition so they can grow more optimally

Maintaining the balance of the ecosystem

Cultivation of the plankton system can help maintain the balance of the pond ecosystem. Apart from serving as natural feed, plankton also maintains water quality and minimizes the risk of harmful algae.

The disadvantages of plankton system in shrimp farming

However, the plankton system in shrimp farming also has disadvantages because it must be monitored intensively. This requires extra time and effort from the farmer.

In addition, the stability of plankton is also quite vulnerable and can be affected by several factors. These factors are fluctuations in temperature, poor water quality, and the presence of disease. Unstable plankton conditions can disrupt the availability of natural feed for shrimp.

Cultivation with the plankton system has its own advantages and disadvantages. For optimal results, recording and monitoring of conditions must be conducted regularly. This is done so that farmers can have accurate decision-making materials and anticipate conditions.

Conclusion:

A 2022 study found that Gujarat's freshwater aquaculture production is expected to reach 3,100 million fry in 2030 and 4,600 million fry in 2050. However, the state's freshwater aquaculture production is low despite the availability of resources. Some reasons for this include poor productivity, lack of quality seed, and improper feeding. Gujarat has 89,000 hectares of saline land that is suitable for aquaculture. Brackish water aquaculture is practiced in coastal districts such as Valsad, Navsari, Surat, Bharuch, Anand, Bhavnagar, Amreli, and Girsomanath. Gujarat ranks second in marine fish production in India. Aquaculture is important for India's food security because it diversifies food sources and fish protein is an important part of the diet for many Indians. The Commissioner of Fisheries in Gujarat has a mission to enhance productivity through sustainable practices and innovative technologies. They also aim to empower fishermen with modern amenities and promote responsible fishing practices.

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A Comparative Study of Flexibility of Gymnastics and Swimming Players

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Abstract:

The main objective of this research study was to do A Comparative Study of Flexibility of Gymnastics and Swimming Players. Gymnastics and Swimming players were selected as subjects in this research study. In which 12 Gymnastics players and 12 Swimming players, a total of 24 players were selected as subjects. In the standard of measurement flexibility was measured by seat and reach. In this research study, significance was tested at 0.05 level by applying 't' ratio to compare the flexibility of Gymnastics and Swimming players. The conclusion of which was seen as follows. The Gymnastics player group was found to be superior to the Swimming player group in flexibility performance.

Keywords: flexibility

Introduction:

The game of Gymnastics is Mother of sports a very scientific and technically game. Without getting in-depth knowledge about this game, one cannot get interested in this game. Physical strength, mental balance and moral enterprise are essential qualities in a player participating in this sport. That is why it is said that great players are born in Sprts. They are not prepared by training and study. The Indian players who have made themselves proud by participating in the Indian team are both God-given qualities and sadhana. Ranjit Singh, Dulip Singh, Vijay Hazare, Mohmand Nisar, Amar Singh, Lala Amarnath, Vinu Mankad, Polyumrogar Naroman, Bishansingh Bedi, Sunil Gavaskar, Kapildev, Sachin Tendulkar, Dipa karmakar all these players have contributed to the development of India.

The game of Swimming is very old. It has been researched for years. It is a game that shows manual skills according to its merit. Swimming may have evolved from wrestling, boxing and athletics during the ancient Olympics.

Flexibility The effectiveness of a person's adaptability in many different activities depends on the flexibility of his whole body or fixed joints. Good flexibility, i.e. wide range of motion, is important anatomically and physiologically. A high degree of flexibility is required for various skills in stringing activities. A person with low flexibility can rarely acquire the required skill conveniently despite expending more energy. Whereas a person with high flexibility expends less energy in performing skills. The development of swimming speed and endurance parallels the development of one's flexion strength. It has been proven that some physiologists believe that a person with relatively low body development for age includes, among other physical factors, a high degree of flexibility.

The Purpose of the Study:

The main objective of this research study was to do a comparative study of the flexibility of Gymnastics and Swimming players.

Selection of the Subject:

Gymnastics and Swimming players were selected as subjects in this research study. In which 12 Gymnastics players and 12 Swimming players, a total of 24 players were selected as subjects.

Criterion Measurement:

SL.	Variable	Test	Measurement
1	Flexibility	Sit and Reach	Centimeter

Statistical Process:

In this research study, significance was tested at 0.05 level by applying 't' ratio to compare flexibility of Gymnastics and Swimming players.

Result of the Study:

Table – 1

Group median, median difference, standard deviation and 't' ratio of Flexibility test

Group	Mean	Mean Different	Standard Deviation	't Ratio
Gymnastics	29.90	1.13	3.70	1.68
Swimming	28.77		4.89	

* The significance level at 0.05 level is 't' 0.05 (22) = 2.074

Table – 1 The mean performance of the Gymnastics player group in the flexibility test was 29.90. While the mean performance of the Swimming player group was found to be 28.77. While the median difference between the two groups is found to be 1.13. While the standard deviation was found to be 3.70 for Gymnastics group and 4.89 for Swimming group. While 't' ratio was found to be 1.68. Which was not found significant difference between the two groups testing (22) = 2.074 at 0.05 level.

Conclusion:

- No significant difference was found in flexibility test of Gymnastics and Swimming players.

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A Comparative Study Arm Strength of Players of Kabaddi, Kho-Kho and Volleyball of Gujarat State

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Abstract

The aim was A Comparative Study Arm Strength of Players of Kabaddi, Kho-Kho and Volleyball Of Gujarat State. In the present study, 72 players of Kabaddi, 72 of Kho-Kho and 72 players of Volleyball participated at state level in Gujarat State were randomly selected of Vadodara, Bharuch and Surat. All selected players were of 13 to 17 years of age. The Arm Strength for medicine ball throw Test was measure of Meter/c.m. Statistical technique such as analysis of variance was applied to know aspects of Arm Strength of players of Kabaddi, Kho-Kho and volleyball of Gujarat State. Significance was examined at 0.05 levels by applying LSD Post Hoc Test to mean difference. 'F' ratio of Arm Strength of male players of Kabaddi, Kho-Kho and volleyball of Gujarat State selected at state level was found 9.554, which followed significance at 0.05 levels. Mean of players of Kho-Kho was found 2552.1111, which was the highest among players of all three groups.

Keywords: Kho - Kho, Kabaddi, Volleyball

Introduction:

The term 'sport' is woven in our life in such a way that it seems the concept and thoughts are developed here. But it is not fact. The word 'Lila' was used for sport in Gujarati language in the past. The general meaning of "Lila" is amusement or game. Means, when any one person does any regulated game with group of persons is regarded as sport or game. Here, meaning of sport is not made limited for any one type of sport, but it focuses on all sports played with the help of limbs of body such as hands, legs etc. Indoor and outdoor sports and games such as Kabaddi, Football, Kho-Kho, Basketball, Handball, Volleyball, Table tennis etc are their best examples. Each sport has its unique existence so each sport is specifically connected to human life.

Objective of the Study:

A Comparative Study of Arm Strength of Players of Kabaddi, Kho - Kho and Volleyball Of Gujarat State

Selection of Subjects:

In the present study, 72 players of Kabaddi, 72 of Kho-Kho and 72 players of Volleyball participated at state level in Gujarat State were randomly selected of Vadodara, Bharuch and Surat. All selected players were of 13 to 17 years of age.

Criterion measurement:

No.	Variable	Test	Measurement
1	Arm Strength	Medicine ball throw	Meter/distance.

Statistical Procedure

Statistical technique such as analysis of variance was applied to know aspects of Arm Strength of players of Kabaddi, Kho-Kho and volleyball of Gujarat State. Significance was examined at 0.05 levels by applying LSD Post Hoc Test to mean difference.

Result of the Study :

Table – 1

Analysis of Variance of Arm Strength of Male Players of Kabaddi, Kho-Kho and Volleyball of Gujarat State

Sport	Mean	Subject	Sum of classes		df	MD	'F'
Kabaddi	2469.8750	72	B	1632814.176	2	816407.088	9.554**
Kho-Kho	2552.1111	72					
Volleyball	2340.8611	72	W	18201335.597	213	85452.282	

*significance at 0.05 Tab 'F' = (2,213) = 3.038

It is observed in table – 1 that mean of Arm Strength of male players of Kabaddi, Kho-Kho and volleyball of Gujarat State selected at state level was 2469.8750, 2552.1111 and 2340.8611 respectively. Sum of squares of all groups was found 1632814.176 and sum of classes between all scores was found 18201335.597. Mean deviation of all groups was 816407.088, whereas mean deviation of all scores was found 85452.280. 'F' ratio was found 9.554, which was found significant at 0.05 levels (2,213) = 3.038. Comparison of mean is made in table – 2 by LSD Test

Table – 2
Critical Ratio Between Mean of Arm Strength of Male Players of Kabaddi, Kho-Kho and Volleyball of Gujarat State

Group			Mean Difference	Critical Difference
Kabaddi	Kho-Kho	volleyball		
2469.8750	2552.1111		82.23611	95.8817
2469.8750		2340.8611	129.01389*	
	2552.1111	2340.8611	211.25000*	

* Significance at 0.05 levels.

Mean difference between sports groups is clearly seen in table – 2. The above table shows difference between players of Kabaddi, Kho-Kho and volleyball and indicates how much increase is found in groups by comparison to critical ratio. The highest difference was found between groups of Kho-Kho and volleyball (211.25000), in which the highest Arm Strength was found in players of Kho-Kho (2552.1111). Mean of all three groups are mentioned in figure

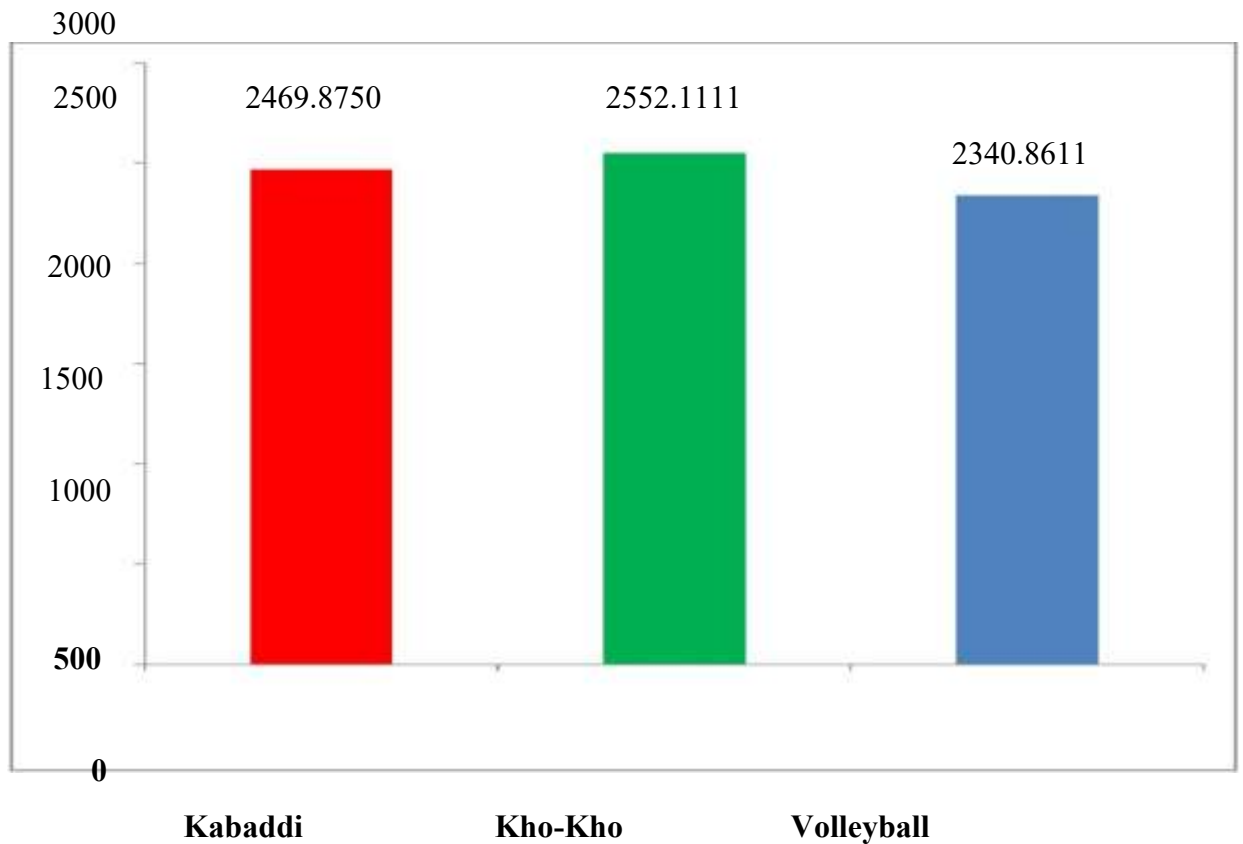


Figure : Mean of Arm Strength of male players of Kabaddi, Kho-Kho and Volleyball of Gujarat State

Conclusion :

- F' ratio of Arm Strength of male players of Kabaddi, Kho-Kho and volleyball of Gujarat State selected at state level was found 9.554, which followed significance at 0.05 levels. Mean of players of Kho-Kho was found 2552.1111, which was the highest among players of all three groups

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Physical Activity as a Predictor of Cognitive Performance in elderly population: A Cross-sectional study

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Abstract

Background: Cognitive decline is a significant concern in aging populations, affecting memory, executive function, and processing speed. Physical activity (PA) is proposed as a potential non-pharmacological intervention to preserve cognitive function by influencing brain health, cardiovascular fitness, and psychosocial well-being.

Objective: To investigate the relationship between physical activity and cognitive performance in adults aged 60–69 years and identify factors moderating this relationship.

Methods: A cross-sectional study was conducted with 400 participants recruited from senior centers and clinics in Surat. Inclusion criteria included individuals aged 60–69 years with no neurodegenerative diseases and the ability to engage in PA. Physical activity was assessed using the International Physical Activity Questionnaire (IPAQ), and cognitive performance was evaluated using the Montreal Cognitive Assessment (MoCA). Data were analyzed using correlation and regression analyses.

Results: A moderate positive correlation ($r=0.564$, $p<0.001$) was found between physical activity and cognitive performance. Regression analysis revealed physical activity ($\beta=2.05$, $p<0.001$) as a significant predictor of cognitive performance, while chronic conditions negatively influenced outcomes ($\beta=-3.21$, $p<0.001$). Other variables, such as age and BMI, showed no significant association.

Conclusion: Regular physical activity is associated with better cognitive performance in older adults, emphasizing its role as a preventive strategy against cognitive decline. Public health initiatives should prioritize promoting physical activity among aging populations to enhance cognitive health and quality of life.

Introduction:

Aging is often accompanied by a decline in cognitive function, affecting domains such as memory, executive function, and processing speed. However, growing evidence suggests that physical activity (PA) may serve as a protective factor, potentially attenuating age-related cognitive decline in older adults (1). The role of physical activity as a predictor of cognitive performance has garnered significant attention in recent years, as numerous studies have highlighted its benefits for brain health and overall cognitive functioning in the elderly population (2, 3).

Physical activity is defined as any bodily movement produced by skeletal muscles that require energy expenditure, and it encompasses a wide range of activities, from structured exercises such as walking, swimming, and resistance training to lifestyle activities like gardening and housework (4). Research indicates that regular participation in physical activity is associated with better cognitive performance in elderly adults, particularly in terms of memory, attention, processing speed, and executive functions (5, 6). These findings have led to a growing interest in understanding the mechanisms through which physical activity impacts cognitive health and how different forms of activity may offer varying degrees of cognitive benefit (7).

One of the key mechanisms by which physical activity improves cognitive function in the elderly is through its influence on brain structure and function. Studies utilizing neuroimaging techniques have shown that older adults who engage in regular physical activity exhibit increased brain volume in areas associated with cognitive functions, such as the prefrontal cortex and hippocampus (8, 9). These areas are particularly vulnerable to age-related atrophy, but physical activity appears to mitigate this decline by promoting neurogenesis, synaptic plasticity, and angiogenesis (10). For instance, aerobic exercise has been consistently linked to hippocampal neurogenesis, which plays a critical role in memory formation and spatial navigation (11).

In addition to its effects on brain structure, physical activity is believed to improve cognitive performance by enhancing cardiovascular health, which in turn supports cerebral blood flow and oxygenation (12). Poor cardiovascular health, including conditions such as hypertension, diabetes, and obesity, has been associated with cognitive impairment in older adults (13). Physical activity helps to regulate these conditions, reducing the risk of vascular-related cognitive decline and promoting overall brain health (14, 15). Furthermore, physical activity has been shown to reduce

inflammation and oxidative stress, both of which are known contributors to neurodegenerative processes (16, 17).

Beyond physiological mechanisms, physical activity may also influence cognitive performance through psychosocial factors. Engaging in regular physical activity can improve mood, reduce stress, and alleviate symptoms of depression and anxiety, all of which are known to negatively impact cognitive function (18). Physical activity also promotes social interaction, which has been shown to have a protective effect against cognitive decline (19). Group-based physical activities, such as walking clubs or fitness classes, provide opportunities for social engagement, which can further enhance cognitive resilience in older adults (20).

Moreover, the type, intensity, and frequency of physical activity play a critical role in determining its cognitive benefits. Aerobic exercises, such as walking, jogging, and cycling, have been most frequently studied and are consistently associated with improvements in cognitive performance, particularly in the domains of executive function and memory (21, 22). However, emerging evidence suggests that resistance training and mind-body exercises, such as yoga and tai chi, may also contribute to cognitive health in older adults (23). These activities not only improve muscle strength and balance but also stimulate brain regions involved in attention and coordination, thereby offering cognitive benefits (24).

Despite the growing body of research supporting the positive relationship between physical activity and cognitive performance, there remains a need for further investigation into the specific types of activity that provide the greatest cognitive benefits, as well as the optimal intensity and frequency of physical activity for elderly populations (25). Additionally, longitudinal studies are essential to better understand the long-term effects of physical activity on cognitive trajectories in aging and to identify whether physical activity can delay or prevent the onset of cognitive impairment and dementia.

Objectives of the study:

1. To examine the correlation between regular physical activity and cognitive function in older adults.
2. To explore the types and intensities of physical activity that are most strongly associated with cognitive improvements.

3. To identify moderating factors (e.g., age, gender, comorbidities) that may influence the strength of the correlation between physical activity and cognitive function.

Significance of the study

The findings of this study have significant ramifications for older individuals' cognitive health promotion. Reducing the societal and personal burden of cognitive decline is contingent upon the development of efficient and accessible interventions to sustain cognitive function as the world's population ages. This study could influence public health policies and clinical practices by shedding light on the connection between physical activity and cognitive function and promoting the adoption of physical activity programs catered to the needs of older persons. Furthermore, the results may serve as a roadmap for future investigations into non-pharmacological means of postponing or avoiding cognitive decline.

Methodology

Study Design: Cross sectional study.

Population: Participants with 60-69 years of age.

Study Settings: Participants will be recruited from local senior centers, retirement communities, and outpatient clinics of Surat city.

Study Duration: 6 months

Study Size: Sample size was calculated by using OpenEpi, Version 3 software at 95% confidence level. Calculated sample size was 400.

Sampling Method: Convenient Sampling

Inclusion Criteria

- Adults aged 60 to 69 years.
- No history of neurodegenerative diseases (e.g., Alzheimer's, Parkinson's).
- Able to engage in physical activity without medical restrictions.
- Consent to participate in the study.

Exclusion Criteria

- Participants will be excluded from the study if they meet any of the following criteria:

- Current diagnosis of severe depression, schizophrenia, bipolar disorder, or other major psychiatric disorders that may affect cognitive performance.
- Conditions that severely limit mobility or prevent the participant from engaging in physical activity, such as advanced osteoarthritis, severe heart disease, or chronic obstructive pulmonary disease (COPD).
- Ongoing treatment for serious medical conditions such as cancer, or recent major surgery (within the last 6 months).
- Current diagnosis or treatment for alcohol or drug abuse, as these may impact both physical activity levels and cognitive function.
- Use of medications specifically prescribed for cognitive enhancement, such as donepezil or memantine, which could influence cognitive test results.
- Inability to understand or communicate in the language used for testing, leading to difficulty in completing cognitive assessments.
- Impairments that cannot be corrected with devices (e.g., hearing aids, glasses) and may interfere with the completion of cognitive assessments or physical activity questionnaires.
- Current participation in another research study that involves cognitive or physical interventions, which could influence study outcomes.
- **Outcome measure:**
 - **International Physical Activity Questionnaire (IPAQ):** This widely used self-report tool measures the frequency, duration, and intensity of physical activity across different domains (e.g., work, leisure, exercise).
 - **Montreal Cognitive Assessment (MoCA):** This will be used to assess different cognitive domains such as memory, attention, and visuospatial abilities.
- **Data Collection Process:** **First**, we identified potential participants (older adults aged 60 to 69 years) from senior centers, retirement communities, or clinics and then screened participants based on inclusion and exclusion criteria (e.g., no severe cognitive impairment or neurodegenerative diseases). **Second**, is about the consent form of the participants we have provided the participants with detailed information about the study, including its purpose, procedures, risks, and benefits and then Obtained written informed consent from each participant before participation. **Third** step was done to Collect basic demographic information

(age, gender, education level) and medical history using data collection sheet then participants were Screened for severe cognitive impairment using the Mini-Mental State Examination (MMSE) to exclude participants with scores below the threshold (e.g., MMSE < 20) and then Conducted a brief health assessment (e.g., blood pressure check) to ensure participants are fit for physical activity. In **Fourth** step we Administered the International Physical Activity Questionnaire (IPAQ). **Fifth** step was about Conduction of Cognitive Tests by using Montreal Cognitive Assessment (MoCA) Test.

Results and Analysis

Table 1: Descriptive statistics

Variable	Mean	Standard Deviation (SD)	Range
Physical Activity (hours/ Week)	5.09	1.97	0.00-11.39
Cognitive score	57.91	6.78	38.51-77.90
Chronic Conditions	0.75	0.89	0-3

Correlation Analysis:

Table 2: The relationship between physical activity and cognitive performance by spearman rank correlation test.

Variable	Correlation Coefficient (r)
Physical Activity vs. Cognitive Score	0.564

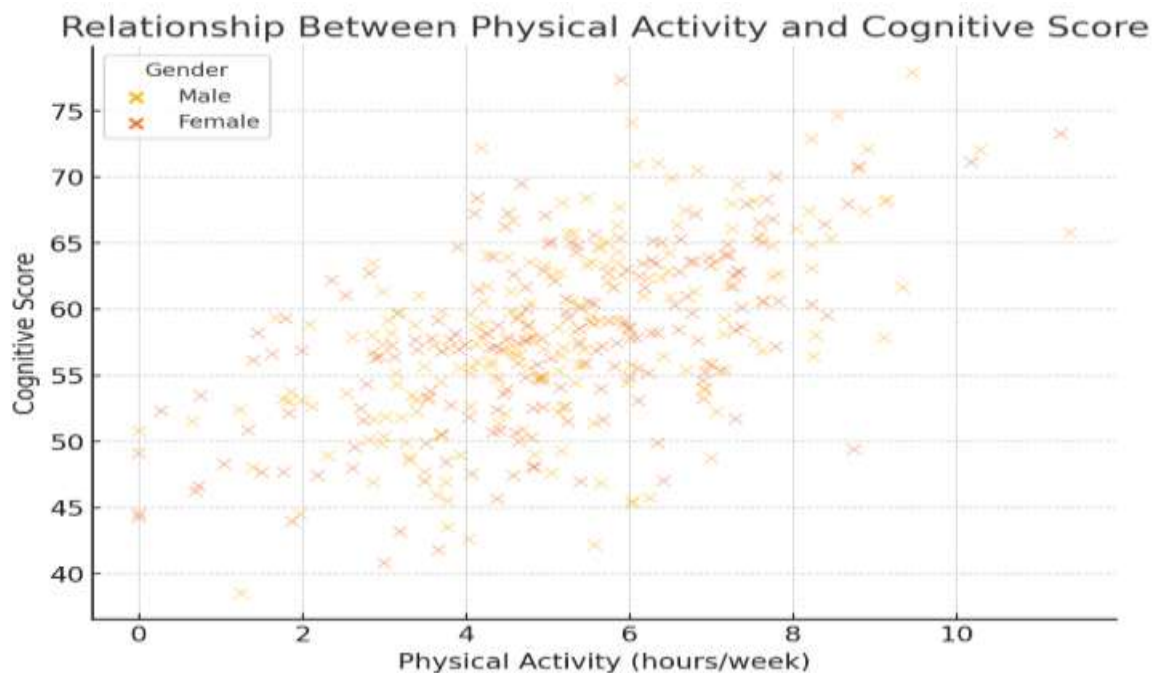
A moderate positive correlation ($r=0.564$) was observed, suggesting higher physical activity is associated with better cognitive performance.

Regression Analysis:

Table 3: Regression analysis

Predictor Variable	Coefficient	Standard error	t-value	p-value
Physical Activity (hours/week)	2.05	0.12	16.55	<0.001
Chronic condition	-3.21	0.27	-11.77	<0.001
Age	0.02	0.05	0.48	0.630
BMI	-0.04	0.06	-0.60	0.547
Gender (Male)	0.23	0.49	0.48	0.634
Education (Graduate vs. others)	-1.00	0.66	-1.52	0.130
Education (High School vs. Others)	-0.57	0.55	-1.05	0.297

Graph 1: Relationship between Physical Activity and Cognitive score



- **Discussion:**

The emerging evidence underscores the role of physical activity (PA) as a promising non-pharmacological intervention for preserving cognitive function in older adults. The multifactorial benefits of PA—impacting brain structure, cardiovascular health, and psychosocial well-being—suggest its integral role as a predictor of cognitive performance in aging populations. With global aging trends accelerating, promoting PA as a preventive strategy against cognitive decline holds significant public health implications. One of the key mechanisms by which PA preserves cognitive function is through its positive effects on brain structure. Neuroimaging studies have consistently shown that older adults who engage in regular PA have larger volumes in brain regions vulnerable to age-related atrophy, such as the hippocampus and prefrontal cortex (26, 27). For example, Erickson et al. (2011) found that aerobic exercise was associated with hippocampal growth, which is critical for memory and spatial navigation (28). This increase in brain volume is believed to stem from exercise-induced neurogenesis and synaptic plasticity, suggesting PA can mitigate age-related cognitive decline by promoting brain health (29). Psychosocial factors further reinforce the cognitive benefits of PA. Physical activity, particularly in group settings, promotes mental health by reducing symptoms of anxiety, depression, and social isolation—factors known to exacerbate cognitive decline (30). Social engagement through PA, such as participating in group exercise classes, has been shown to foster cognitive resilience by providing mental stimulation and emotional support (31). Fratiglioni et al. (2004) found that older adults who maintained an active and socially integrated lifestyle were less likely to develop dementia, highlighting the importance of psychosocial well-being in cognitive preservation (32). While aerobic exercise has been most frequently studied, recent research suggests that other forms of PA, such as resistance training and mind-body exercises, may also contribute to cognitive health. For instance, resistance training has been linked to improvements in executive function and memory (33), while practices like yoga and tai chi enhance cognitive function through their focus on mental discipline and balance (34). This diversity in PA forms underscores the need for tailored exercise interventions that cater to the

physical and cognitive needs of older adults. The promotion of PA as a public health strategy is essential, especially given the growing elderly population and the rising prevalence of dementia. Encouraging regular PA among older adults could have a substantial impact on reducing cognitive impairment and associated healthcare costs (35). Public health policies should focus on increasing access to exercise opportunities for seniors, creating age-friendly environments, and raising awareness about the cognitive benefits of PA. Healthcare professionals should also incorporate PA recommendations into routine care, emphasizing the importance of PA for cognitive health.

- **Conclusion**

- Physical activity appears to be a promising non-pharmacological intervention for preserving cognitive function in older adults. Its effects on brain structure, cardiovascular health, and psychosocial well-being all contribute to its role as a predictor of cognitive performance. As the global population ages, promoting physical activity as a preventive strategy against cognitive decline could have significant public health implications.

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Appraisal of Majorly Involved Joints in Hemophilia Patients Using Hemophilia Joint Health Score Scale

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Abstract

BACKGROUND: Haemophilia is an inherited X-linked recessive bleeding disorder characterized by recurrent bleeding into muscle and joint, causing synovial hypertrophy, destruction of the articular cartilage and ultimately haemophilic arthropathy. This observational cross-sectional study was conducted to study joint health status in Hemophilia patients and draw their joint disability score by using Hemophilia Joint Health Score (HJHS). **OBJECTIVE:** To rule out the majorly involved joints as per the HJHS in haemophilia patients in age between 10-65 years at New Civil Hospital, Surat. **METHODS:** In this study total number of participants were 42 as per inclusion and exclusion criteria. Each patient was assessed by using HJHS scale **RESULT:** Out of total 42 cases 33 (78.57%) cases were diagnosed as hemophilia A while 9 cases (21.42 %) were diagnosed as hemophilia B. In haemophilia (95.23%) cases were males while (4.76%) cases were females. Knee joint was the predominant joint affected by hemarthrosis in 64.28 % cases followed by ankle joint (11.9 %) elbow joint (23.8 %). Swelling was the most frequently present in haemophilic patient which was 95.2%. There was no correlation of HJHS score with age. **CONCLUSION:** This study concludes that knee joint was the most frequently affected joint while assessing the hemophilic patients by using HJHS scale. Next to it, elbow and ankle were commonly involved joints. Additionally, more patients were prone to restrict their daily activities

because of presence of swelling in different joints of body. In present study, weak relationship was found between increasing age and HJHS score.

Keywords:Haemophilia, HJHS Scales, Gait, Rehabilitation.

1. Introduction

Congenital deficiencies of plasma proteins involved in blood coagulation generally led to lifelong bleeding disorders. They include inherited deficiencies of fibrinogen, factor (F) II, FV, FVII, FX, FXI, FXIII, and combined FV and FVIII deficiencies⁽¹⁾. Hemophilia refers to a group of bleeding disorders in which there is a deficiency of one of the factors necessary for coagulation of the blood. The two most common forms of the disorder are factor VII and factor IX deficiency⁽²⁾, which has serious consequences for the activation of the endogenous system of the coagulation cascade⁽³⁾. There are two known types of haemophilia: FVIII (haemophilia A), FIX (haemophilia B): mild, moderate, severe. The risk of bleeding and, consequently, the risk of joint damage is related to the severity of the disease, being very high in untreated severe haemophilia and much less relevant in mild haemophilia^(4,5).

Hemophilia A accounts for around 80 % of cases. The incidence of Hemophilia A is around 1 in 5,000 male births. Hemophilia B accounts for the remaining 20 % of cases. The incidence of Hemophilia B is around 1 in 25,000 male births⁽²⁾. 1 in 100,000 live births for hemophilia C which is about 1% of hemophilia cases. It is equal among all ethnic groups⁽⁷⁾. Between 2009 and 2010, 260 new patients were reported from India. Indian data are reported by the Hemophilia federation of India (HFI). The data showed that in 2011, India reported 14,718 patients with bleeding disorders and 11,586 patients with Hemophilia A⁽⁹⁾. Haemophilia is not a disease of public health relevance in India. It's being a rare condition, which is non-communicable, chronic and extremely expensive to treat. Thus, this condition does not attract any government resources. There is still lack of awareness in the society and also in the physiotherapists about the rehabilitation role of their in the Hemophilia⁽⁹⁾. Recurrent and spontaneous joint bleeding or hemarthrosis is the most frequent manifestation of haemophilia. The most affected joints, in decreasing order of frequency, are the knees, elbows and ankles so they are also called 'Index joints'⁽¹¹⁾.

The initial laboratory investigation of a patient suspected of having a bleeding disorder includes coagulation tests such as the activated partial Thromboplastin time (aPTT) and

prothrombin time. (13) To confirm a diagnosis, the quantity (amount) of factor XIII is tested in a blood sample through quantitative analysis of factor XIII(1) Measurement of FVIII or FIX clotting activity is necessary to confirm the diagnosis and establish the severity ⁽¹⁾. The haemophilia joint health score (HJHS) is a validated outcome tool developed for the assessment of joint health in people with haemophilia. It is recognised as a optimal measurement of arthropathy in children and young adults. This study will help us to asses joint health status and majorly involved joints in Haemophilia patients and draw their joint disability score by using HJHS score.

In the last five years, replacement therapy has been enriched with the advent of FVIII/FIX molecules purposely modified with enhanced pharmacokinetic properties that deliver better protection over a prolonged period (18). The mainstay of treatment is factor replacement injected or infused intravenously on a regular basis. Prophylaxis, which has been shown to improve quality of life (19) . Gene therapy provides hope for a cure for patients with hemophilia by establishing continuous endogenous expression of factor VIII or factor IX following transfer of a functional gene copy to replace the hemophilic patient's own defective gene⁽²⁰⁾ .

Although a number of studies have been designed to assess the safety and efficacy of the various physiotherapy,(21) techniques such as electrotherapy strength and proprioception training and aqua fitness training,(22) further progress is needed identify and design a protocol for the physiotherapeutic approach in patients with hemophilic arthropathy.(23) Physiotherapy through the RICE method (Rest, Ice, Compression, and Elevation) has been described for the improvement of acute joint injuries, as well as in the management of hemarthrosis in patients with hemophilia(24). Manual therapy use as manual force applied to articular and soft-tissue structures through mobilization and stretching intended to improve joint function in Hemophilic patients.(25) The HJHS is well-recognized physical examination scale used to numerically score the joint health of patients with hemophilia and has been validated in a Chinese population. There are nine impairment items in the HJHS, including swelling, duration of swelling, muscle atrophy, crepitus of motion, extension loss, flexion loss, joint pain, strength, and gait. A higher total score indicates a worse joint health status. Moreover, HJHS scale is the most reliable and standardized scale in evaluating overall status of hemophilic patients and is best in guiding physical therapist to make appropriate protocol. Through this study it would be easier for the physical therapist to start treatment as per the involvement of

different areas of this scale.

2. Methods

An observational type cross-sectional design study with 42 participants using convenient sampling was done. Participants who clinically diagnosed with hemophilia were included in the study according to the selection criteria. The inclusion criteria for this study were both male and female participants diagnosed with hemophilia, participants who were receiving treatment from New Civil Hospital, Surat and participants under the age group of 10 to 65 years. The non-hemophilic participants and participants receiving treatment from other hospitals were excluded from this study.

Haemophilic Joint Health Scale (HJHS) was used for the assessment of the participants. With the help of the scores, analysis of data was done by using statistical tools. Out of 42 cases, 26 cases were between 16 and 65 year of age were assessed for joint impairment by HJHS score 2.1 version. This is an eight item scoring tool for assessing joint impairments of the six index joints in patients with Hemophilia. Each of the six index joints were evaluated individually by trained physiotherapist. Each joint was then scored using all eight items, with a joint score ranging from 0 to 20. Global gait was assessed separately for a score of 0–4. The total joint scores and global gait score were then combined for a total score ranging from 0 to 124.

2.1 Outcome Measure

Physical examination scales such as the Hemophilia Joint Health Score (HJHS) have been successfully used to assess joint outcomes, without requiring imaging techniques. The HJHS is a structured physical examination score evaluating the 6 joints most affected by hemophilia specifically, the elbows, knees, and ankles. Classification of Functioning, Disability and Health, the HJHS is a clinical measure of joint structure and function. The score for each joint is the sum of the individual item scores and the overall total score (range 0 –124) is the sum of the 6 joint scores. A normal evaluation in all 6 joints gives a score of 0 – 6. A score of 148 suggests the worst possible damage/impairment in all 6 joints. The HJHS measures gait globally and separately by providing a score for each joint thought to be contributing to altered gait.

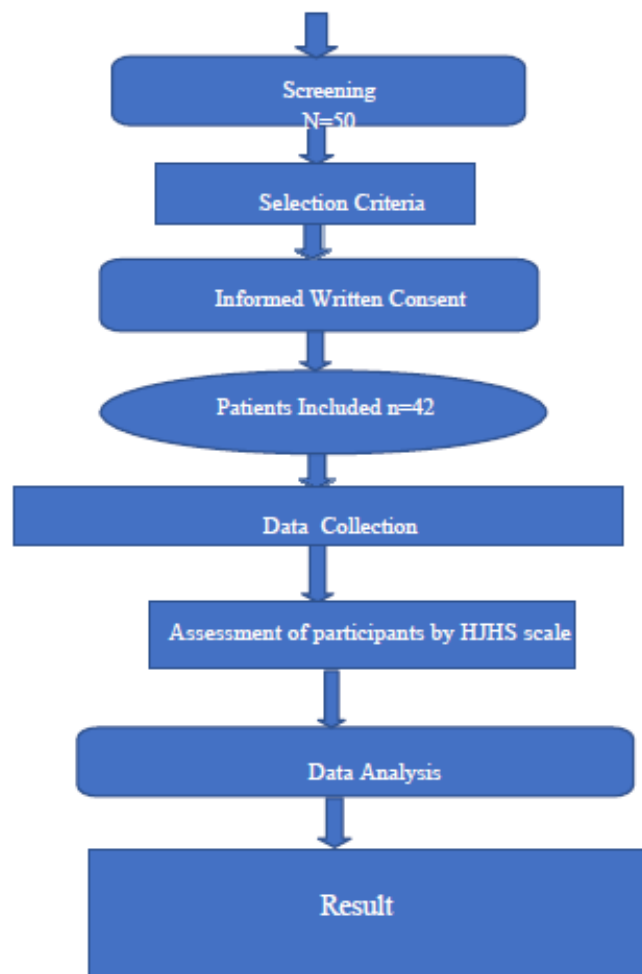


Figure 2.1: The Flow chart represents procedure of the study

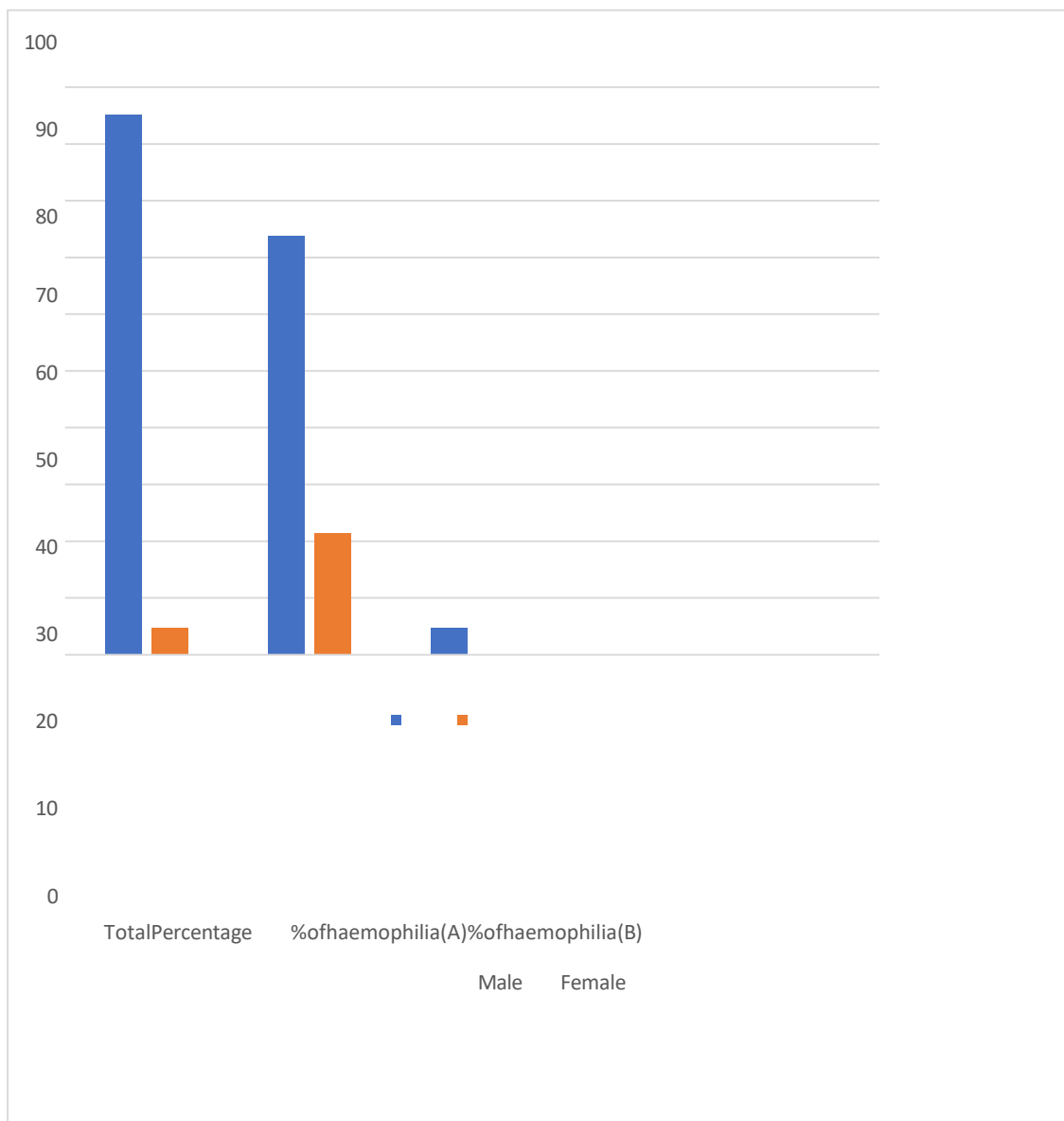
3. Results

The objective of the study was to appraise the majorly involved joints in patients with Hemophilia when using HJHS scale. The data was entered in the excel spread sheet tabulated and subjected to statistical analysis. Data was analysed using SPSS software. Descriptive statistical methods were used and main outcome measure was expressed in percentages to evaluate the majorly affected joint and area which is more prone to get affect by Haemophilia. The confidence interval was set at 95% and data was considered statistically significant with $p < 0.001$

Table 3.1: Percentage of Male and Female participants with hemophilia

Gender	Male	Female
Total percentage	95.23	4.76
%of HA	73.8	21.42
%of HB	4.76	0

Graph 3.1: Percentage of Male and Female participants with hemophilia

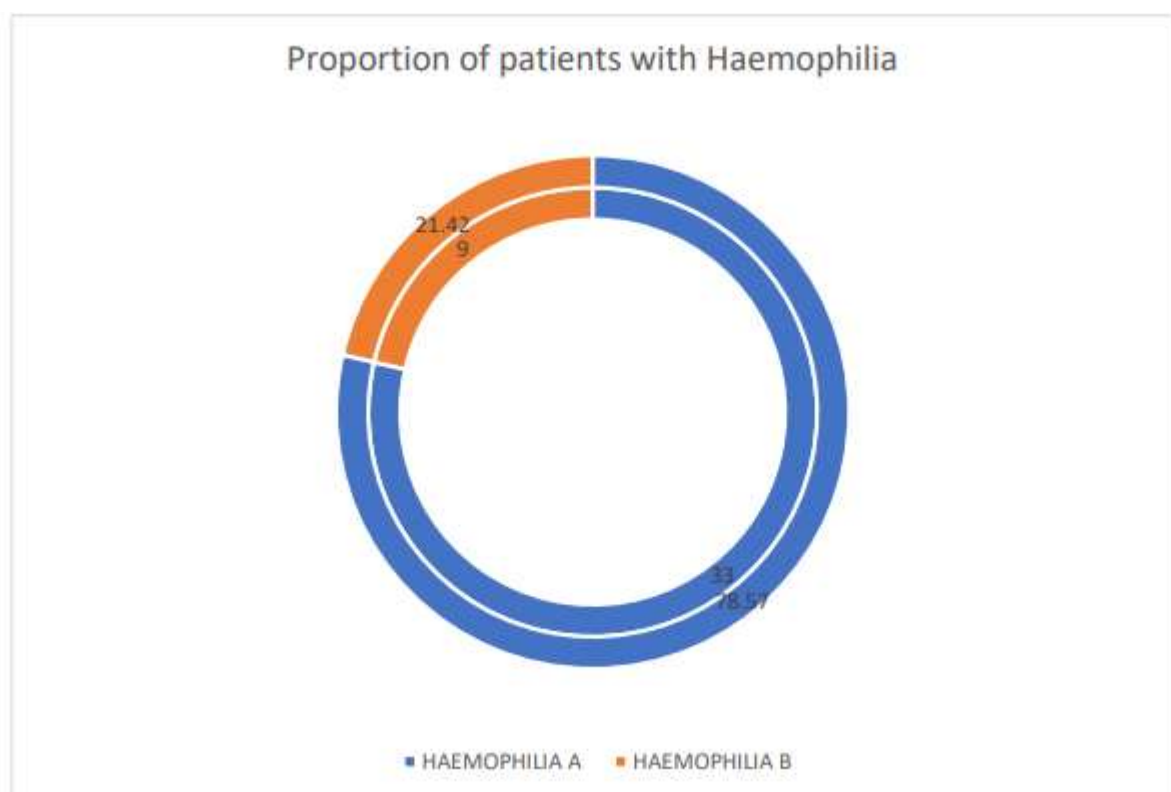


According to this table 3.1 and graph 3.1, it is clearly seen that males are (95.23%) and females are (4.76%) affected by haemophilia. We also found

out that haemophilia A (73.8%) is predominantly affecting in males than haemophilia B (4.76%) and females is only affected by haemophilia A (21.42%).

Table 3.2: Percentages of Hemophilia A and B

Disease	Number of Patients	Percentage (%)
Haemophilia A	33	78.57
Haemophilia B	9	21.42



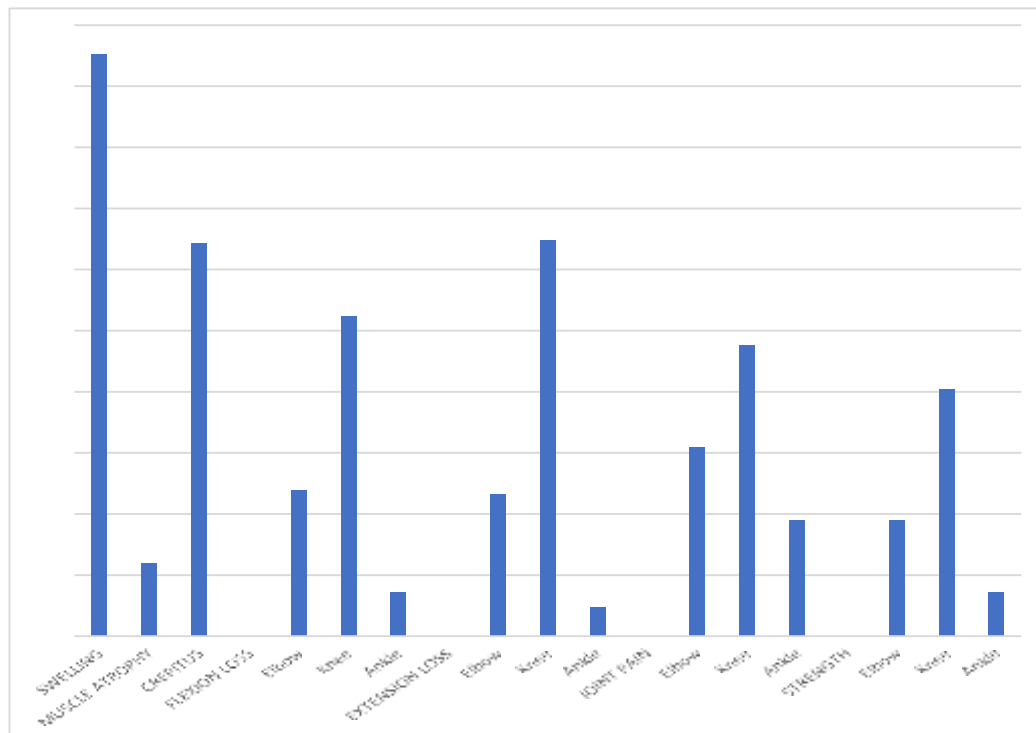
Graph 3.2: Proportion of participants with hemophilia A and B

A total of 50 participants were screened for this study of which 42 participants were selected on the basis of selection criteria who were attending Haemophilia Department at New Civil Hospital, Surat. The table

3.2 and Graph 3.2 illustrate the number and percentage of patients included in the study diagnosed with Haemophilia A and B. This data suggest that 78.57% participants were found with Haemophilia A and only 33% of patients with Haemophilia B.

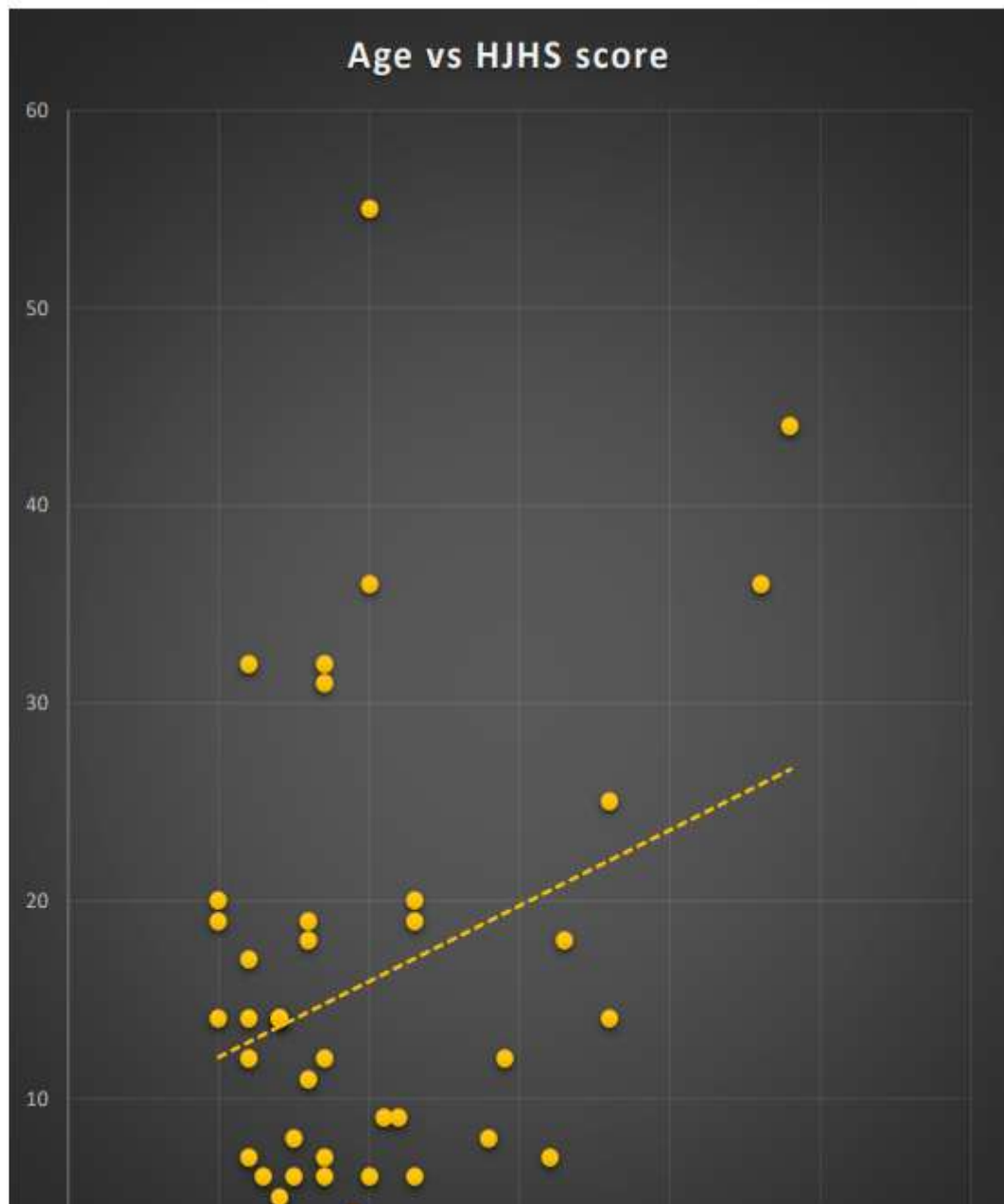
Table 3.3: Frequency and Distribution of HJHS domains in cases of Hemophilia

Sr.No.	HJHS Domain	Total Number	Percentage
1	Swelling	40	95.2
2	MuscleAtrophy	5	11.9
3	Crepitus	27	64.28
4	FlexionLoss		
	Elbow	10	23.80
	Knee	22	52.38
	Ankle	3	7.14
5	ExtensionLoss		
	Elbow	10	23.80
	Knee	23	54.76
	Ankle	2	4.76
6	JointPain		
	Elbow	13	30.95
	Knee	20	47.61
	Ankle	8	19.04
7	Strength		
	Elbow	8	19.04
	Knee	17	40.47
	Ankle	3	7.14



Graph 3.3: Frequency and Distribution of HJHS domain in cases of Hemophilia

The table 3.3 and graph 3.3 suggest that swelling was the most frequently present clinical feature in hemophilic patients which was about in 95.2% of patients and secondly crepitus was present in 64.27% of patients. The ankle joint was found least commonly involved joint in flexion loss, extension loss, joint pain and strength with proportion of 7.14%, 4.76%, 19.4%, 7.14% respectively.

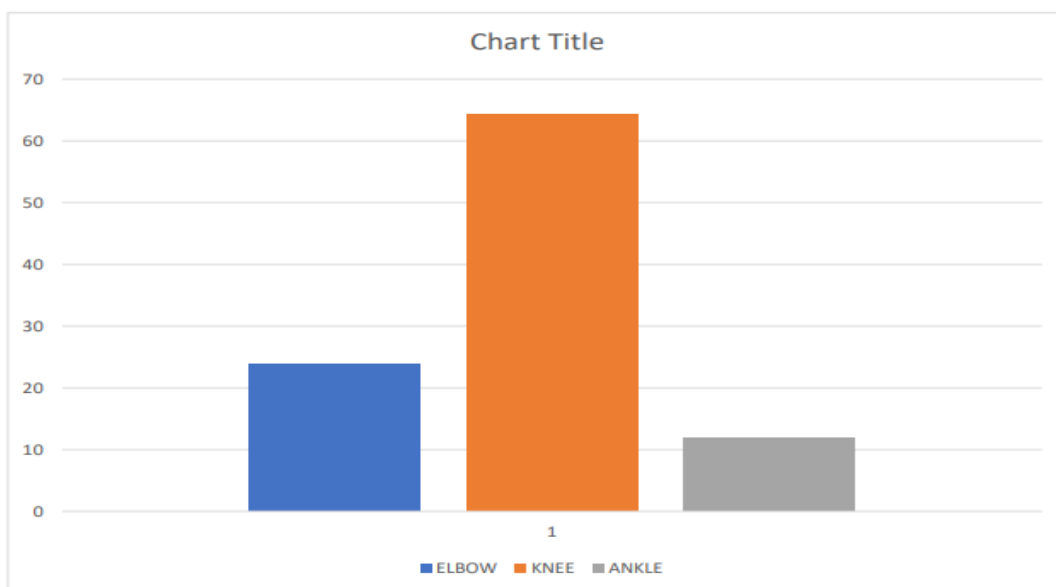


Graph 3.4:Correlation of HJHS score with age

In present study HJHS score was plotted against age of patients. Pearson correlation was 0.299 and p value was ($p=0.55$) which is statistically non significant. HJHS score showing negative correlation with age of patient. There was no increase in HJHS score with increasing age.

Table 3.4: Percentage of majorly involved joints by using HJHS scale

Sr. no	Targeted joints	Total number	percentage
1	ELBOW	10	23.8
2	KNEE	27	64.28
3	ANKLE	5	11.9



Graph 3.5: Percentage of majorly involved joints by using HJHS scale

According to this table 3.4 and graph 3.5 it is clearly seen that knee joint was the predominantly affected joint in the haemophilic patients. Knee joint was involved in 64.28% of cases, elbow joint was involved in 23.8% of cases and Ankle joint was involved in 11.9% of cases.

4. Discussion

In this study knee joint was the predominant joint affected by hemarthrosis in 64.28% cases, elbow joint was involved in 23.8% cases and ankle joint was involved in 11.9% cases. Similar results were observed by Pramod S. et al in a study in Jodhpur region. In their study, knee joint was affected in 67.85% cases , Ankle joint was affected in 51.78% cases and Elbow joint was affected in 35.71% cases.⁽²⁾

In a study by Shahida Mohsin et al. on Hemophilia B patients, most commonly involved

joint was found to be knee in 15 cases (33.3%), followed by elbow in 17.7%, ankle in 13.3%, and hip joint in 4.5 %⁽²⁸⁾ In this study most commonly involved joint was knee joint which is similar to observation of Pramod S. In this study next to knee joint in order of frequency was elbow and ankle joint contrary to Pramod S who reported more involvement of Ankle joint⁽²⁾.

In a project aimed at constructing a composite score (Hemophilia Severity Score, HSS) to assess the severity of the disease, Schulman *et al.* evaluated 100 patients affected by HA (n=67) and HB (n=33)⁽³⁾. Similarly in our study we evaluated 42 patients in which patients affected by HA (n=33) and HB (n=9).⁽²⁸⁾ In a study by MM Uddin *et al.* (80%) of patients were diagnosed as haemophilia A and only (20%) patients were diagnosed as haemophilia B.⁽²⁶⁾

HJHS score showed significant positive correlation with age of patient indicating that a worsening of the HJHS score was noticed with increasing age in the study of Pramod S. where in our study there was a negative correlation between increasing age and HJHS score.⁽²⁾ In our study swelling was present in 95.2% cases. Similar results were observed by Karim MA *et al.* in their study knee joint (68%) cases of haemophilia followed by ankle joint (22%), elbow joint (14%).⁽²⁷⁾

In a study of MMU d din *et al.* swelling was the predominant presenting symptom (100%) cases was involved in their study.⁽²⁶⁾ In this study we found out that haemophilia was most commonly affecting the male patients than the female patients similar results were found by Karim MA *et al* in their study. All the 50 cases of haemophilia were male found by Karim MA *et al* while in our study 40 cases were male and 2 cases were female.⁽²⁷⁾

4.1 Limitations:

1. Using HJHS scale this study was able to find only three major joint.
2. Other joints such as shoulder, hips, spine were not assessable.
3. Also the subject were only from a particular place i.e., civil hospital.
4. Our sample size was only limited to Surat region

4.2 Future Recommendation:

1. Future studies can use updated versions of HJHS scale to find out majorly involved joints in Haemophilia patients.
2. Also future studies can use different scales for assessment.

3. Future studies can also be carried out in different regions with large sample size to get more accurate results.

5. Conclusion:

Hemophilia is still not a disease of public health relevance in India like other developed countries. There is very little information on the disorder and its trends in our population. In this study an attempt has been made to enlist hemophilia cases, grade their severity and to find out the joint complications. This study concludes that knee joint was the most frequently affected joint while assessing the hemophilic patients by using HJHS scale. Next to it, elbow and ankle were commonly involved joints. Additionally, more patients were prone to restrict their daily activities because of presence of swelling in different joints of body. In present study, weak relationship was found between increasing age and HJHS score.

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Online and Digital Education under the New Education Policy: Ensuring Equitable Use of Technology

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Abstract

The New Education Policy (NEP) 2020 emphasizes the transforming role of technology in shaping the Indian education system. This is especially true in the context of online and digital education. The policy envisages a future where education is accessible, inclusive and flexible, leveraging technology to overcome traditional barriers such as geographic boundaries. and economic and social differences Equitable access to technology is at the core of NEP's vision to ensure that digital education reaches every corner of the country. From city centers to remote rural areas This policy emphasizes the importance of digital infrastructure. online learning platform and digital knowledge to enhance the potential of educators and learners Particular attention has been paid to addressing the digital divide. To ensure that marginalized and disadvantaged communities have equal opportunities to benefit from online education, NEP also supports capacity building among educators to use digital tools effectively. and create interesting learning experiences Through initiatives such as the National Educational Alliance for Technology (NEAT), the policy aims to develop high quality digital content and resources. To improve the overall learning experience, in this context, policies do not only promote the integration of innovation and technology. But it also emphasizes the need for a comprehensive, ethical approach to digital education. with emphasis on data privacy cyber security and access This theme explores how the NEP aims to provide an inclusive, learner-centric environment where all students, regardless of socioeconomic background or location, have access to high- quality educational opportunities by ensuring equitable use of technology in online education.

Keywords

New Education Policy, Digital Education, accessible education, National Educational Alliance for Technology (NEAT), Equitable Education, Digital Infrastructure and

learner-centric environment.

Introduction

Since the pandemic forced schools to close all around the world, parents are now in charge of their children's education. Universities, colleges, and schools were closed for as long as two full years. This state will be in control. This had a negative impact on schooling. Out of millions of pupils. 1Online education was used to make up for the abrupt demise of the traditional educational system. This substitute has been the choice accessible to educational establishments of all kinds. However, one factor that has been brought to attention of various educators and policymakers is that with the inclusion of Online education the educational disparities within the system will be widened up. The epidemic has caused socio-technical inequalities to have enlarged and concurrently different types of exclusion and has also enhanced marginalization. Parents vary in their access to resources and their capability to offer effective support at home, which has amplified the existing disparities in children's learning opportunities.

The Indian government introduced the New Education Policy 2020 during the pandemic, and through digital technology, they were taking it quite seriously in using all this to help learn and get better results. It involves the ICT-based education program that had been initiated earlier and implies improvement and growth of the present digital platforms. It motivated the use of "online" resources as a big shift in education. 3Even with all this growth, unfairness still makes it hard for many people to access online education. There is no question that e-learning has been the new pandemic darling. But to believe it has totally and completely replaced traditional education or could replace it ignores the various lines drawn in society based on caste, class, economic, and gender divisions. Many questions related to accessibility, quality, and relevance need to be addressed and pursued before continuing with these digital platforms as replacement options for the traditional system.

New Education Policy 2020 was announced by government amidst pandemic which fetched a lot of attention towards digitization.⁵ The policy highlighted the human dependency on technology for educational process for its betterment. It also elaborates the optimum utilization of currently available digital platforms and ICT based educational initiatives. It's attractive and accessible commands have encouraged their

adoption. In spite of the needs and advantages, access to online education has still remained challenge due to existence gaps and inequalities in society. However, to believe that online education or e-learning can replace the traditional method of education without considering the socio- disparity, caste- disparity and other inequalities is irrelevant.

Teachers and lawmakers got on one accord over how technology should be utilized in schools. The "ISTE (International Society for Technology in Education) Standards for Students" now possess new goals like teaching the responsible use of the Internet, improvement in the communication of the students, and team experience in solving problems in groups. Additionally, both computer software and hardware operations have to be known very well.

The main aim of NEP 2020 is to ensure fair access to education, from the preschool level to high school. Made in 2020, the NEP-2020 replaced the National Policy of Education from 1986. This broad plan targets improving all India's levels of education, ranging from primary to higher education.

NEP 2020 is transformative when discussing education. The policy focuses significantly on the inclusion of technology in the classroom. Language obstacles are also overcome because the strategy emphasizes bilingualism.⁸ Other than making learning more accessible, the use of technology facilitates the organization and organization of educational initiatives. As a way to empower the student for participation in today's interconnected world, the National Education Policy is reassessing what is taught in the classroom. It is redefining how to make high-performing students.

Methodology

This research uses a qualitative and analytical approach. It includes a review of literature, policy documents, and reports on the NEP's digital education framework. Primary data is collected through interviews with educators and students, while secondary data includes case studies and statistics. A thematic analysis identifies trends and disparities in technology use, supported by a comparative review of global best practices. Ethical guidelines, including informed consent and confidentiality, are strictly adhered to. This method aims to assess and suggest measures for ensuring equitable technology use in education under the NEP.

Education cannot be revolutionized without a transformed educational system through technology. There are alternative perspectives regarding the problem of education to address the problem by various technologies. In the fields of IT, manufacturing, warehousing, marketing, logistics, finance, and human resource development, interplays with the technology are not at all unfamiliar.¹⁰ Advanced media applications and consumer gadgets, such as cameras and audio-visual equipment, have also been the reasons why information and communication technology has been pervasive. Reports of great research and studies on the deep effects that technology has on the art of education in different industrialized cultures abound, even with circumstances wherein cost is not placed in the forefront or core reason for conducting the studies.

Primary Schooling

Policy The policy seeks to recognize the role that technology would play in assisting teachers and closing the gap between native language speakers and non-native language speakers of the teaching faculty and students, popularizing access to digital libraries, and education, especially to children with disabilities. The policy also suggests introducing coding into school curriculums as a necessary skill required by a child to be taught.

The policy also recognizes the fact that technology has the potential of becoming a highly effective tool in the improvement and facilitation of informing teachers' education. It therefore highly advocates and promotes the deployment of the various technologies involved into online training meant specifically for teachers.

Professional and Higher Education

This need to adopt technology in professional education (legal/health) as also the inclusion of technology to hasten the plan towards achieving 100% literacy by providing quality technology-based alternative opportunities to adult learning have also been demanded.

The Policy recognizes, as well as provides emphasis on the active role that technology can play in addressing numerous challenges that communities face in society today. It shall actively pursue interdisciplinary research efforts and innovation across the different domains. For instance, it called for stronger efforts on the part of Higher Education Institutions ("HEIs") in the establishment of start-up incubation centers and

technology development centers. The proposal also suggests the establishment of a National Research Foundation, intended to infuse and promote a strong culture of research within the community.

The Policy provides for the establishment and establishment of the entity known as the National Educational Technology Forum, or "NETF." The NETF should be a robust and dynamic exchange mechanism that encourages free and open discussion, dialogue, and insight into all matters related to technology implementation and use in the practice of education for learning, planning assessment, and general management of school level education and institutions of higher learning.

Administration of Education

Another progressive step taken by the Policy is the concept of Academic Bank of Credit, allowing learners' academic credits earned from different HEIs to be digitally stored, so that degrees are granted based on credits earned over a period of time. The significance and interest for the Policy depends wholly on the emphasis it places upon the effective utilisation of advanced technology. The great benefit that towards the efficiency and transparency regarding various regulatory bodies that play a significant role in the education sector has emerged from it. These include some of the most prominent entities such as the State School Standards Authority and the Higher Education Commission of India. Further, the Policy also includes its four verticals, namely the National Higher Education Regulatory Council, the National Accreditation Council, the Higher Education Grants Council, and the General Education Council.

Adjust to AI

The Policy recognizes the varied forms of challenges that come directly as a result of the wide and pervasive usage of Artificial Intelligence ("AI"). It further stresses the necessity to put into practice changes that increasingly become more pertinent with the widespread acceptance and use of AI across multi-sectors. ¹⁵It has directed the NETF to identify and categorize emerging technologies on their 'potential' and 'estimated timeframe for disruption' and submit a time- bound analysis of the same to the MHRD who would then formally identify such technologies that call for appropriate responses from the education system.¹⁶

In light of the emerging and increasingly impactful 'disruptive technologies' that reshape our modern landscape, the Policy is pioneering in its approach as it not only

highlights with critical need, but also that such awareness needs to be created on wide scale levels.¹⁷ Furthermore, it underlines a point that intensive research into several facets of these emerging disruptive technologies must be carried out. This involves raising major issues concerning handling and protecting data that are necessary for ethical and sound practices in the digital arena.¹⁸ Digital India Actually, it calls for investment in digital infrastructure, development of online teaching platforms and tools, creation of virtual labs and digital repositories, training teachers to become high quality online content creators, designing and implementing of online assessments, technology and pedagogy for online teaching learning. The Policy envisions the establishment of a dedicated unit, specifically responsible for the development and improvement of digital infrastructure.¹⁹ It will also work on the curation of digital content and capability building initiatives so that the e-education needs of institutions can be addressed and supervised in an effective manner, including those at school levels as well as other higher education groups.

Digital India

Digital Education can be termed as a whole technique or approach to study that involves technology and makes use of many digital appliances. This modern and vast technical platform has the great potential to help any student to acquire knowledge very significantly, in addition to obtaining vital information from nearly all the corners of the nation. ²¹It is believed that Digital Education in India is the future of education and learning. Various channels have been defined by the Government of India for a widespread of the sources and means to provide education to different corners of the country. Discussed further in this article are the channels and initiatives taken up by the Government for Digital Education in India.²²

Ministry of Human Resource Development (MHRD) – Digital Learning Initiatives:

An ambitious and comprehensive initiative christened as PM eVidya was formally announced on May 17, 2020, which mainly focused on. All activities related to the digitization of on-line and broadcast education must be established so as to provide equitable access to multi-mode access to education.

This is expected to bring much better benefits to nearly 25 crore children, who are now going to school anywhere in the country. One of the most important initiatives

undertaken by MHRD is DIKSHA (Digital Infrastructure for Knowledge Sharing).

DIKSHA- (Digital Infrastructure for Knowledge Sharing):

General Overview:

- **National Platform:** DIKSHA is a digital platform for school education, developed by NCERT under the Ministry of Education (MoE), Government of India. Inaugurated in 2017 by then Vice President of India, Shri M. Venkaiah Naidu.
- **Adoption:** Many states, union territories, CBSE, and other central groups use it extensively.
- **Languages:** Supports 36 Indian languages, thus making it accessible to learners all over the country.
- **Policy Framework:** This is from the Strategy and Approach Paper for the National Teacher Platform (2017) released by Shri Prakash Javdekar.

Role in PM eVidya Initiative:

It has been named 'One Nation, One Digital Platform' under the Atma Nirbhar Bharat scheme. It supports online, offline, and on-air educational initiatives for equitable access to learning.

Main Features:

- **Open-Source Technology:** Sunbird technology from MIT has been developed to administer big digital learning. Provides over 100 small services to create and manage educational content.
- **Flexible Utilization:** States/UTs can tailor DIKSHA to their specific educational requirements. Supports the possible solutions are active textbooks, online classes, quizzes, content creation, and analysis.²⁶
- **NDEAR Integration:** This follows the National Digital Education Architecture (NDEAR), which began in July 2021. Acts as the base for connected and compatible educational systems.
- **Accessibility for All:** Inclusions Content has the following inclusions Audio books Videos in ISL Dictionaries for Children With Special Needs (CWSN).
- **Rich Content Storage:** Through the VidyaDaan initiative, content is provided by teachers, schools, NGOs, companies (CSR), and content partners. The NCERT textbooks and materials are available on a Creative Commons license.²⁷

SWAYAM

- The ‘Study Webs of Active Learning for Young Aspiring Minds’ (SWAYAM) is India’s own MOOCs platform offering free online courses on almost all the disciplines.
- A programme initiated by Government of India, designed to achieve the three cardinal principles of Education Policy viz., access, equity and quality has the objective to ensure access to the best teaching learning resources to all, including the most disadvantaged.
- It facilitates hosting of all the courses, taught in classrooms from 9th standard till post- Graduation to be accessed by Anyone, Anywhere, anytime. 28
- SWAYAM was formally launched on 09.07.2017 With this, the students studying in any Institution can transfer the credits earned through the SWAYAM Courses into their academic records. 29

SWAYAM PRABHA

- SWAYAM PRABHA is an initiative to provide 32 high quality educational channels through DTH (Direct to Home) across the length and breadth of the country on 24X7 basis.
- SWAYAM Prabha is launched on 9th July, 2017.30
- The contents are prepared by different MHRD agencies like CEC, IGNOU, IITs, NIOS and NCERT.
- Curriculum based course contents at postgraduate and undergraduate level covering diverse disciplines
- (NEAT)National Educational Alliance for Technology
 - The MHRD not so long ago announced a new National Educational Alliance for Technology, NEAT. A program that is attempted to be rolled out to improve learning through technology in Higher Education.
 - The idea behind the plan is to utilize artificial intelligence to make learning become personal and geared to the needs of every learner.
 - The MHRD wants to sponsor the development of these technologies in Adaptive Learning and puts all of them on a different platform so that learners can easily

access them.³¹

- It recommends forming a National Alliance using a PPP model to create EdTech Companies focused on building technological solutions.
- MHRD would help to make sure that the Adaptive Learning Solutions are available for free to many students who are economically disadvantaged.
- Then, a National NEAT platform would be opened for easy access to Adaptive Learning Solutions.
- EdTech companies will be responsible for developing solutions and managing registration of learners through the NEAT portal.
- NEAT is aimed at taking the concept of Massive Open Online Courses (MOOCS) platform a step ahead.
- All India Council for Technical Education, AICTE, would act as the implementing agency for the NEAT scheme. It would help in certifying the most students with useful skills and also make it easier for students to get jobs.³²
- **E-PATHSHALA**
 - e-Pathshala mobile app (Android, iOS, Windows), and web portal can be used to access e textbooks.³³
 - It may easily be accessed by both students, teachers, and parents.
 - There are 3,500 pieces of audio and video content from NCERT.
 - It is available in various languages-English, Sanskrit, Urdu, and Hindi.³⁴

CHALLENGES

Challenges for using technology in education under NEP (National Education Policy): NEP 2020 makes enough emphasis on using technology to make education better and fairer for all. But there are big challenges to add technology into education:

1. Digital Divide:

- **Access restrictions:** Many, most of them in the countryside and rural areas, do not have access to the internet and smartphones because there is no route providing access.
- **Affordability Issues:** High-cost prices for devices and data plans make digital education less accessible to the lesser income-generating people.

2. Infrastructure Gaps:

- Not Enough Connection: In remote areas, the internet is often unreliable which affects the success of online learning.
- Not enough power: Regular power cuts in rural areas make it hard to use technology.
- Inadequate resources. Schools do not have resources such as computers, projectors, and a smart classroom.

3. Digital Literacy:

- Many teachers lack the skills required to use digital tools and platforms well for teaching.
- Students and Parents: Inadequate digital literacy, especially among students and parents from background groups that are underrepresented, limits the use of technology-based learning.

4. Content Accessibility and Quality:

- Lack of Localized Content: Educational content is often not available in regional languages, limiting its reach.
- Not Enough Support: Resources for the students having disabilities like audio-visual tools and assistive technologies are scarce.

5. Information Safety and Privacy:36

- Safety Issues: Increased exploitation of digital spaces places learners and educators at risk of hacking, phishing, and cyberbullying.
- Privacy Problems: Weak data protection rules can cause personal data to be misused.

6. Resistance to Change:

- Cultural Resistance: Traditional teaching practices, where teachers and school leaders have not used technology.
- Training Challenges: Resistance to participating in professional development programs for technology use.

7. Money Problem:

- Budget Limitations: For the government schools, especially in the rural areas, access to digital sources and tools is typically difficult to acquire.
- Sustainability Issues: The enduring and improving nature of technology systems

compounds financial problems over time.

8. Monitoring and Verification:

- Tracking Effectiveness: It is difficult to see how the use of technology affects learning outcomes due to a lack of credible data.
- Scaling issues: The technology-based solutions must reach each and every corner of the country uniformly.

9. Obsolete Technology:

- Rapid Update Cycle: The technology moves so fast that the tools and systems become outdated, hence in a cycle of constant upgrading.

10. Fairness in Using Technology:

- Urban-Rural Disparity: City schools are more likely to have access to technology, which creates a bigger gap in how well students learn. In some communities, girls have cultural limits on using digital devices.

Way Forward: Overcoming Challenges in NEP Through Technology Integration

Much effort, a number of steps, and lasting solutions will be needed to ensure that the technologies are used successfully as envisaged in NEP 2020. Important strategies to solve current problems are:

1. Connect Everyone to Technology:

- Low-cost Devices and Internet:

The government can give cheaper smartphones, tablets, and laptops to low-income people by working with private companies.

Make internet plans cheaper by using government money or working with phone companies.

- Public Digital Libraries:

Establish community digital centers and libraries with equipment and internet connectivity in rural and remote areas.

- Rural Connectivity:

Speed up projects like BharatNet to provide broadband internet to all villages, helping people access online education platforms more easily.

2. Designing Effective Digital Systems:

- Smart Classrooms:

Give schools smart boards, projectors, and fast internet so that they can use blended learning.

Reliable power source. This is possible by devising renewable energies, such as solar energy, to address power supply in rural schools.

- Cloud-Based Platforms:

1. Enhancing Digital Skills:

- Training of Teachers:

Conduct regular professional development programs, focusing on integrating technology into teaching methodologies. Add digital teaching methods in teacher training schools and B.Ed. programs.

- Student and Parent Awareness:

Hold workshops to teach students and parents about digital tools and how to use them well in education.

- Gamification of Learning:

Fun, game-based, competition-friendly tools that would teach digital skills to young students.

2. Developing Contextual and Inclusive Content:

- Local Language Tools:

Create digital content in local languages to make learning easy for everyone.

- Tailored instruments for Special Needs:

Invest in assistive technologies like text-to-speech software development and production of ISL videos with interactive Braille contents.

- Crowdsourcing Content:

Encourage teachers, NGOs, and schools to contribute more to the collection resource by schemes such as VidyaDaan.

3. Ensuring Data Privacy and Cybersecurity:

- Strong Legal System:

Proper legislations must be enacted to safeguard the data of students and teachers from misuse.

- Cyber Safety Awareness:

Hold cybersecurity workshops in schools to teach students and teachers safe online

practices.

- Secure sites:
- Safe and protected platforms should be used to share the content and instruct online.

Overcoming Economic Barriers:

- More Budget Allocation

Set aside more money for ICT (Information and Communication Technology) in education using central and state budgets.

- Corporate Social Responsibility (CSR):

Invest in digital resources and tools in education through CSR initiatives by private companies.

- Innovative Financing Models:

Explore crowdfunding sites and global partnerships to fund huge digital education projects.

3. Monitoring and Verifying:

- Learning Outcome Assessments:

Create tools to see how technology affects student learning results and use the information for ongoing improvement.

- Dashboards for Real-Time Monitoring:

Create national dashboards that track the deployment and use of digital platforms like DIKSHA.

Independent Checks:

Have independent groups audit how the school technology programs work.

Conclusion

Today, it incorporates digital technology in delivering a broad range of knowledge and save important time. The idea of digital education is not new and has been in different versions for a long time. But now, its importance has clearly grown during the COVID-19 pandemic. It was accepted New Education Policy (NEP) in July 2020 by the Union government. The plan will look at teaching all subjects in a complete way. Three levels of education in India: primary, secondary, and higher. The policy marks out the importance of using technology in the classroom. When it comes to

information and India is involved in communication technology and other advanced areas like space exploration. unrivaled on a global scale. A knowledge- based economy and digitally enabled society are becoming a norm in India due to the Digital India Campaign. Technology will play a significant role in improving educational procedures and outcomes, but education itself will be pivotal in this change. So, technology and learning help each other at every levels.

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"Women at the Crossroads: Managing Work and Life in Modern Times"

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Abstract:

In modern society, the pursuit of work-life balance has become increasingly important, particularly for female employees who often face unique challenges in managing their professional and personal lives. This paper explores the complexities of work-life balance for women in contemporary workplaces. It examines the various factors influencing work-life balance, including workplace culture, societal expectations, and individual aspirations. Through a review of existing literature and empirical evidence, this paper sheds light on the challenges female employees face in achieving work-life balance, such as gender discrimination, care-giving responsibilities, and the pressure to succeed in career and family domains. Furthermore, it discusses strategies and initiatives at organizational, governmental, and individual levels to address these challenges and promote a more equitable and sustainable work-life balance for women. By understanding and addressing the barriers to work-life balance, organizations, and policymakers can create supportive environments that enable female employees to thrive both personally and professionally.

Keywords: Work-life balance, women's health, stress management, exercise habits, sleep patterns, work hours, health neglect, workplace interventions, family support, well-being, time management, self-care, female employees, health priorities, gender roles.

Introduction

In today's fast-paced and competitive world, the concept of work-life balance has emerged as a crucial consideration for individuals striving to maintain harmony between their professional and personal lives. This balance is particularly pertinent for female employees, who often navigate a multitude of roles and responsibilities both in the workplace and at home. As women continue to make significant strides in the workforce,

understanding and addressing the challenges they face in achieving work-life balance is paramount.

The term "work-life balance" encompasses the equilibrium between one's career or professional obligations and their personal life, encompassing family, social, and leisure activities. Achieving this balance is not merely a matter of time management but also involves aligning values, priorities, and aspirations in both domains. For female employees, the pursuit of work-life balance is often compounded by societal expectations, gender norms, and organizational structures that may not adequately support their needs.

Historically, women have faced systemic barriers to full participation in the workforce, including limited access to education, discriminatory hiring practices, and unequal pay. While significant progress has been made in addressing these issues, gender disparities persist in various facets of employment, including leadership representation, wage parity, and access to flexible work arrangements.

In contemporary workplaces, the demands of the job can often spill over into personal time, blurring the boundaries between work and home life. Female employees, in particular, may experience heightened pressure to juggle competing priorities, such as advancing their careers, caring for family members, and nurturing personal relationships. The inability to strike a balance between these responsibilities can lead to stress, burnout, and diminished well-being.

Against this backdrop, this paper seeks to explore the multifaceted nature of work-life balance for female employees in modern times. Through an examination of existing literature, empirical research, and real-world examples, we aim to elucidate the challenges faced by women in managing their professional and personal lives. Furthermore, we will discuss potential strategies and interventions at organizational, governmental, and individual levels to promote a more equitable and sustainable approach to work-life balance for women.

By delving into the complexities of work-life balance and its implications for female employees, this paper aims to contribute to a deeper understanding of the issue and inform efforts to create supportive environments that enable women to thrive both inside and outside the workplace.

2. Literature review:

(Asfahani, 2021) This study shows that there are so many factors that affect the work-life balance of female employees and it creates conflicts that disturb the female employees. The reasons behind the conflict are working hours, work environment, nature of the job, and interpersonal relations. The factors from the family background are marital status, number of children home environment, etc.

(Balamurugan & Sreeleka, 2020) the study revealed that work-life balance is influenced by different factors such as demographic variables, and individual variables. Thus, the women employee has to balance both work and personal life, only the women employees should be satisfied with their jobs and develop by themselves may lead to a good work-life balance in the current situation.

(Beham et al., 2019) according to this survey the provision of statutory work–family support is considerably lower than in the other three countries, which may explain the comparably high levels of WHI experienced by respondents in the countries above and beyond work demands and work–family resources at the organizational level.

(Belwal & Belwal, 2017) The results indicated that employers, in general, are impressed by women workers in Oman. However, they identify several challenges women face. This study synthesized and grouped employers' perceptions of these challenges in the following categories: women's natural and physiological composition, their attitude at work, post-marital challenges, socio-cultural barriers, nature and place of work, organizational preparedness and governance, biases or prejudices of employers, and work-life balance (WLB) issues facing them.

(Hashimi, 2021) the study shows that the work-life balance includes maintain balance between work environment stress and routine pressure of family, friends and self. Keeping and maintaining the balance between family and work life has become an important topic in the society. By identifying factors that impact work-life balance and making work-life balance policies and practices can help this category of employees to have high productivity in work-place to be able to support their family financially.

(Hasib et al., 2022) The well-being of women in the workplace affects not just individuals but also their families and communities. Schools are meant to be stress-free

zones, but the work-life balance is damaging women in the workforce. So, in order to expand the business, it's necessary to give them a little more consideration. The findings of this study will help businesses re-evaluate their policies on flexible work hours and improve part-time possibilities for women workers, both of which have been demonstrated to increase employee happiness and productivity.

(Mayya et al., 2021) As the higher education sector is becoming more demanding, adequate attention has to be paid to the issue of WLB. The study revealed WLB was associated with gender, age, and science discipline, after adjusting for the effect of other demographic variables. Actions at both the organizational and personal level to maintain a WLB are essential. Future studies may be planned to assess the impact of specific measures at the organizational or personal level on WLB, work productivity.

Research Methodology:

The research is based on a quantitative research approach through the administration of a structured questionnaire to investigate the phenomenon of women prioritizing work and family obligations over health-related activities. This methodology aims to identify the underlying factors influencing this behavior and analyze its implications on both physical and mental health.

The study relies solely on survey data collection and analysis to gather insights. A sample of 10 women from varied backgrounds is selected using simple random sampling to ensure impartiality and diversity. Each participant is provided with a comprehensive questionnaire that captures information about work-life balance, health habits, and the perceived challenges in maintaining personal well-being. The data obtained from the responses are used to understand common trends and evaluate the relationship between work-life responsibilities and health neglect.

Sample and Sampling Method:

A sample of 10 women were chosen using simple random sampling to ensure unbiased representation. The data collected includes variables such as working hours, time spent on household duties, exercise frequency, sleep quality, stress levels, and perceived support from family or workplace.

Data Analysis Procedure:

1. Data Collection and Preparation: Each participant responded to the questionnaire, providing data points for numerical analysis.

2. Descriptive Statistics: Mean, median, and standard deviation were calculated for key metrics to summarize the data.

3. Numerical Calculations:

Average Work Hours (per week):

Data points: [40, 45, 50, 35, 40, 55, 30, 50, 42, 48]

Mean work hours = $(40 + 45 + 50 + 35 + 40 + 55 + 30 + 50 + 42 + 48) / 10 = 435 / 10 = 43.5$ hours

Average Exercise Frequency (per week):

Data points: [1, 0, 1, 2, 3, 0, 1, 2, 1, 4]

Mean exercise frequency = $(1 + 0 + 1 + 2 + 3 + 0 + 1 + 2 + 1 + 4) / 10 = 15 / 10 = 1.5$ times

Average Sleep Duration (hours per night):

Data points: [5, 6, 7, 5, 8, 6, 5, 7, 6, 5]

Mean sleep hours = $(5 + 6 + 7 + 5 + 8 + 6 + 5 + 7 + 6 + 5) / 10 = 60 / 10 = 6$ hours

Standard Deviation of Stress Levels:

Stress level scores: High (3), Moderate (2), Low (1) converted for calculation: [3, 3, 3, 2, 3, 3, 3, 2, 3, 1]

Mean stress level = $(3 + 3 + 3 + 2 + 3 + 3 + 3 + 2 + 3 + 1) / 10 = 26 / 10 = 2.6$

Variance = $[(3-2.6)^2 + (3-2.6)^2 + \dots + (1-2.6)^2] / 10 = 0.64$

Standard Deviation = $\sqrt{0.64} \approx 0.8$

Findings and Interpretation:

The mean work hours and low average exercise frequency indicate that participants allocate significant time to work, often at the expense of physical activities. The average sleep duration of 6 hours suggests potential sleep deficits, while a standard deviation of 0.8 in stress levels shows consistent reports of high stress among most participants.

Results:

The study reveals significant insights into how women prioritize work and family responsibilities at the expense of their health. The following key findings emerged from the data:

1. **Work Hours:** The average workweek for participants was 43.5 hours, with 50% of respondents working over 40 hours a week. This suggests that most women dedicate substantial time to their careers, limiting their time for self-care.
2. **Exercise Habits:** On average, participants exercised only 1.5 times per week. This indicates a lack of regular physical activity, which is essential for maintaining both physical and mental health.
3. **Sleep Patterns:** The average sleep duration was 6 hours per night, with many participants reporting insufficient sleep. This contributes to fatigue and stress, further impacting overall well-being.
4. **Stress Levels:** High stress was reported by 60% of the respondents, with a standard deviation of 0.8 indicating consistency in the reported stress levels across the group. The main factors contributing to stress were long working hours and domestic responsibilities.
5. **Health Neglect:** Most respondents (70%) reported rarely or never attending health checkups, with time and financial constraints being the most cited reasons.

These results highlight a clear pattern where work and domestic duties take precedence over health, leading to negative physical and mental health outcomes.

Limitations:

1. **Small Sample Size:** The study is based on a sample of just 10 women, which limits the ability to generalize the findings to a larger population. A larger, more diverse sample would provide more robust and representative data.
2. **Sampling Bias:** The respondents were selected using simple random sampling, but the small sample size could still introduce some bias, as it may not capture the full spectrum of women's experiences across different industries, ages, or cultural backgrounds.
3. **Self-Reporting:** The data is based on self-reported answers, which can be subject to bias or inaccuracies. Some participants may have under reported or over reported their work hours, stress levels, or health habits.
4. **Lack of Qualitative Data:** While the questionnaire provided numerical data, it lacked open-ended questions that could have offered deeper insights into personal experiences and the reasons behind health neglect.

Suggestions:

1. **Workplace Interventions:** Employers should consider implementing flexible work policies, mental health programs, and wellness initiatives to alleviate stress and support work-life balance for female employees.
2. **Health Promotion:** Women should be encouraged to make time for regular physical activity, even if it's brief, and to prioritize sleep. Simple strategies like walking during lunch breaks or setting aside 15 minutes a day for stretching can make a significant difference.
3. **Support Systems:** Family and societal support systems need to be strengthened. Shared responsibility for household duties and care-giving roles could help reduce the mental load on women.
4. **Future Research:** Future studies should explore a larger and more diverse sample to understand the nuances of work-life balance among different demographics. Additionally, qualitative research would be beneficial to capture personal stories and insights.

Conclusion:

This study underscores the pressing need for a balanced approach to work and health, particularly for women who are often caught between the demands of their careers and family responsibilities. The findings clearly show that many women prioritize work over health, which has detrimental effects on their physical and mental well-being.

To address this issue, both organizational changes and personal health practices must be adopted. Employers should implement more flexible work policies, while women need to prioritize self-care through exercise, sleep, and regular health checkups. Societal support for shared responsibilities can further alleviate the strain on women, allowing them to achieve a healthier work-life balance.

Ultimately, this research calls for greater attention to the health needs of women in the workplace and beyond, advocating for a cultural shift that recognizes the importance of well-being alongside professional and familial obligations.

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A Study on Artificial Intelligence [AI] Technology in Financesector.

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Abstract:

This research paper explores the pervasive influence of Artificial intelligence (AI) in the realm of finance, investigating its multifaceted impact on the finance sector. The study encompasses a comprehensive analysis of AI applications, focusing on its transformative effect on operational processes, decision-making paradigms and the overall trajectory of the financial sector. Advancements in AI continue to unfold at a rapid pace. In the coming years, these new technologies enabling computers and machines to simulate human learning, comprehension and problem solving will become further interwind with our day to day lives. Certainly, the financial sector is no exception. There, these technologies-in particular the new and dramatic advances in Generative-AI-are poised to Impact financial markets. Today, I will discuss some of these recent and potentially far-reaching developments, as well as their potential impact on financial sector.

Artificial intelligence in finance refers to the application of a set of technologies, particularly machine learning algorithms, in the finance industry. fintech (financial technology) is used to describe new technology that seeks to improve and automate the delivery and use of financial services organizations to improve the efficiency, accuracy and speed of such tasks as data analytics, forecasting, investment management, risk management, fraud detection, customer services and more. Our study focuses on the application of artificial intelligence in the field of finance sector [banking, investment companies, insurance companies] with a brief introduction. the study explains challenges and their impacts with pros & cons in financial sector. The study also reveals how artificial intelligence makes changes in financial industries in the future with few recommendation...

Keywords:

Artificial intelligence, robotic process automation, machine learning, digital banks.

Introduction:

Background of Artificial intelligence [AI]

The idea of “Artificial Intelligence” goes back thousands of years, to ancient philosophers considering questions of life and death. In ancient times, inventors made things called “automations” which were mechanical and moved independently of human intervention.

Definition:

The ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. The term is frequently applied to the project of developing systems endowed with the intellectual processes characteristic of humans, such as the ability to reason, discover meaning, generalize, or learn from past experience. since their development in the 1940s, digital computers have been programmed to carry out very complex tasks-such as discovering proofs for



mathematical theorems or playing chess-with great proficiency.

According to John McCarthy (1958) defined” the first programming language for Artificial Intelligence Research”, which is still in popular use to this day.

Artificial intelligence is the science of making machines that can think like humans. It can do things that are considered “smart”. AI technology can process large amounts of data in ways, unlike humans. Machine learning [ML] is a subset of Artificial intelligence and is a science of getting computers to learn and act as human do. Specific applications of AI include expert systems, natural language processing, speech recognition and machine vision.

Source: <https://www.aismartz.com/blog/use-cases-of-ai-in-the-finance-sector>

OBJECTIVES:

1. To study the Applications of artificial intelligence in the field of finance sectors with brief introduction
2. To study the challenges and impacts of AI in financial sectors with pros and cons
3. To study the future prospectus of AI in India with recommendations.

SCOPE:

The study covers the area of AI in financial sectors like banking Industries, investment companies, Insurance companies, real estate firms etc.

METHODOLOGY:

The study is based on secondary data and deceptive. The data collected from various journals, reports and articles,

LIMITATIONS:

The study is only based on AI in the field of finance sector, there are many more applications of artificial Intelligence such as Automobile, health care, gaming, robotics, surveillance, entertainment, space exploration, agriculture, E- commerce, social media on which further study can be done.

REVIEW OF LITERATURE:

Kunwar M (2019) present thesis on “Artificial Intelligence in finance. Understanding how automation and machine learning is transforming the financial industry” examines

the influence of artificial intelligence on the modern world, especially in the field of finance. The research concludes that throughout the value chain in financial services whether it is processing, analytics or investing.

The thesis on “Artificial intelligence application in corporate finance” by Wallon (2019), focused on the usage of AI in corporate finance with the current usages and its prospects in a near future. It offered a view point on this subject through information retrieved from papers, reports and experts and an evolving survey using qualitative and quantitative analysis.

As per the article by Tom C W Lin (2019) on “artificial intelligence, finance and the law a study of those risks and limitation the ways artificial intelligence and misunderstanding of it can harm and hinder law, finance and society. It highlights the perils and pitfalls of artificial codes, data bias, and systematic risks relating to financial artificial intelligence on finance cyber security, competition and society soon.

As per Zoriac Golic (2019) “finance & artificial intelligence the fifth industries revolution and its impact on the financial sector. Understanding of the business needs of financial organizations, institutions and markets and the ability to connect with technological capabilities.

The research paper on “artificial intelligence in finance by Patel K. (2018) studying the thought process of human beings. and also focus that artificial intelligence deals with representing those processes via machine [like robotics etc.] artificial intelligence has now taken over many sectors including the financial sector.

APPLICATION OF ARTIFICIAL INTELLIGENCE IN FINANCE:

As know AI is used in every field but have some challenges are there:

1. Enhanced decision making:

By swiftly processing vast data sets AI systems provide valuable insights, aiding executives in making informed and strategic choices.

Artificial intelligence leverages predictive analytics and deep learning models to shift through big data, extracting actionable patterns and trends for decision support system.

2. Risk mitigation & management:

By continuously analyzing market trends and adapting to evolving conditions, AI models contribute to evolving conditions, AI models contribute to real time risk optimize portfolios and minimize exposure to potential financial downturns.

3. Fraud detection and prevention:

Artificial intelligence sophisticated algorithms detect anomalies and patterns indicative of fraudulent activities, preventing unauthorized transactions and safeguarding financial assets, the result is not just monetary savings but also the preservation of customer trust and confidence.

4. Operational efficiency and Automation:

From routine data entry to complex compliance processes, AI Applications significantly reduce manual efforts, enhancing overall operational efficiency and reducing the risk of errors.

Robotic process automation(RPA) & Natural language processing (NLP) are integral components of AI driven automation, enabling seamless integration with existing system and processes.

5. Customer experience and personalized:

Through predictive analytics, chat bots & recommendation engines, financial institutions can tailor their offerings to individual preferences, creating a more engaging and customer- centric experience.

CHALLENGES OF ARTIFICIAL INTELLIGENCE:

1.Tracking measure of success:

AI forecasting is based on the future prospectus, not provide a 100% guarantee whether your investment gives you profit or loss. It is a challenge to tracking measure of success like how, ML positively impact on human behavior, how to reduce cost, how improved efficiencies.

2.Building trust:

The AI is all about science, technology and algorithms which mostly people are unaware of, which make it difficult for them to trust it.

3.Investment:

AI is an expensive technology that not every business owner or manager can invest money into as large amount of computing power will be necessary and sometimes hardware acceleration with GPU, FPGA or ASIC must be in place to run machine learning models effectively. Though adoptability of AI is surging high, it has not been integrated fully in business value chain at the scale which it should have.

4.Responsibility:

Another main challenge in AI is if something goes wrong who will be liable for responsibility and accountability. the fact that there is no explanation as to why the algorithm provided a positive or negative answer to a specific question can be disturbing for a banker's rational mind. So, it becomes necessary to keep a human supervisor to validate the machine's decision for critical activities such as releasing \ blocking payments or validating trades, partially defeating the purpose of using a machine in the first place.

5.Fast changing technology:

As technology change rapidly each financial organization must look to move abstract concepts about AI from theory to practice so they can be used in daily operations. The right AI technology can automate labor- intensive manual processes, offer the level of performance needed to make use of the latest technologies, and mix with active systems and be reusable for other reasons.

6. Reliability of AI:

For security reason reliability of AI depends on its data & degree of control over the system. The slow but steady method of test-driven development which places assessment and verification to develop the required algorithm at it 's core is needed for a reliable system that can with stand the test of time.

7. lack of emotional intelligence:

AI is intelligent in solving various specific problems, detect fraudulent activities but lacks emotional intelligence for instance, chat boxes are smart but lack empathy. They do what the program is loaded.

IMPACT OF AI IN FINANCE SECTOR:

➤ POSITIVE IMPACT OF AI ON THE FINANCIAL SERVICES INDUSTRY:

1. Improved customer experience:

One of the most significant impacts of AI in the financial services industry is improved customer experience. AI powered chatbots and virtual assistants have become increasingly popular in recent years as they provide customers with 24\7 support system. AI powered customer service systems can also analyze customer data to identify patterns and trends, which can be used to improve product and services. For example: AI can help financial institutions personalize their marketing campaigns by analyzing customer data to identify specific customer needs and preferences.

2. Operational efficiency:

AI powered systems improve operational efficiency by automating many tasks, such as document processing and data entry, which can reduce the need for manual labor. AI can also optimize business processes like loan approvals and risk management. AI powered risk managements systems can analyze large amounts of data to identify potential risks and make recommendations to mitigate them.

3. Fraud Detection:

AI powered fraud detection systems are becoming increasingly popular due to their ability to analyze customer data, identify potentially and alert financial institutions to act. This can help prevent fraud and reduce losses for financial institutions.

4. Investment management:

AI powered systems improve investment management by analyzing large amounts of data, identifying investment opportunities, and making recommendations based on historical trends and current market conditions. This can help financial institutions make more informed investment decisions and potentially increase returns.

5. Regulatory compliance:

Regulatory compliance is a significant concern for financial institutions. AI powered systems can analyze large amounts of data to ensure financial institutions comply with regulations and identify potential issues before they become problems.

➤ **NEGATIVE IMPACT OF AI**

1. Job losses:

AI most significant adverse effects is causing job losses. With the increasing use of AI in finance, many jobs previously performed by humans, such as data entry, analysis, and customer services, are becoming automated. This can lead to a significant decrease in employment opportunities for people who previously worked in these roles.

2. Lack of human interaction:

AI can also have an adverse effect on human interaction. many customers prefer to speak to a human when they have a financial query or problem. However, the increasing use of AI means they can only interact with a machine, which can frustrate customers and reduce customer satisfaction.

3. Bias and Discrimination:

AI systems can perpetuate prejudice and discrimination in the financial services industry because their algorithms are only as unbiased as the data they are trained on. If the data contains biases or discriminatory patterns, the AI system will replicate them, leading to unfair outcomes for certain groups of people.

4. Cybersecurity risks:

As with any technology operating on computer networks, AI systems are vulnerable to hacking and cyber – attacks. Theft of sensitive financial information can have severe consequences for businesses and consumers, including financial loss and damage to reputation.

5. Over – Reliance on AI:

Becoming too dependent on AI can lead to adverse outcomes. While AI can provide valuable insights and predictions, keep in mind that it is only a tool. Over reliance can lead to a lack of critical thinking and analysis, which can be detrimental to decision making.

FUTURE OF AI IN INDIA WITH SOME RECOMMENDATION:

Banking & financial services industry: A few companies in India have started leveraging AI to solve India-centric issues. For example, a leading fintech company uses AI to develop customized financial products for the highly heterogeneous rural

population. Few other banks in India have adopted AI to increase digitization to improve customer experience, improve investment returns and use algorithms in risk management (for example, fraud detection).

Pharma & healthcare: A healthcare startup in Hyderabad launched AI-powered low-cost ventilators that can capture patient information to make medical intervention decisions. Similarly, a Mumbai-based startup has used AI to analyze chest X-rays to identify the extent of infection in the lungs and help in tuberculosis detection.

Agriculture: A company is using AI to power a sowing app in Andhra Pradesh, resulting in a higher crop yield per hectare. Additionally, AI algorithms are being used to monitor crop and soil health, where AI-based analytics solutions are used to plan events like crop harvesting, pest control and fertilization to optimize yields.

While there are a few good AI success stories in India, overall, less than 25% of Indian enterprises have deployed AI solutions thus far. Some of the barriers to increases adoption in India include:

- Limited understanding of AI: Many Indian companies may have not yet understood the full benefits of leveraging AI in their companies
- Low investments and less evolved startup ecosystem: AI requires an initial investment/incubation period (example, for POCs, discerning real use-cases). Startup/investment funding ecosystem in India is yet to scale up in terms of AI startups and service providers.
- Limited availability of AI trained talent: There is limited infrastructure to 'democratize' and scale-up important AI skills such as deep learning and neural networks.

Countries like China, USA and Israel currently lead the way in terms of AI adoption. India can consider a few learnings from these countries to further scale-up its AI ecosystem while keeping in mind the overall social development and inclusiveness agenda. This requires a focus on three key areas:

Clear central strategy and policy framework: The National Strategy for Artificial Intelligence (NITI Aayog, June 2018) which is focused on inclusive AI (AI for all), and the New Education Policy (NEP, 2020) which addresses the need to inculcate AI in the

curriculum are the right strategic steps in this direction to encourage core and applied research. However, AI adoption in India can be accelerated through the formulation of more focused policies related to innovation, for example, patent control and security.

Collaboration among government, corporates and academia: These three critical stakeholders need to come together and work synergistically to undertake actions like nurturing entrepreneurship, promoting re-skilling, encouraging research and development, and driving the policies on the ground. While this is happening in pockets, there is a need to drive this in a structured and consistent manner with clear outcomes.

Leveraging MNCs and their GICs: MNCs and their GICs are leading the way in terms of AI adoption in India, their experience (for example approach, business solutions) can be leveraged effectively to help other companies learn about AI applicability in their industry to further accelerate AI adoption.

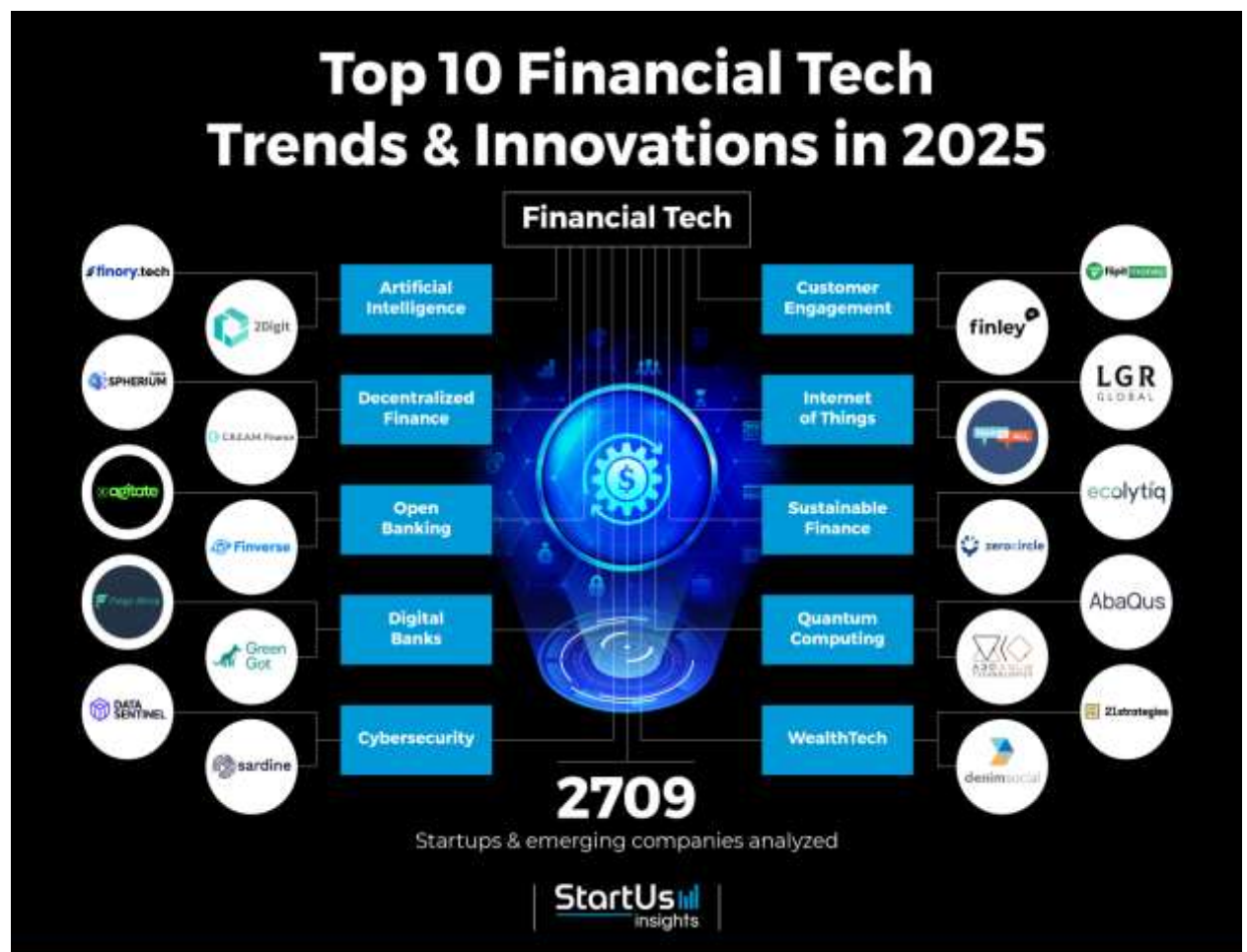
More than ever, rapid and scalable innovation has become critically important for companies and countries to survive and thrive in this rapidly evolving complex economic and social environment. As Abraham Lincoln famously said ‘The best way to predict the future is to create it’. AI will play a big role in creating this future, and India, due to its inherent strengths, has the potential to lead the way if it makes the right choices.



In the year 2024, the trajectory of artificial intelligence (AI) and its trends are set to persist in its transformative trajectory, intricately integrating into our daily routines, influencing diverse sectors, and instigating regulatory shifts. Concurrently, positions in the field of Artificial Intelligence (AI) have emerged as one of the swiftly expanding sectors on a global scale-a foreseeable outcome amidst the ongoing AI revolution. Across the spectrum, from burgeoning startups to colossal Fortune 500 enterprises, entities are actively leveraging the capabilities of AI to optimize their operational frameworks. Additionally, the assimilation of AI into everyday life has experienced a notable upswing.

As we stand at the threshold of 2024, the realm of AI continues to unfold, presenting a tapestry of advancements that promise to reshape industries, redefine user experiences, and challenge the boundaries of what we thought possible.

AI has captivated global attention due to its ability to revolutionize numerous sectors. In financial services, AI offers the promise of better products and services at lower costs. It enables machines to learn from experience, process vast amounts of data, and identify



patterns that can solve complex problems. The recent surge in AI adoption can be attributed to several factors:

1. Affordable Cloud-Based Computing Power:

2. Large Data Availability.

3. AI-as-a-Service:

4. Advancements in Mobile Computing:

A survey indicates that 50% of financial institutions aim to achieve cost savings or productivity improvements through AI projects, and 80% are investing in AI initiatives. This level of investment suggests that AI will soon underpin all core products and services in the financial sector

RECOMMENDATION:

- 1.** Developed and implement robust governance framework and best practices for AI Adoption to ensure responsible and ethical use of AI Technologies. This includes establishing clear guidelines for data privacy, security, Transparency and algorithmic fairness, as well as mechanisms for monitoring and mitigating potential biases and risks associated with AI-driven decision-making.
- 2.** Facilitate knowledge sharing and collaboration and information exchange among financial institutions, regulators, academic, and technology providers to accelerate AI Adoption and innovation in the fintech industry.
- 3.** AI is used in every field and probability to reduce human job opportunities, need deep learning of AI.
- 4.** Government supported to encourage AI, so we are not backward by other countries in the field of technology.

CONCLUSION:

In conclusion, AI is changing finance for the better by making things run smoother and safer. It is also giving customers a better experience. There is a possibility that AI reduces human needs, so we need to balance by updating ourselves according to the changes. Over time, AI will keep improving how banks work, making predictions more

accurate, and personalizing customers help with smarter chatbots. As AI grows, it will bring more improvements, making finance smarter and more accessible to everyone. We get benefits by making its proper utilization.

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A Comparative study of the financial performance of selected pharmaceutical companies.

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ABSTRACT:

The goal of this study is to examine the company's liquidity and profitability utilizing financial instruments. Financial statements, including ratio analysis and comparative balance sheets, served as the foundation for this study. It is feasible to make an efficient determination by combining these tools. The purpose of the research is to assess a business concern's operational performance, financial health, and financial trajectory. It describes how ratio analysis can help increase financial performance and help avoid financial barriers in long-term planning, budgeting, and asset management.

KEYWORDS:

BALANCE SHEET, FINANNCIAL RATIO, LIQUIDITY, PROFITABILITY

INTRODUCTION:

Measurements like sales, net income, earnings per share, and return on equity are examples of business performance indicators that, when combined, provide a picture of the efficiency and profitability of the company. Financial performance analysis is required for investors to evaluate a business's current and potential prospects, help with strategic decision-making, and assess its position in the market. Apart from showcasing the financial choices made by the organization, it also illustrates the ways in which external economic factors impact its functioning and sustained sustainability. India is known to manufacture the most generic drugs at the lowest possible cost and for having the largest output of these medications worldwide. Over the course of the last nine years, the Indian pharmaceutical industry has risen at a compound annual growth rate (CAGR) of 9.43%, placing it third in the world in terms of volume of pharmaceutical production. Among the major sectors of the Indian pharmaceutical industry are biologics,

biosimilars, contract research and production, over-the-counter, generic, and bulk medications, as well as vaccines. India boasts more than 500 API manufacturers, accounting for approximately 8% of the global API market, and the greatest number of pharmaceutical manufacturing facilities that comply with US Food and Drug Administration (USFDA) regulations. 50% of the world's demand for different vaccines, 40% of the US market's total demand, and 25% of the UK market's total demand for pharmaceuticals are supplied by the Indian pharmaceutical industry. Approximately 10,500 manufacturing facilities and 3,000 pharmaceutical businesses make up the domestic pharmaceutical industry. In the global pharmaceutical industry, India is a significant player. Additionally, the nation is home to a sizable population of scientists and engineers with the ability to advance the sector. At the moment, Indian pharmaceutical companies provide more than 80% of the antiretroviral medications used worldwide to treat AIDS (acquired immune deficiency syndrome). Given the affordability and excellent quality of its pharmaceuticals, India is aptly referred to as the "Pharmacy of the World."

Source; <https://www.ibef.org/industry/pharmaceutical-india>

Review of the literature:

Ahm Yaseen Chowdhury, Mohammad Zahedul Alam, Sabiha Sultana, and Md. Kaysher Hamid (2018), " The Impact of Working Capital Management on Profitability: A Case Study of Pharmaceutical Companies in Bangladesh" Researchers looked into nine pharmaceutical companies that were listed on the Dhaka Stock Exchange between 2001 and 2015. Earnings per share, return on equity, and return on assets were used as proxies. Unlike working capital management, which gauges profitability using cash conversion cycles, average holding and payment durations, inventory conversion periods, and marketable securities investments, profitability is measured directly. average storage time, cash conversion cycle, investment in marketable securities and returns on assets; cash conversion cycle, investment in marketable securities, and average payment time; And cash conversion cycle, investments in marketable securities, and earnings per share have all been shown to be negatively correlated with correlational study results in this research. Thus, this study demonstrates that effective working capital management is essential to a business's profitability and that finance managers may enhance investor value by implementing a successful working capital management plan.

Nufazil Altaf, Farooq Ahmad Shah (2018), "How does working capital management affect the profitability of Indian companies?" is a topic of discussion. The study aims to investigate the relationship between working capital management (WCM) and corporate profitability in a sample of 437 non-financial Indian enterprises. Ten years' worth of secondary financial data from the Capitaline database served as the basis for the research. Generalized methods (GMM) approaches were used in two phases to get the investigation's findings. The study's findings support the U-shaped relationship between WCM and corporate profitability. Additionally, the survey found that companies complete their CCC in 63 days on average.

Dr Navena Nesa Kumari, Dr M. Victor Louis Anthuvan (2017) Investigations, Researchers looked at the "Impact of working capital management on the profitability of leading listed automobile companies in India" from 2006 to 2012. The primary objective of this study is to ascertain if it may affect the profitability of Indian automakers. Using the top S&P CNX 500 manufacturing companies in the Indian subcontinent as examples, the research intends to show how effective working capital management affects the corporate profitability of ten key listed automotive industries in Chennai.

Agha (2014), investigated the impact of working capital management on profitability. This study's main goal is to conduct an empirical investigation of how working capital management affects profitability. He investigated Galaxy Smith Kline Pharmaceutical Company, which was listed on the Karachi Stock Exchange from 1996 until 2011, with this goal in mind. Based on the analysis of the data, the company's debtors can boost profitability by raising the ratio of inventory. and creditors; yet, no justification has been shown to alter the existing profitability ratio. Based on the results of this investigation, managers may boost profitability through effective working capital management.

Wobshet Mengesha (2014), Using audited financial data from a sample of eleven private limited firms that produced metals in Addis Ababa, Ethiopia, between 2008 and 2012, the effect of working capital management on company performance was investigated. Return on invested capital and return on total assets were the two

dependent financial performance (profitability) criteria utilized to assess performance. The cash conversion period, accounts payable period, inventory conversion period, and accounts receivable period were the four independent working capital variables used to compute working capital. SPSS was used to analyze the data (version 20.0). Equations were constructed for cross-sectional data and time series data using correlation analysis and pooled panel data regression models, respectively. The study found a negative correlation between the length of time it takes to maintain inventory and accounts receivable and profitability. The results are also reflected. The findings also indicate a strong negative link between the cash conversion cycle and the profitability metrics of the tested enterprises. The data indicate a highly substantial negative association between the accounts receivable, inventory conversion, and account payable periods and return on assets. The findings indicate that the cash conversion cycle has a substantial negative association with return on assets.

Dr Sarangarajan (2013), The performance of the cement industry in Tamil Nadu, India, was good during the years 1997, 1998, and 2004. It is found that, in the remaining years studied, cement industries should improve their financial performance.

Ikram U (2011), The financial performance and working capital management of Pakistan's established cement industry are correlated in the short term.

Objectives of this study:

1. To conduct a comparative analysis of the financial performance of selected pharma companies.
- 2.To analyze the companies. liquidity condition within the chosen pharma companies.
- 3.To analyze the profitability status of the chosen pharma companies.
- 4.To analyze the turnover status of the chosen pharma companies.
- 5.To analyze how companies operate using a general statement and a comparative analysis.

Limitation of this study:

1. Financial statements generally reflect historical book costs.
- 2.Ratio analysis does not serve as a predictive tool for the future; instead, it provides insights based on historical data."
- 3.The two pharma companies are not limited for this study.

Research Methodology:

The characters of this research are descriptive, focusing on the analysis of secondary data from money control, google, companies' profile and existing literature. data analysis from march 2014 to march 2023 in this research with excel sheet used to.

Sample of the study:

1.SUN PHARMA

2.CIPLA

SOURCE:

<https://www.moneycontrol.com/stocks/marketinfo/marketcap/bse/pharmaceuticals-drugs.html>

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Data analysis and interpretation:

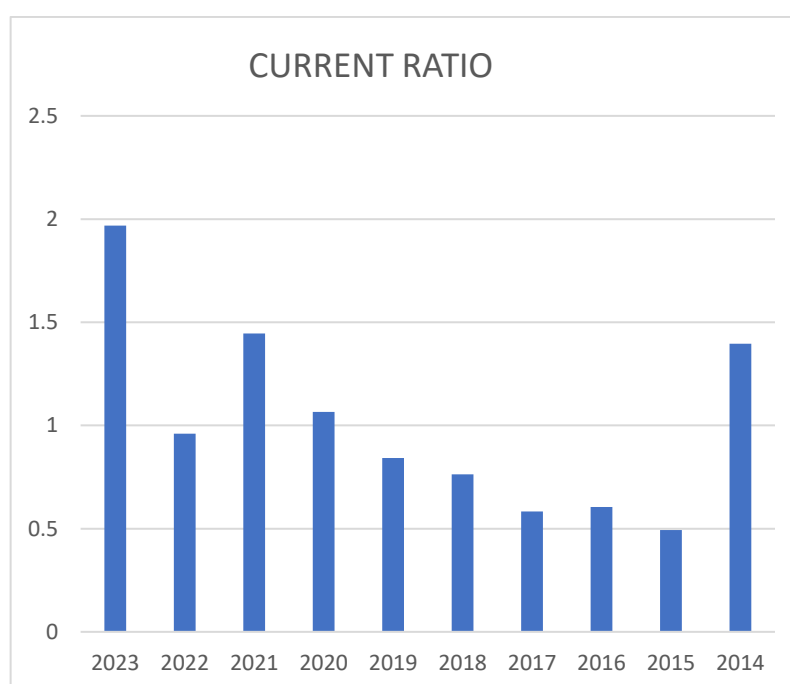
(A) Sun pharma

1.CURRENT RATIO:

YEARS (IN MARCH)	CURREN T ASSETS (C.A.)(In Rs. Cr.)	CURRENT LIABILITIES(C.L.) (In Rs Cr.)	CURRE NT RATIO= C.A./C.L .
2023	16,465.15	8,366.06	1.97
2022	9703.75	10,105.83	0.96
2021	12066.34	8,343.55	1.45
2020	11941.12	11,203.74	1.06
2019	11169.77	13,271.83	0.84
2018	9575.21	12,558.42	0.76
2017	6388.19	10,962.65	0.58

2016	5343.70	8,838.78	0.60
2015	5450.28	11,052.08	0.49
2014	5172.04	3,706.07	1.39

SOURC:<https://www.moneycontrol.com/financials/sunpharmaceuticalindustries/balance-sheetVI/SPI/1#SPI>



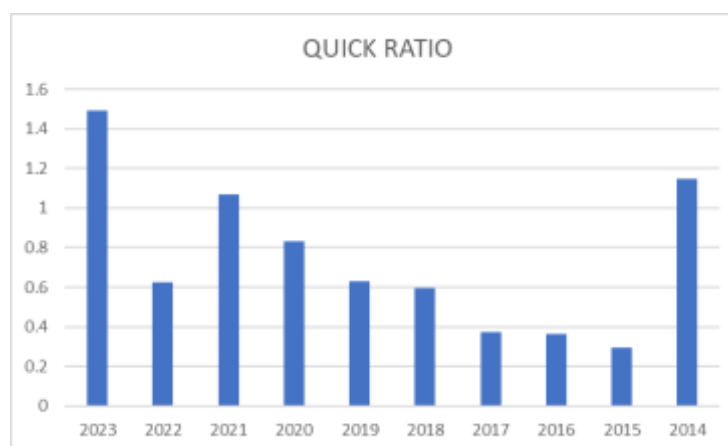
INTERPRETATION:

A Standard C.R. is 2:1. liquidity measurement that assesses the ability of a company to pay short-time debts with short-time assets is the current ratio. Between 2015 and 2023, there has been a consistent improvement in the current ratio. It started at 0.49 in 2015 and climbed to 1.96 in 2023, showing a rising trend in the ability of the business to pay short-term debt. All things considered, the company has improved its current ratio significantly, which has improved short-term liquidity and improved its ability to pay debt. However, it's critical to look into the difficulties encountered in 2019 and 2020 and

make sure the upward trend continues in the long run. Industry comparisons can provide extra background information for a more complete evaluation.

2. QUICK RATIO:

YEARS (IN MARCH)	QUICK ASSETS (Q.A.)(In Rs. Cr.)	CURRENT LIABILITIES (C.L.) (In Rs Cr.)	QUICK RATIO=Q. A./C.L.
2023	12,475.96	8366.0	1.49
2022	6300.01	10,105.83	0.62
2021	8900.62	8343.55	1.06
2020	9307.45	11,203.74	0.83
2019	8377.15	13,271.83	0.63
2018	7439.57	12,558.42	0.59
2017	4079.91	10,962.65	0.37
2016	3211.54	8838.78	0.36
2015	3261.03	11,052.08	0.29
2014	4253.66	3706.07	1.14



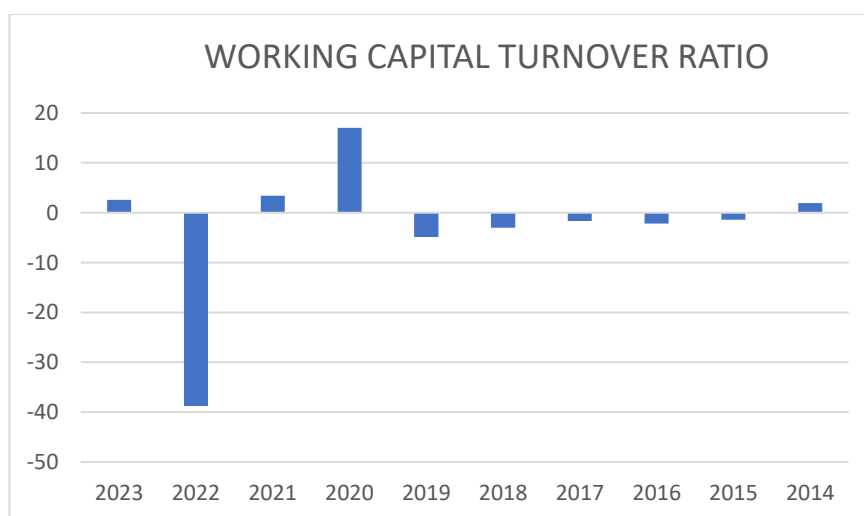
INTERPRETATION:

Standard quick ratio is 1, The quick ratio, also known as the acid-test ratio, measures a company's ability to cover its short-times debts with its most liquid assets (excluding inventory). The quick ratio has shown a positive trend, increasing from 0.29 in 2015 to

1.49 in 2023. This steady improvement indicates enhanced short-time liquidity and the company's ability to meet immediate debt. with more liquid assets.

3.WORKING CAPITAL TURNOVER RATIO:

YEARS (IN MARCH)	WORKING CAPITAL=C. A.-C.L. (In Rs. Cr.)	NET SALES (In Rs Cr.)	WORKING CAPITA TURNOVE R RAIO=NET SALES/W. C.
2023	8,099.09	20,812	2.57
2022	-402.08	15,585.98	-38.76
2021	3,722.79	12,803.21	3.44
2020	737.38	12,531.93	16.99
2019	-2102.06	10,303.21	-4.90
2018	-2983.21	9006.25	-3.01
2017	-4574.46	7683.96	-1.67
2016	-3495.08	7614.46	-2.17
2015	-5601.80	8017.19	-1.43
2014	1465.97	2828.79	1.93

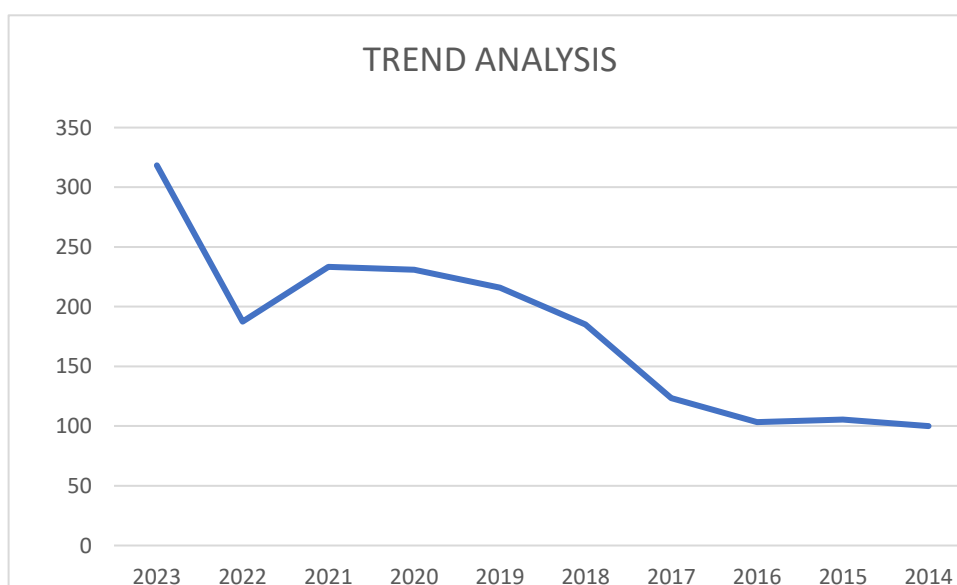


INTERPRETATION:

The working capital turnover ratio procedures how efficiently a company utilizes its working capital to generate sales. The company has seen fluctuations in the working capital turnover ratio over the years, with the most recent data (2023) showing a positive trend of improved efficiency in converting working capital into sales. The negative ratio in 2022 raises concerns and requires further investigation.

4.TREND ANALYSIS: (FROM CURRENT ASSETS)

YEARS (IN MARCH)	CURRENT ASSETS (C.A.)(In Rs. Cr.)	TREND ANALYSIS
2023	16,465.15	318.35
2022	9703.75	187.62
2021	12066.34	233.30
2020	11941.12	230.88
2019	11169.77	215.96
2018	9575.21	185.13
2017	6388.19	123.51
2016	5343.70	103.32
2015	5450.28	105.38
2014	5172.04	100.00

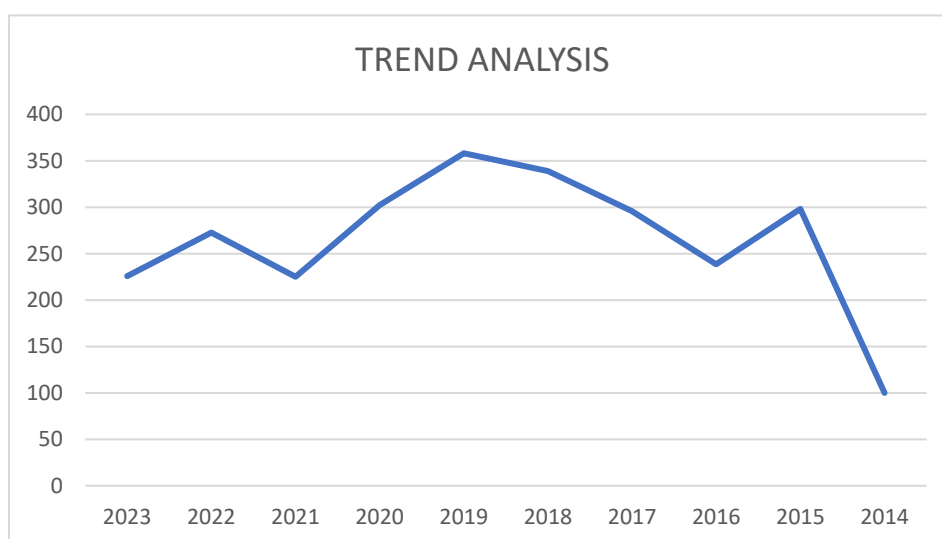


INTERPRETATION:

The company has demonstrated consistent growth in current assets given the years, indicating improved liquidity and a positive trend in managing short-term resources. Monitoring these trends alongside other financial metrics will contribute to a holistic assess of the company's financial health.

5.TREND ANALYSIS: (FROM CURRENT LIABILITIES)

YEARS (IN MARCH)	CURRENT LIABILITIES(C. L.)(In Rs. Cr.)	TRENDANALYSIS
2023	8366.06	225.74
2022	10,105.83	272.68
2021	8343.55	225.13
2020	11,203.74	302.31
2019	13,271.83	358.11
2018	12,558.42	338.86
2017	10,962.65	295.80
2016	8838.78	238.49
2015	11052.08	298.21
2014	3706.07	100.00



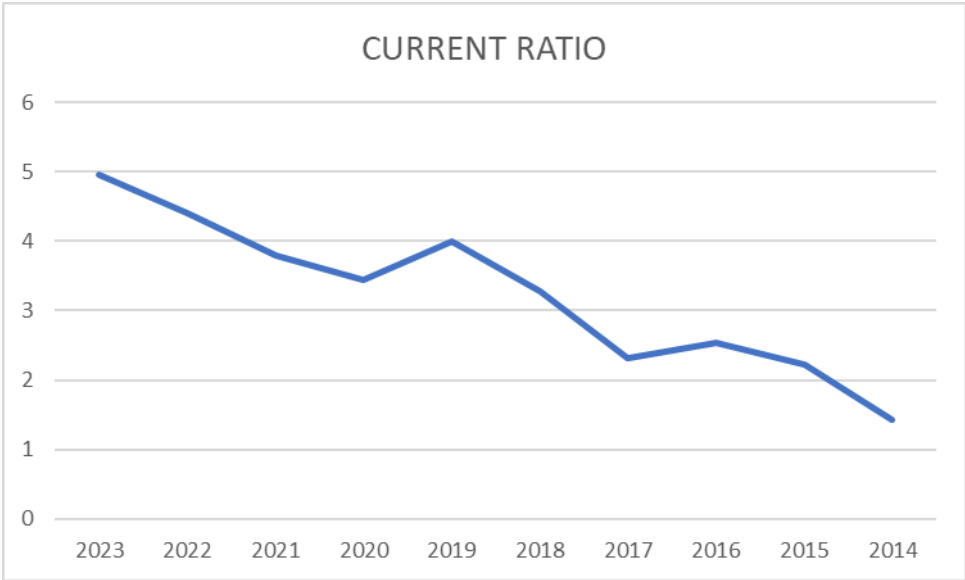
INTERPETATION:

The data reveals a consistent decreasing trend in current liabilities from 2014 to 2019, decreasing from 100 to 358.11. This suggests effective management and control of short-term obligations during this period. And the company has demonstrated resilience in its trend of managing current liabilities, with a recovery from the spike in 2020 and a continued decrease in recent years. The focus on maintaining a positive liquidity position is evident in the data.

(B) CIPLA:

1.CURRENT RATIO:

YEARS (IN MARCH)	CURRENT ASSETS (C.A.)(In Rs. Cr.)	CURRENT LIABILITIES(C.L.) (In Rs Cr.)	CURRENT RATIO=C.A./C.L.
2023	13,371.13	2699.74	4.95
2022	12,024.63	2728.56	4.41
2021	10,192.18	2691.94	3.79
2020	9027.06	2619.29	3.45
2019	9478.65	2368.08	4.00
2018	7938.17	2416.74	3.28
2017	6345.34	2731.70	2.32
2016	6467.37	2555.83	2.53
2015	6558.66	2954.47	2.21
2014	5097.97	3578.74	1.42



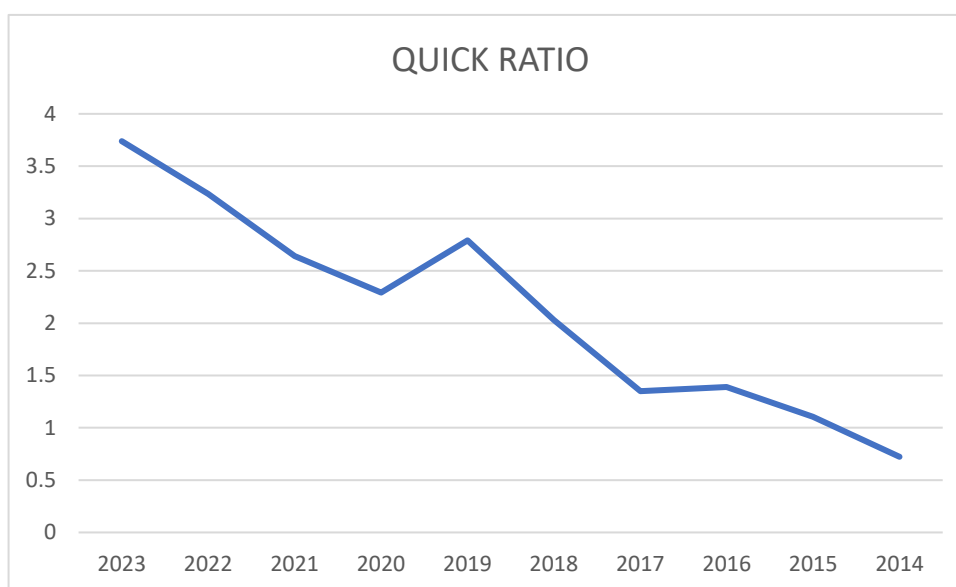
INTERPRETATION:

The current ratio has demonstrated a consistent and positive trend over the past decade, reflecting the company's improving liquidity position. Starting at 1.42 in 2014, the current ratio has steadily increased, reaching 4.95 in 2023. This upward trend suggests the company has been effective in managing its short-term assets and liabilities.

2.QUICK RATIO:

YEARS (IN MAR CH)	QUICK ASSETS (Q.A.) (In Rs. Cr.)	CURRE NT LIABILI TIES(C. L.) (In Rs Cr.)	QUICK RATIO=Q .A./C.L.
2023	10,093.77	2699.74	3.74
2022	8,825.58	2728.56	3.23
2021	7,106.37	2691.94	2.64
2020	6,005.70	2619.29	2.29

2019	6,610.24	2368.08	2.79
2018	4,900.19	2416.74	2.02
2017	3,691.84	2731.70	1.35
2016	3,548.90	2555.83	1.39
2015	3,269.46	2954.47	1.11
2014	2,586.81	3578.74	0.72



INTERPRETATION:

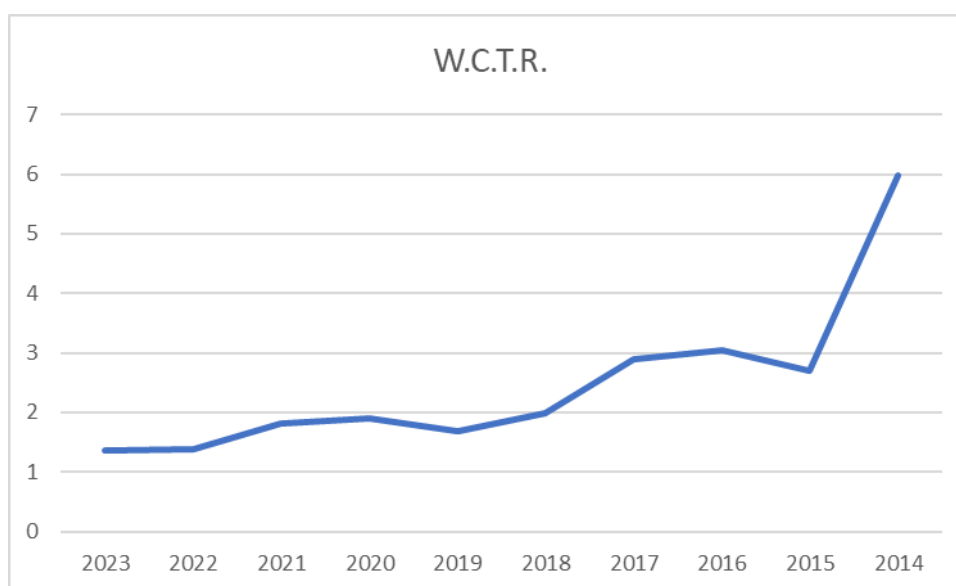
The increasing trend and consistently high quick ratios from 2014 to 2023 suggest that the company has maintained a robust liquidity position, indicating its ability to meet short-time debts comfortably without relying heavily on inventory. Monitoring this trend give time and comparing it with industry standards will provide a more comprehensive understanding of the companies' financial health.

3.WORKING CAPITAL TURNOVER RATIO:

YEARS (IN MARCH)	WORKING CAPITAL=C.A.- C.L. (In Rs. Cr.)	NET SALES (In Rs Cr.)	WORKING CAPITA TURNOVE R RAIO=NET SALES/W.C.
2023	10,671.39	14,518.79	1.36

2022	9296.07	12,827.29	1.38
2021	7500.24	13,610.02	1.81
2020	6407.77	12,220.22	1.91
2019	7110.57	11,968.44	1.68
2018	5521.43	10,949.53	1.98
2017	3,613.64	10,430.99	2.88
2016	3,911.54	11,873.46	3.03
2015	3,604.19	9738.94	2.70
2014	1,519.23	9075.84	5.97

Source: https://www.moneycontrol.com/stocks/company_info/print_main.php

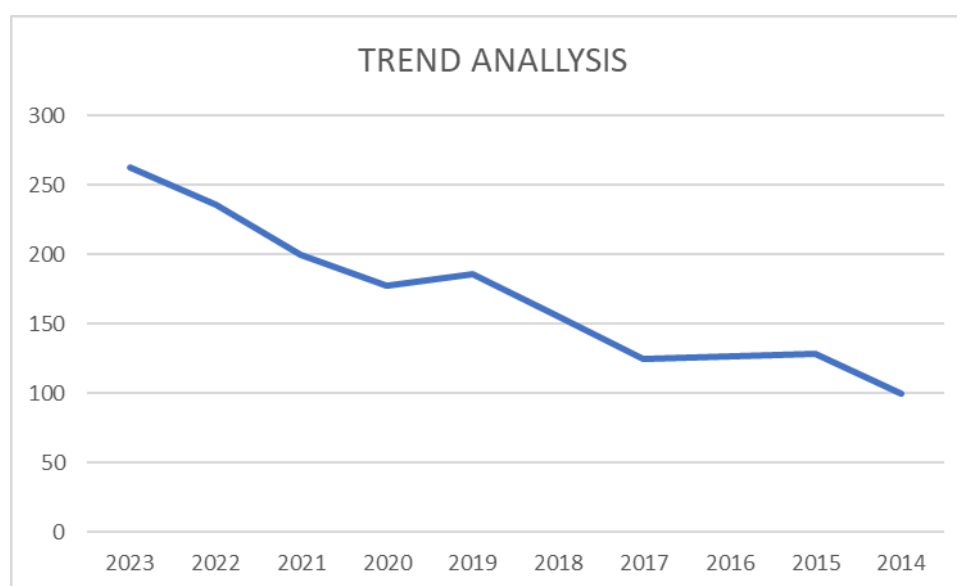


INTERPRETATION:

The working capital turnover ratio has been gradually decreasing over the years, from 5.97 in 2014 to 1.36 in 2023. the decreasing trend in the working capital turnover ratio suggests a potential decline in the efficiency of working capital utilization. It's important to research deeper into the underlying factors contributing to these trends for a more comprehensive analysis.

4.TREND ANALYSIS: (FROM CURRENT ASSETS)

YEARS (IN MARCH)	CURRENT ASSETS (C.A.)(In Rs. Cr.)	TRENDAN ALYSIS
2023	13,371.13	262.28
2022	12,024.63	235.87
2021	10,192.18	199.93
2020	9027.06	177.07
2019	9478.65	185.93
2018	7938.17	155.71
2017	6345.34	124.47
2016	6467.37	126.86
2015	6558.66	128.65
2014	5097.97	100



INTERPRETATION:

The current assets have more than doubled from 100 in the base year 2014 to 262.28 in 2023. This significant growth suggests improved liquidity and the ability to finance day-to-day operations. the trend analysis of current assets from 2014 to 2023 reflects a consistently positive growth trajectory, showcasing the company's ability to effectively

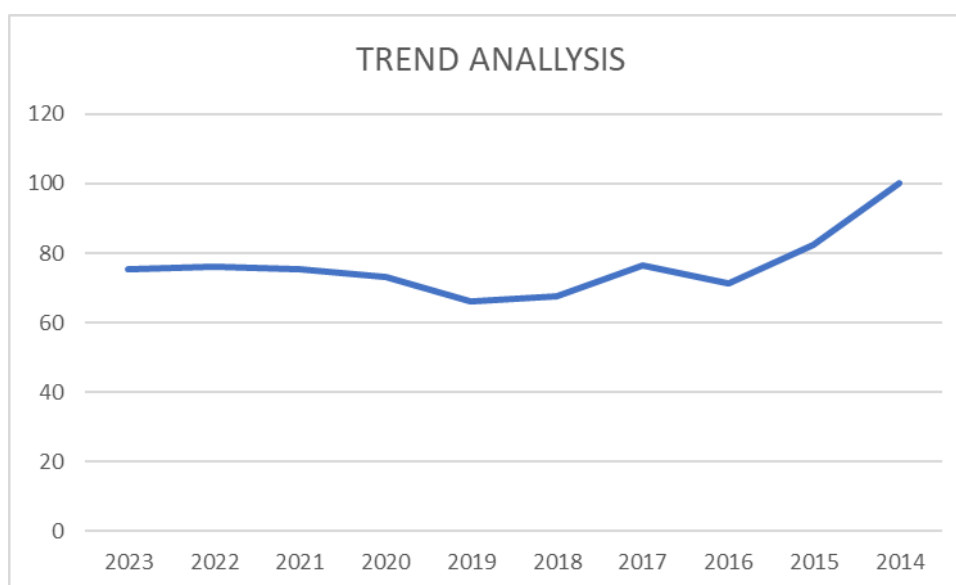
manage its short-time assets give the years. This growth has likely contributed to the

PARTICULARS	SUN PHARMA (in cr.)	CIPLA (in cr.)	DIFFERENCE (in cr.)

overall improvement in the company's liquidity position.

5.TREND ANALYSIS: (FROM CURRENT LIABILITIES)

YEARS(IN MARCH)	CURRENT LIABILITIES(C.L.)(In Rs. Cr.)	TRENDANALYSIS
2023	2699.74	75.44
2022	2728.56	76.24
2021	2691.94	75.22
2020	2619.29	73.19
2019	2368.08	66.17
2018	2416.74	67.53
2017	2731.70	76.33
2016	2555.83	71.42
2015	2954.47	82.56
2014	3578.74	100



INTERPRETATION:

Capitals and Debts.			
Capitals:			
Equity share capital	239	161	78
Reserve and surplus	23508	24437	929
Non-current debts.			
Long term borrowing	7586	00	7586
Deferred tax debts. (net)	00	36	36
Other long-term debts.	1080	140	940
Long term provision	206	81	125
Current debts.			
Short term borrowing	5	00	5
Trade payable	3125	1594	1531
Other current debts.	4425	458	3967
Short term provision	809	646	163
Total	Na	na	00
Assets			
Fixed with non-current assets			
Non-current investments	12416	9137	3279
Deferred tax assets(net)	1032	00	1032
Long term loan and advance	632	131	501
Other non-current assets	876	643	233
Tangible assets	4733	3547	1186
Intangible assets	3978	199	3779
Capital work in progress	328	441	113
Other assets	00	61	61
Current assets			
Current investments	200	2771	2571
Inventories	3989	3277	712
Trade receivable	7125	2888	4237
Cash and cash equivalents	421	966	545
	3347	772	2575
Other current assets	1382	2694	1312
Total	Na	Na	00

From 2014 to 2017, there is a noticeable increase in current liabilities, reaching the highest point of 76.33 in 2017. This might indicate higher short-term obligations during this period. There's been a notable reduction in current debts from the base year, with fluctuations over different periods. The recent increase should be monitored, but the overall trend and the current ratio suggest sound liquidity management. It would be beneficial to investigate the specific reasons behind the fluctuations to gain a deeper understanding.

Comparative Balance sheet of Sun Pharma and Cipla Pharma for 2023.

Note; The balance sheet does not show an equal balance. I am not showing the points amount because

Source: <https://www.moneycontrol.com/financials/sunpharmaceuticalindustries/balance-sheetVI/SPI#SPI>

<https://www.moneycontrol.com/financials/cipla/balance-sheetVI/C#C>

INTERPRETATION:

The equity share capital represents the ownership interest of shareholders. Sun Pharma has a higher equity share capital compared to Cipla, indicating a higher level of ownership value. These differences highlight variations in the financial structures and strategies of Sun Pharma and Cipla. Further analysis would involve considering industry benchmarks and historical data to gain a comprehensive understanding of their financial positions.

FINDINGS:

1. The current ratio of Sun Pharma has consistently improved from 2015 to 2023, signalling enhanced short-term liquidity and an improved ability to pay short-term debt.
2. Sun Pharma's quick ratio has shown a positive trend, increasing from 0.29 in 2015 to 1.49 in 2023, indicating improved short-term liquidity and the ability to meet immediate debt with more liquid assets.
3. The working capital turnover ratio of Sun Pharma experienced fluctuations over the years, with the most recent data (2023) showing a positive trend, suggesting improved efficiency in converting working capital into sales.
4. Sun Pharma has demonstrated consistent growth in current assets over the years, indicating improved liquidity and a positive trend in managing short-term resources.

5. Effective management and control of short-term obligations are evident, as seen in the consistent decreasing trend in current liabilities from 2014 to 2019.
6. Sun Pharma has shown resilience in managing current liabilities, recovering from a spike in 2020 and continuing the decreasing trend in recent years.
7. The company's focus on maintaining a positive liquidity position is evident in the data, contributing to a holistic assessment of its financial health.
8. Cipla Pharma has exhibited a consistently positive trend in the current ratio over the past decade, reflecting an improving liquidity position from 2014 to 2023.
9. The increasing trend and consistently high quick ratios from 2014 to 2023 indicate that Cipla has maintained a robust liquidity position, comfortably meeting short-term debts without heavy reliance on inventory.
10. While Cipla's working capital turnover ratio has gradually decreased, suggesting a potential decline in the efficiency of working capital utilization, the company has more than doubled its current assets from 2014 to 2023, showcasing improved liquidity and the ability to finance day-to-day operations.

These findings provide insights into the financial performance, liquidity, and operational efficiency of both Sun Pharma and Cipla Pharma over the specified period.

SUGGESTION:

These suggestions aim to provide strategic directions for both Sun Pharma and Cipla Pharma based on the financial data and trends identified in the interpretation. It's important to regularly review and adjust these strategies based on evolving market conditions and the companies' financial performance.

CONCLUSION:

Sun Pharma has exhibited significant improvement in short-term liquidity, reflected in rising current and quick ratios. Despite fluctuations, there's a positive trend in managing current assets and liabilities, indicating resilience. Cipla Pharma has shown consistent growth in liquidity, maintaining robust current and quick ratios. However, declining working capital turnover raises efficiency concerns. Both companies should continue monitoring these trends for sustained financial health.

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Impact of the National Food Security Act (2013) on Food Security in India: Challenges, Implementation, and Policy Measures

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(Note: This paper is the part of my PhD study)

Abstract:

The National Food Security Act (NFSA), enacted in 2013, is a key policy aimed at ensuring food security for a large segment of India's population. The Act provides subsidized food grains through the Public Distribution System (PDS) and includes provisions for maternal and child nutrition. This study evaluates the implementation and socio-economic impacts of the NFSA using secondary data from government reports, academic research, and national surveys.

The analysis reveals that the NFSA has significantly improved food accessibility, particularly for marginalized groups. By making food entitlements a legal right, the Act has contributed to reducing hunger and malnutrition. However, challenges such as leakage in the PDS, exclusion errors, and regional disparities persist. Technological interventions like Aadhaar-linked ration cards have enhanced transparency but have also led to unintended exclusions.

The study also highlights concerns about the nutritional quality of food provided under the NFSA, which primarily focuses on staple grains. Critics argue for a diversified food basket that includes protein-rich and micronutrient-rich foods. Additionally, regional variations in implementation impact the Act's overall effectiveness, with some states demonstrating better outcomes than others.

To enhance NFSA effectiveness, policy recommendations include improving grievance redressal mechanisms, expanding digital inclusion, and diversifying the food basket. Addressing these challenges can strengthen food security and contribute to reducing malnutrition in India.

Keywords: National Food Security Act, Food Security, Public Distribution System, India, Policy Reform, Nutritional Security.

1. Introduction

Food security remains a critical issue in India, with millions of people facing hunger, malnutrition, and inadequate access to nutritious food. Despite being one of the largest

food producers in the world, India continues to struggle with high levels of food insecurity due to socio-economic disparities, inefficient food distribution systems, and fluctuating agricultural productivity. According to the Global Hunger Index (2022), India ranks among the countries with significant hunger concerns, highlighting the urgency of addressing these issues through effective policy interventions.

The Indian government has implemented various food security measures over the years, with the National Food Security Act (NFSA) being a landmark legislation in this regard. The NFSA, enacted in September 2013, aims to provide legal entitlements to food and nutrition security, particularly for vulnerable sections of society. The act is designed to guarantee access to adequate food at affordable prices, thereby reducing hunger and malnutrition while promoting equitable food distribution.

1.1 Background

The National Food Security Act (NFSA) was introduced as a response to persistent food insecurity in India, particularly among marginalized and low-income households. It builds upon existing food security programs, such as the Public Distribution System (PDS), and aims to make access to food a legal right for eligible beneficiaries. Under the NFSA, the government provides subsidized food grains to nearly 75% of the rural population and 50% of the urban population, covering approximately 800 million people across the country.

The NFSA is implemented through three main components:

1. Targeted Public Distribution System (TPDS): The TPDS forms the core of the NFSA and ensures the distribution of essential food grains—rice, wheat, and coarse cereals—at highly subsidized rates. Eligible households are classified into two categories: Priority Households and Antyodaya Anna Yojana (AAY) households, with the latter receiving the highest level of assistance. While the TPDS has improved food accessibility, challenges such as leakages, inefficiencies, and exclusion errors continue to hinder its effectiveness.
2. Maternity Benefits: The NFSA recognizes the importance of maternal health in addressing food security and includes provisions for pregnant and lactating women. Under the act, these women are entitled to a maternity benefit of at least ₹6,000 to support their nutritional needs during pregnancy and early motherhood. This initiative is intended to reduce maternal and infant mortality rates by ensuring better prenatal and postnatal care. However, the implementation of

maternity benefits has been inconsistent across states, with delays and lack of awareness affecting its reach.

3. **Nutritional Support for Children:** The NFSA mandates the provision of free meals to children in the age group of 6 months to 14 years under the Integrated Child Development Services (ICDS) and the Mid-Day Meal Scheme (MDMS). These programs aim to improve child nutrition and school enrollment while addressing concerns of malnutrition and stunted growth. Despite its positive impact, there are concerns regarding the quality and diversity of meals provided, as well as the need for better monitoring mechanisms.

1.2 Objectives

This study aims to:

1. To Analyse the implementation framework of the NFSA using secondary data.
2. To Evaluate the socio-economic effects of the act on beneficiaries.
3. To Identify challenges in execution and propose policy recommendations.

1.3 Research Questions

1. How effective has the NFSA been in achieving its objectives?
2. What are the key challenges in its implementation?
3. How can the act be improved to enhance food security in India?

Review of Literature

Food security has been a central concern in India's policy landscape, with various initiatives aimed at ensuring access to adequate nutrition for its population. A significant component of this effort is the Public Distribution System (PDS), which has evolved over the years to improve efficiency and effectiveness in addressing food insecurity. The literature on food security policies extensively discusses the role of the PDS, the National Food Security Act (NFSA), and their implications on the broader food security framework in India.

Drèze and Khera (2015) provide a critical analysis of the PDS, highlighting its transition from a universal to a targeted system. Their work underscores the need for reducing leakage and improving transparency in the distribution mechanism. They argue that despite various reforms, inefficiencies such as corruption and diversion of food grains persist, limiting the effectiveness of the PDS in reaching intended beneficiaries. The introduction of technological interventions, such as Aadhaar-linked ration cards and

digitization of records, has been suggested as a means to enhance accountability and reduce leakages.

Swaminathan (2013) takes a different perspective by emphasizing the importance of nutritional quality over mere calorie intake. While traditional measures of food security focus on caloric sufficiency, Swaminathan advocates for a more holistic approach that incorporates protein and micronutrient consumption. This aligns with global shifts in food security assessments, which increasingly recognize the need for diverse and balanced diets to combat malnutrition effectively.

Kumar et al. (2016) examine the NFSA's impact on food accessibility and affordability. Their study finds that while the Act has improved access to subsidized food grains, challenges remain in beneficiary identification and logistical inefficiencies. The study also highlights that some marginalized communities, particularly in rural areas, continue to face barriers in accessing entitlements due to administrative bottlenecks and lack of awareness.

Pingali, Mittra, and Rahman (2017) explore the relationship between agricultural productivity and food security policies in India. They argue that while government programs like the NFSA address short-term hunger mitigation, they often neglect the structural issues in agricultural production and market access. Their research suggests that strengthening rural livelihoods, investing in sustainable agricultural practices, and improving supply chain efficiencies could enhance the long-term effectiveness of food security initiatives.

Ghosh (2020) investigates the role of digital technologies in improving food security governance. The study examines the impact of digitization and direct benefit transfers (DBTs) in minimizing fraud and enhancing transparency in food distribution. Ghosh finds that states that have implemented robust digital tracking systems report lower leakage rates and better targeting of subsidies. However, concerns about digital exclusion and access disparities remain significant, particularly for low-income and tribal communities.

Despite these contributions, there is a notable gap in the literature concerning the long-term effects of the NFSA and its varied implementation across different states and regions. Existing studies primarily focus on short-term impacts, policy recommendations, and operational inefficiencies. There is limited empirical research assessing the sustainability of food security improvements under the NFSA, particularly

in relation to socio-economic inequalities and climate-related vulnerabilities affecting agricultural production.

This study aims to bridge these gaps by conducting a comprehensive analysis of the NFSA's implementation and outcomes using secondary data sources. By examining key indicators such as coverage, efficiency, nutritional impact, and regional variations, this research will contribute to a more nuanced understanding of India's food security policies. Additionally, it will provide insights into potential reforms needed to enhance the effectiveness of the NFSA in ensuring equitable and sustainable food security for all.

3. Methodology

3.1 Research Design

This study adopts a quantitative research design based on secondary data analysis. The research primarily relies on existing datasets, reports, and peer-reviewed studies to evaluate the implementation and impact of the National Food Security Act (NFSA). By using secondary data sources, the study ensures a comprehensive understanding of trends, effectiveness, and challenges associated with the NFSA. The analysis focuses on assessing food security indicators, policy effectiveness, and regional disparities in implementation.

3.2 Data Sources

The study utilizes multiple credible sources to ensure accuracy and reliability. These sources are categorized as follows:

- **Government Reports:** Official reports from the Ministry of Consumer Affairs, Food and Public Distribution, the Food Corporation of India (FCI), and the National Sample Survey Office (NSSO) are used to assess policy implementation, food grain distribution efficiency, and leakage estimates. Specifically, reports such as the Annual Report of the Department of Food and Public Distribution and the Economic Survey of India provide valuable insights into food security measures. Additionally, periodic evaluations conducted by the NITI Aayog on the performance of the Public Distribution System (PDS) offer crucial data on the NFSA's effectiveness.
- **Academic Journals:** Peer-reviewed articles from reputed journals such as the Economic & Political Weekly (EPW), Food Policy, and the Indian Journal of Agricultural Economics contribute scholarly insights into the NFSA's impact, policy gaps, and implementation challenges. Studies conducted by leading

research institutions, including the Indian Council for Research on International Economic Relations (ICRIER) and the Centre for Policy Research (CPR), are also referenced.

- **National Surveys:** Large-scale national surveys provide empirical data to evaluate food security trends and household consumption patterns. The study relies on the following:
 - Household Consumption Expenditure Survey (HCES): Conducted by the National Statistical Office (NSO), HCES provides data on household food consumption and expenditure patterns, which help assess changes in food security post-NFSA implementation.
 - National Family Health Survey (NFHS): Conducted by the Ministry of Health and Family Welfare, NFHS data is used to analyze malnutrition rates, dietary diversity, and the nutritional impact of the NFSA, particularly among children and women.
 - Periodic Labour Force Survey (PLFS): Provides insights into employment trends and household income levels, which indirectly affect food security and access to PDS benefits.
 - Comptroller and Auditor General (CAG) Reports: These reports offer audits on PDS efficiency, financial expenditures, and discrepancies in food grain procurement and distribution.

3.3 Data Analysis

The collected data is analysed using both descriptive and inferential statistical methods to assess the effectiveness of the NFSA. The key analytical approaches include:

- **Descriptive Statistics:** Used to summarize key metrics such as coverage rates of NFSA beneficiaries, food grain distribution patterns, and variations in subsidy allocations across states.
- **Trend Analysis:** Examines changes in food security indicators over time by comparing pre- and post-NFSA implementation data.
- **Leakage and Efficiency Metrics:** Estimates the percentage of food grain diversion and inefficiencies in PDS supply chains using NSSO and CAG data.
- **Nutritional Outcome Analysis:** Assesses the impact of NFSA on malnutrition rates and dietary diversity using NFHS and HCES data.

- **Regional Comparison:** Identifies disparities in NFSA implementation across different states to highlight best practices and areas requiring policy intervention.

By employing a structured analytical approach, this study aims to provide a data-driven evaluation of the NFSA, offering insights into its strengths, challenges, and opportunities for improvement.

4. Implementation of the National Food Security Act

4.1 Legal Framework

The National Food Security Act (NFSA), enacted in 2013, provides a statutory framework for ensuring food security in India by making access to subsidized food grains a legal entitlement. The Act mandates that eligible beneficiaries receive 5 kg of food grains per person per month at subsidized rates—₹3/kg for rice, ₹2/kg for wheat, and ₹1/kg for coarse grains. Households categorized under the Antyodaya Anna Yojana (AAY) are entitled to 35 kg of food grains per month, ensuring special provisions for the most vulnerable sections of society.

Beyond food grain distribution, the NFSA also incorporates provisions to enhance nutritional security. It mandates maternity benefits of at least ₹6,000 per pregnant and lactating woman, promoting maternal health and well-being. Additionally, it institutionalizes nutritional support for children through the Mid-Day Meal Scheme (MDMS) in schools and the Integrated Child Development Services (ICDS) for children below six years, aiming to address child malnutrition and improve educational outcomes through enhanced school enrolment and retention rates.

4.2 Role of State Governments

While the NFSA provides the overall legal and policy framework, its implementation is decentralized, with state governments playing a crucial role in operationalizing the Act. The responsibilities of state governments include:

- **Identification of Beneficiaries:** States are responsible for identifying eligible households based on socio-economic criteria, ensuring that food entitlements reach intended beneficiaries. However, variations in identification methodologies have led to inclusion and exclusion errors across different states.
- **Procurement and Distribution:** Although food grain procurement is largely centralized through the Food Corporation of India (FCI), some states follow a

decentralized procurement system, improving efficiency and reducing transit losses.

- **Supply Chain Management:** Effective logistics, warehousing, and last-mile distribution are managed by state authorities, requiring robust infrastructure and administrative oversight to minimize wastage and leakage.
- **Grievance Redressal Mechanisms:** The Act mandates the establishment of grievance redressal systems at the district and state levels, yet the effectiveness of these mechanisms varies widely, with some states exhibiting best practices in transparency while others face governance deficits.

Despite the legal provisions, the implementation of NFSA remains uneven across states due to disparities in administrative capacity, financial resources, and governance efficiency. States such as Tamil Nadu and Chhattisgarh have demonstrated effective PDS management with minimal leakages, whereas states like Bihar and Jharkhand continue to struggle with inefficiencies and irregularities.

4.3 Technology Integration

Technological interventions have been a significant aspect of NFSA implementation, aiming to enhance efficiency, reduce corruption, and improve service delivery. Some of the key technology-driven initiatives include:

- **Aadhaar-Linked Biometric Authentication:** Many states have integrated Aadhaar-based biometric authentication to prevent duplication and ghost beneficiaries. While this has reduced leakages, concerns remain regarding authentication failures in areas with poor internet connectivity and technical infrastructure.
- **Electronic Point of Sale (e-PoS) Devices:** The introduction of e-PoS devices at Fair Price Shops (FPS) has improved real-time tracking of food grain distribution, ensuring accountability. However, challenges such as connectivity issues, power outages, and inadequate digital literacy among beneficiaries have hindered its effectiveness in remote areas.
- **Digitization of Ration Cards:** Several states have transitioned to digitized ration card systems, allowing for better tracking of beneficiaries and reducing fraudulent claims. The portability of ration cards under the 'One Nation One Ration Card' (ONORC) scheme has also facilitated intra-state and inter-state access to entitlements, benefiting migrant populations.

- **Data Analytics and Transparency Portals:** Some states have developed real-time public dashboards that display stock levels, distribution patterns, and beneficiary transactions, promoting transparency and accountability in the PDS.

While these technological innovations have improved NFSA implementation in several states, significant digital divides remain, particularly in rural and tribal areas where infrastructure constraints limit accessibility. Additionally, technological failures, such as biometric mismatches and internet connectivity issues, have occasionally led to unintended exclusions, necessitating a more inclusive and flexible approach to technology adoption.

Overall, while the NFSA has established a robust framework for ensuring food security, its implementation is influenced by regional governance capacities, infrastructural limitations, and technological advancements. Addressing these challenges through policy refinements and capacity-building initiatives is essential to realizing the full potential of the Act in ensuring equitable and efficient food distribution.

5. Results and Discussion

The implementation of the National Food Security Act (NFSA) has yielded notable improvements in food accessibility across India. However, challenges such as inefficiencies in distribution, exclusion errors, and regional disparities continue to hinder its full potential.

5.1 Positive Outcomes

Increased Food Access:

The NFSA has significantly expanded food access, benefiting approximately 813 million individuals, as reported by the Ministry of Consumer Affairs, Food and Public Distribution (2022). The Act's focus on subsidized food grains has alleviated immediate food insecurity, particularly among economically vulnerable groups.

Reduction in Hunger and Malnutrition:

Empirical data from the National Family Health Survey (NFHS-5) suggests a decline in hunger-related indicators in states with effective policy implementation. Kerala and Tamil Nadu, for instance, have recorded reductions in stunting (low height-for-age) and wasting (low weight-for-height) among children, indicating improved nutritional security (NFHS-5, 2021).

Women's Empowerment:

A key provision of the NFSA is the mandatory designation of the eldest female member as the head of the household for ration card eligibility. This policy has contributed to improved decision-making power among women, as observed in the National Sample Survey Office (NSSO) reports. Studies indicate that female-led households have better food consumption patterns, enhancing intra-household nutritional equity (NSSO, 2020).

5.2 Challenges and Limitations

Leakage and Corruption

Despite technological interventions such as Aadhaar-based authentication and electronic Point of Sale (e-PoS) systems, inefficiencies persist within the Public Distribution System (PDS). A 2020 audit by the Comptroller and Auditor General (CAG) estimates that leakage in the distribution chain—diversion of food grains to the open market—ranges from 15% to 25% in several states. Such systemic inefficiencies undermine the intended benefits of the NFSA.

Exclusion Errors and Targeting Inefficiencies:

Outdated beneficiary databases remain a critical issue, leading to exclusion errors wherein eligible households fail to receive entitlements. The NSSO (2021) reports that nearly 10% of households eligible under NFSA criteria are excluded due to reliance on outdated census data. Moreover, inclusion errors—wherein ineligible individuals receive benefits—further challenge the efficiency of targeting mechanisms.

Nutritional Deficiencies and Micronutrient Gaps:

While the NFSA ensures calorie security, it does not adequately address micronutrient deficiencies. The NFHS-5 (2021) data highlights widespread anemia among women and children, suggesting that reliance on cereals alone does not fulfill essential dietary requirements. Scholars argue that incorporating diversified food baskets, including pulses, millets, and fortified foods, could enhance the Act's nutritional impact (Swaminathan, 2019).

5.3 Regional Disparities in Implementation

State-wise variations in NFSA outcomes highlight governance and administrative capacity as critical determinants of success. Southern states such as Kerala and Tamil Nadu have leveraged robust administrative frameworks, resulting in high beneficiary coverage and minimal leakage (CAG, 2020). Conversely, states like Bihar and Uttar Pradesh exhibit lower efficiency due to logistical constraints, corruption, and inadequate monitoring mechanisms. Disparities in the adoption of digital PDS reforms further

exacerbate the divide, with technologically advanced states demonstrating better outcomes (Dreze & Khera, 2021).

5.4 Policy Implications and Recommendations

To enhance NFSA implementation, policymakers should focus on:

1. **Strengthening Technological Infrastructure:** Expanding Aadhaar-linked authentication while addressing rural connectivity issues.
2. **Periodic Database Updating:** Ensuring real-time beneficiary identification through dynamic data integration with socio-economic surveys.
3. **Diversifying Food Baskets:** Incorporating nutrient-rich alternatives like pulses, fortified rice, and edible oil to combat hidden hunger.
4. **Enhancing State Capacity:** Providing financial and administrative support to weaker states to bridge governance gaps

6. Conclusion and Policy Recommendations

6.1 Conclusion

The National Food Security Act (NFSA), 2013, represents a transformative policy initiative aimed at ensuring food security for millions of vulnerable individuals in India. By institutionalizing legal entitlements to subsidized food grains through the Targeted Public Distribution System (TPDS) and complementary schemes such as maternity benefits and nutritional support for children, the Act has significantly improved food access. The provision of food grains at highly subsidized rates has played a crucial role in alleviating immediate food insecurity, reducing hunger, and strengthening social protection mechanisms.

However, despite its achievements, the implementation of NFSA has encountered persistent structural challenges that hinder its full potential. Leakage and corruption within the Public Distribution System (PDS) remain substantial, as a considerable proportion of subsidized food grains are diverted to the open market. Exclusion errors due to outdated beneficiary databases prevent millions of eligible households from receiving benefits, while inclusion errors contribute to inefficiencies in resource allocation. Moreover, the Act's limited focus on nutritional quality—primarily ensuring calorie sufficiency rather than addressing micronutrient deficiencies—has led to concerns about its long-term impact on public health.

Regional disparities further exacerbate these challenges, with states demonstrating varying degrees of efficiency in NFSA implementation. States like Kerala and Tamil

Nadu have leveraged robust administrative mechanisms and technology-driven interventions to optimize food security outcomes, whereas states such as Bihar and Uttar Pradesh continue to struggle with logistical inefficiencies, governance failures, and high rates of leakage. These disparities highlight the need for targeted state-specific strategies to enhance the effectiveness of NFSA provisions.

To maximize the NFSA's impact and ensure sustainable food security, a comprehensive, data-driven approach must be adopted. Strengthening governance frameworks, incorporating nutritional diversity, and leveraging technology for real-time beneficiary management are essential strategies for enhancing efficiency and reducing systemic inefficiencies.

6.2 Policy Recommendations

To strengthen NFSA implementation and enhance its overall effectiveness, the following policy interventions are recommended:

1. Strengthening Digital and Administrative Infrastructure

- Expanding the use of Aadhaar-linked biometric authentication and electronic Point of Sale (e-PoS) devices to minimize fraud and improve efficiency.
- Establishing real-time data integration between the Socio-Economic Caste Census (SECC), National Sample Survey Office (NSSO), and PDS databases to update beneficiary lists dynamically.
- Developing mobile applications and AI-based grievance redressal systems for beneficiaries to report exclusions, corruption, and service delays.

2. Reducing Leakage and Improving Targeting

- Conducting independent third-party audits of PDS operations at regular intervals to assess leakage and ensure accountability.
- Implementing Direct Benefit Transfer (DBT) for food subsidies, enabling beneficiaries to purchase food items directly from the market where PDS inefficiencies persist.
- Enhancing social audits and citizen engagement to promote transparency and accountability in food distribution.

3. Addressing Nutritional Gaps and Diversifying the Food Basket

- Expanding the scope of NFSA beyond cereal distribution to include protein-rich foods such as pulses, fortified rice, edible oil, and dairy products to combat hidden hunger and micronutrient deficiencies.

- Integrating NFSA provisions with existing nutrition programs such as the Integrated Child Development Services (ICDS) and Mid-Day Meal Scheme to improve dietary quality.
- Promoting biofortification strategies and fortified food grains to ensure better nutritional outcomes.

4. Bridging Regional Disparities in Implementation

- Providing technical and financial assistance to underperforming states for capacity-building and improved governance.
- Encouraging inter-state knowledge-sharing mechanisms, where best practices from states with efficient NFSA implementation (such as Kerala and Tamil Nadu) are adapted in weaker-performing states (such as Bihar and Jharkhand).
- Creating state-specific strategies based on socio-economic factors, infrastructure capabilities, and governance effectiveness to ensure context-specific solutions for NFSA implementation.

5. Periodic Policy Evaluations and Evidence-Based Reforms

- Institutionalizing regular impact assessments of NFSA implementation through government agencies, research institutions, and independent policy think tanks.
- Conducting longitudinal studies on food security trends, nutrition outcomes, and socio-economic impacts to inform evidence-based policy adjustments.
- Introducing policy flexibility mechanisms to allow states to customize NFSA provisions based on their specific demographic and economic conditions.

6.3 Future Research Directions

To further enhance understanding of NFSA's effectiveness and inform future policy reforms, multidisciplinary research should focus on:

1. Long-term nutritional impacts of NFSA beneficiaries, with an emphasis on micronutrient deficiencies and dietary diversification.
2. Socio-economic implications of NFSA on employment, women's empowerment, and rural livelihoods.
3. Comparative studies on global best practices in food security policies and their adaptability in the Indian context.
4. Technological innovations in food distribution, such as blockchain-based PDS tracking and AI-driven beneficiary targeting.

6.4 Final Remarks

The NFSA remains one of the most ambitious food security policies in the world, offering a legal framework for food entitlements to a large segment of India's population. However, to achieve its full potential, targeted reforms, technological interventions, and governance enhancements are essential. A multi-stakeholder approach, involving the government, civil society, researchers, and the private sector, is necessary to create a robust and equitable food security system. By addressing systemic inefficiencies, bridging regional disparities, and incorporating nutritional diversity, the NFSA can evolve into a comprehensive food security model that not only alleviates hunger but also promotes sustainable well-being for future generations

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A Comparative Study on Financial Performance of Selected Pharmaceutical Industry of India with Special Reference to Pre and Post COVID-19 Period

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ABSTRACT:

During the COVID-19 epidemic, which caused significant economic disruptions worldwide, the Indian pharmaceutical sector was highly influential in focusing on public health issues. By comparing the strategies taken by some Indian pharmaceutical companies before and after the pandemic, this study seeks to investigate the performance, market dynamics, operational effectiveness, and policy decisions of these companies. This study assesses the durability and growth of the sector using secondary data from the financial years 2016–17 to 2023–24. The study highlights the pharmaceutical industry's remarkable adaptability and improved returns throughout the pandemic by comparing the stock market performance of pharmaceutical companies with other key industries, in addition to examining company-specific strategies and results. A greater understanding of how the pharmaceutical sector not only overcame the difficulties presented by COVID-19 but also took use of new chances to strengthen its position in the market is provided by this comparative method. The findings of the research provide important new information on the strategies that pharmaceutical companies have made to deal with disruptions brought on by pandemics. Additionally, the study pinpoints important areas for industry improvement, including global competitiveness, supply chain resilience, and innovation. It also provides policymakers with practical suggestions for creating forward-thinking plans that would maintain growth and ensure the pharmaceutical industry's sustainability and efficiency in India. Ultimately, this study improves our knowledge of how key industries can overcome obstacles towards growth and offers a framework for managing international crises and

promoting sustainable growth in a cutthroat and quickly changing economic environment.

KEYWORDS:

Performance Analysis, Pharmaceuticals Ltd., COVID-19

INTRODUCTION:

The pharmaceutical industry is a crucial sector in the global economy, which focuses on the research, development, production, and distribution of medications. Supplying necessary medications for the management, treatment, and prevention of illnesses, significantly contributes to the improvement of public health. In terms of output volume, the Indian pharmaceutical industry ranks third in the world. (Raval et al., 2021). In 2023–24, the pharmaceutical industry's total yearly revenue was Rs. 4,17,345 crore, representing a 10% increase over 2022–23. Financial performance analysis is an essential tool for determining how well management is performing across a company's different areas. (Rahman, 2014). Over the past few years, the Indian pharmaceutical industry has grown significantly, from a turnover of about US \$1 billion in 1990 to over US \$30 billion in 2015, of which about US \$15 billion comes from exports. The nation currently accounts for about 10% of global output by volume and 1.5% by value, ranking third in terms of production volume and fourteenth in terms of value. It is ranked fourth in the world for generic manufacture and seventeenth for the value of bulk active ingredients and dosage forms exported. More than 200 nations worldwide, including the highly controlled markets of the US, Western Europe, Japan, and Australia, are the final destinations for Indian exports. It showed remarkable developments in a variety of products, technology-based development, and infrastructure development. Its essence and resolve to succeed in the ever-changing environment have been established.

SWOT Analysis

STRENGTH	WEAKNESS
➤ Low Cost of Manufacturing	➤ Lack of Investment in Research and Development
OPPORTUNITY	THREAT
➤ Greater Export Possibilities ➤ Hub for International Clinical Trials	➤ Product Patent Policy ➤ New MRP-based excise duty structure

Chart 1 Indian Pharmaceutical Market (US \$ Billion) (The Indian Economic



Survey 2021

Source: <https://www.ibef.org/assets/images/charts/pharmaceuticals.jpg>

COVID-19

In December 2019, the novel coronavirus illness (COVID-19) was discovered and identified in Wuhan, China. On March 11, the COVID-19 outbreak was considered a worldwide pandemic by the World Health Organization (WHO). (Chauhan, 2023). The COVID-19 virus rapidly spread over the world, infecting approximately 2.5 million people by April 23, 2020. The world economy was impacted by the COVID-19 epidemic, and the pharmaceutical sector was no exception. From balancing the medicine supply chain during emergencies to doing research and development on possible treatment approaches, the pharmaceutical sector is assisting governments in meeting the unmet demands of COVID-19.

PHARMACEUTICALS INDUSTRY AND COVID-19

India's pharmaceutical sector contributes significantly to the country's international trade and presents significant possibilities for investment. The country also operates a significant number of plants that adhere to Good Manufacturing Practices (GMP) guidelines established by the United States Food and Drug Administration (USFDA) and the World Health Organization (WHO). India has historically been the leading country in pharmaceutical production. Over the next five years, India's medical spending is predicted to increase by 9–12%, placing it among the top 10 nations in terms of medical spending. Numerous actions have been taken by the Indian government to lower

healthcare expenditures. The elderly population, the rise in chronic illnesses, the National Health Protection Scheme, which seeks to provide universal healthcare, and other government initiatives, such as the establishment of pharmacies selling low-cost generic drugs, should all help to expand the Indian pharmaceutical sector.

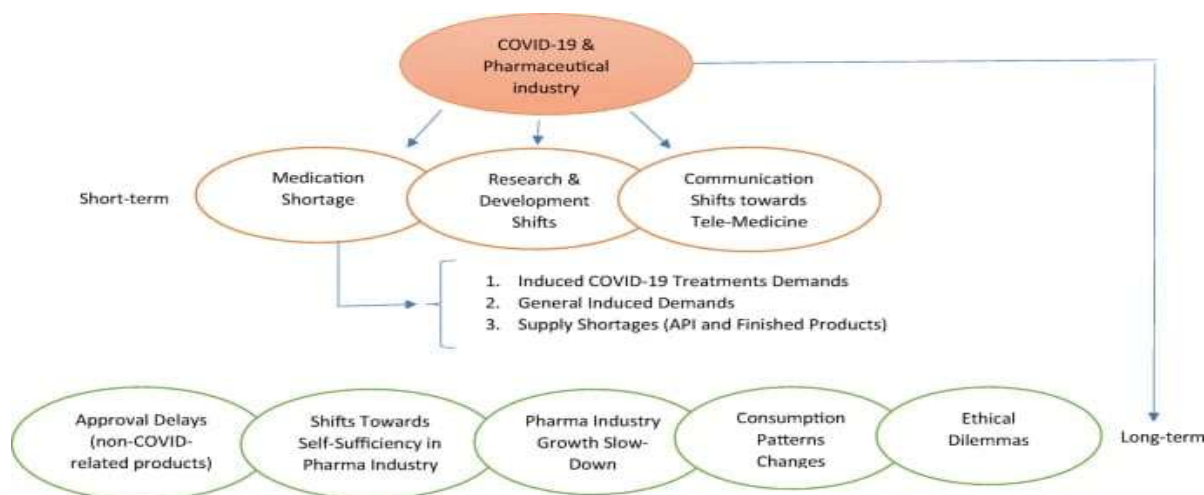


Chart 2 COVID-19 and Pharmaceutical Industry

Source:

https://media.springernature.com/lw685/springerstatic/image/art%3A10.1007%2Fs40199-020-00358-5/MediaObjects/40199_2020_358_Figa_HTML.png

REVIEW OF LITERATURE:

- **(Bhattacharya & Ghosh, 2024)**, conducted a study on the financial performances of select Pharma companies in India during the COVID Period: A Comparative Study. This study evaluates selected pharmaceutical companies' financial results during the COVID-19 epidemic. In order to study financial data from seven randomly selected companies out of twenty listed on NSE sectoral indexes, important ratios such as debtor turnover, inventory turnover, current ratio, debt-equity ratio, profit margins, return on net worth, and EPS were obtained. The study examined four years of financial performance, encompassing both the pre-pandemic and pandemic periods.
- **(Chauhan, 2023)**, conducted a study on the impact of COVID-19 pandemic on India's Pharmaceutical sector with reference to stock market activity and export performance. This study evaluates how well India's pharmaceutical sector performed during the COVID-19 epidemic, with particular attention on exports, government assistance, and stock market returns. The analysis highlights the superior performance of the pharmaceutical industry by comparing stock market returns

across various sectors. India has been successful in meeting the demands of the global pharmaceutical industry, supplying more than 150 nations, according to export data from 2016–2022. The role of the government in assisting the industry is also covered, with a focus on how additional advancements could make the sector self-sufficient.

- **(Daryanto & Mardawiyah Daryanto, 2019)**, conducted a study on financial performance analysis and evaluation of Pharmaceutical companies in Indonesia. This study assesses the financial health of two privately held companies (Kalbe Farma and Darya Varia) and two pharmaceutical SOEs (Kimia Farma and Bio Farma) in Indonesia under the National Health Insurance (JKN) scheme. A variety of financial ratios were examined using certified financial reports from 2010 to 2017, including ROE, ROI, cash ratio, current ratio, collection period, inventory turnover, total asset turnover, and total equity to total assets. Kimia Farma and Darya Varia maintained their AA ratings, indicating solid financial health, while Bio Farma and Kalbe Farma first had AAA ratings before moving up to AA ratings in subsequent years.

PROBLEM STATEMENT:

The COVID-19 pandemic presented new challenges for economies around the world, and India's pharmaceutical sector was vital to the handling of public health emergencies. The sector had to deal with dynamic changes in supply chain logistics, market trends, operations, and regulatory frameworks during this time. To determine the long-term effects on the sector's growth, adaptability, and sustainability, it is important to understand these changes. Prior to COVID-19, the company was known for its consistent growth, targeted innovation, and leadership in international exports. On the other hand, the post-COVID-19 period brought about a rise in the demand for specific pharmaceuticals, a concentration on the development of vaccines, supply chain disruptions, and important legislative changes. These modifications underscore the necessity of conducting a comparative study in order to determine the strategic, operational, and economic changes that the Indian pharmaceutical industry underwent both during and after the pandemic.

RESEARCH OBJECTIVES:

1. To evaluate the growth of selected pharmaceutical companies in India during the pre-COVID-19 and post-COVID-19 periods.

2. To examine the changes in financial performance indicators of pharmaceutical companies in India during the pre-COVID-19 and post-COVID-19 periods.

RESEARCH METHODOLOGY:

The study is based on secondary data. The secondary data has been collected through journals, articles, websites and annual reports of the company. The study is descriptive in nature. The study covers the period from 2016-17 to 2023-24.

SCOPE OF THE STUDY:

The study is limited to assessing the financial performance of selected Pharmaceutical Companies, namely Sun Pharmaceuticals Industries Ltd., Divi's Laboratories Ltd., Cipla Ltd., Torrent Pharmaceuticals Ltd., and Dr Reddy's Laboratories Ltd. Parameters like Total sales, Total Revenue, Cost of Material Consumed, and Net Profit after Tax have only been considered for the study.

SAMPLE SIZE AND SAMPLING:

Based on **Market Capitalization**, information has been extracted from a sample of five Indian pharmaceutical companies. Only pharmaceuticals in the "A" category are taken into consideration for the purpose of research.

Sr. No.	Issuer Name	Security Code	Security Id	ISIN No.	Market Capitalisation (Rs. Cr.)
1.	Sun Pharmaceuticals Industries Ltd.	524715	SUNPHARMA	INE044A01036	430334.21
2.	Divi's Laboratories Ltd.	532488	DIVISLAB	INE361B01024	154742.96
3.	Cipla Ltd.	500087	CIPLA	INE059A01026	118549.66
4.	Torrent Pharmaceuticals Ltd.	500420	TORNTPHARM	INE685A01028	113316.6
5.	Dr. Reddy's Laboratories Ltd.	500124	DRREDDY	INE089A01031	104955.63

Table 1

Source:https://www.bseindia.com/corporates/List_Scrips.html

DATA ANALYSIS AND INTERPRETATION:

The Statistical Analysis has been carried out in the study by using MS-EXCEL AND SPSS (Statistical Package for Social Science) Software. Simple Growth Analysis and

Paired Samples T-Test have been carried out. Analyzed and Interpreted data has been presented in the form of Tables, Charts and Figures.

NORMALITY TESTING

The Shapiro–Wilk test is a more appropriate method for small sample sizes (< 50 samples). The Shapiro–Wilk test is used to determine the normality. In this study, the **P-value** of all the parameters is greater than 0.05 so the null hypothesis is accepted which means that the data is normally distributed.

SIMPLE GROWTH ANALYSIS

Simple growth analysis has been carried out by taking the subtraction of four years of figures of the pre-COVID period (2019-20 to 2016-17) and the post-COVID period (2023-24 to 2020-21). The difference has been divided by base year figures and multiplying by 100. The formula of simple growth analysis is given below:

$$\text{SimpleGrowthAnalysis(Pre – CovidPeriod)} \\ = \frac{\text{Figuresof(2019 – 20)} - \text{Figuresof (2016 – 17)}}{\text{Figuresof (2016 – 17)}} \times 100$$

SimpleGrowthAnalysis(Post – CovidPeriod)

$$= \frac{\text{Figuresof(2023 – 24)} - \text{Figuresof (2020 – 21)}}{\text{Figuresof (2020 – 21)}} \times 100$$

Table 2 Growth in Total Sales

Year	Sun		Divis		Cipla		Reddy		Torrent	
	Total Sales	% of Growth	Total Sales	% of Growth	Total Sales	% of Growth	Total Sales	% of Growth	Total Sales	% of Growth
Pre										
2016-17	77,932.00	60.81	40657.80	30.62	109745.80	15.35	97198.00	21.92	45926.80	34.31
2017-18	79,476.00		38372.30		114448.10		93593.00		42482.40	
2018-19	1,03,232.10		48796.60		123740.10		106255.00		57624.80	
2019-20	1,25,319.30		53105.70		126591.50		118504.00		61684.40	
Average	96,489.85		45,233.10		118631.38		103887.5		51929.6	
Post										
2020-21	128032.10	58.36	67,986.10	12.74	139005.80	19.23	133491.00	45.96	64508.30	32.3
2021-22	155859.80		88,798.20		153808.20		144052.00		67423.20	
2022-23	208121.40		76,253.00		157906.00		169625.00		76952.00	
2023-24	202751.70		76,650.00		165743.40		194838.00		85329.00	
Average	173691.25		77,421.83		154115.85		160501.5		73553.125	
Overall Average/ Growth	2,70,181.10	119.17	1,22,654.93	43.36	272747.23	34.58	264389	67.88	125482.725	66.59

The above table highlights the details of growth in Total Sales during Pre-COVID and Post-COVID periods. The growth of sales in the Pre-COVID period was highest in Sun Pharmaceuticals Industries Ltd. followed by Torrent Pharmaceuticals Ltd., Divi's Laboratories Ltd., Dr Reddy Laboratories Ltd. and Cipla Ltd. while the growth of sales in the Post-COVID period was highest in Sun Pharmaceuticals Industries Ltd. followed by Dr Reddy Laboratories Ltd., Torrent Pharmaceuticals Ltd., Cipla Ltd. and Divi's Laboratories Ltd.

Table 3 Growth in Total Revenue

Year	Sun		Divis		Cipla		Reddy		Torrent	
	Total Revenue	% of Growth	Total Revenue	% of Growth	Total Revenue	% of Growth	Total Revenue	% of Growth	Total Revenue	% of Growth
Pre										
2016-17	83,082.80	69.02	41417.20	32.81	111044.30	22.04	103110.00	22.14	48922.80	30.93
2017-18	90,756.40		39497.10		117796.90		95633.00		45805.50	
2018-19	1,15,746.50		50362.40		129519.30		108639.00		61444.40	
2019-20	1,40,428.50		55004.30		135520.00		125936.00		64053.70	
Average	1,07,503.55		46,570.25		123470.13		108329.5		55056.6	
Post										
2020-21	129534.30	60.12	68,611.40	16.63	141308.60	24.87	141502.00	43.79	65,689.10	31.3
2021-22	165439.00		89,910.80		160475.20		148872.00		69,464.90	
2022-23	210911.70		79,743.10		162473.90		175538.00		77,770.80	
2023-24	207409.30		80,020.00		176450.00		203461.00		86,242.60	
Average	178323.575		79,571.33		160176.93		167343.25		74791.85	
Overall Average/ Growth	2,85,827.13	129.14	1,26,141.58	49.43	283647.05	46.91	275672.75	65.92	129848.45	62.22

The above table gives the information regarding growth in total revenue. The growth of total revenue in the Pre-COVID period of Sun Pharmaceuticals Industries Ltd. is the highest followed by Divi's Laboratories Ltd., Torrent Pharmaceuticals Ltd., Cipla Ltd. and Dr Reddy Laboratories Ltd. while growth in the Post-COVID period of Sun Pharmaceuticals Industries Ltd. is highest followed by Dr Reddy Laboratories Ltd., Torrent Pharmaceuticals Ltd., Cipla Ltd. and Divi's Laboratories Ltd.

Table 4 Growth in Cost of Material Consumed

Year	Sun		Divis		Cipla		Reddy		Torrent	
	Cost of Material Consumed	% of Growth	Cost of Material Consumed	% of Growth	Cost of Material Consumed	% of Growth	Cost of Material Consumed	% of Growth	Cost of Material Consumed	% of Growth
Pre										
2016-17	22,284.50	43.67	15,631.90	39.63	29,560.40	1.46	19,046.00	34.23	11,764.00	15.01
2017-18	21,675.20		15,242.80		33,033.10		20,110.00		9,952.50	

2018-19	27,277.10		20,820.50		31,122.50		21,032.00		12,069.50	
2019-20	32,017.10		21,826.60		29,991.70		25,565.00		13,529.60	
Average	25,813.48		18,380.45		30926.925		21438.25		11828.9	
Post										
2020-21	38,091.10	16.28	23,655.00	35.70	32,629.90	-19.79	32,663.00	0.77	14,208.20	16.3
2021-22	45,849.70		34,397.90		36,166.90		33,784.00		15,286.00	
2022-23	51,656.30		29,794.90		35,027.70		31,614.00		14,774.20	
2023-24	44,293.80		32,100.00		26,172.10		32,915.00		16,519.10	
Average	44972.725		29,986.95		32499.15		32744		15196.875	
Overall Average/ Growth	70,786.20	59.96	48,367.40	75.33	63426.075	-18.33	54182.25	35.00	27025.775	31.27

The above table explains the details of the Cost of Material Consumed by Selected Pharmaceutical Companies during the Pre and Post-COVID period. The growth of the Cost of Material Consumed in Pre-COVID period of Sun Pharmaceuticals Industries Ltd. is the highest followed by Divi's Laboratories Ltd., Dr Reddy Laboratories Ltd., Torrent Pharmaceuticals Ltd. and Cipla Ltd. while the Cost of Material Consumed by Divi's Laboratories is highest followed by Torrent Pharmaceuticals Ltd., Sun Pharmaceuticals and Dr Reddy Laboratories Ltd. in Post-COVID period.

Table 5 Growth in Profit After Tax (PAT)

Year	Sun		Divis		Cipla		Reddy		Torrent	
	Profit After Tax	% of Growth	Profit After Tax	% of Growth	Profit After Tax	% of Growth	Profit After Tax	% of Growth	Profit After Tax	% of Growth
Pre										
2016-17	-228.40	14159.28	10,532.70	30.33	9,749.40	137.78	13,841.00	112.25	8,542.20	9.87
2017-18	-4945.90		8,695.80		14,685.20		5,669.00		4,820.40	
2018-19	8166.00		13,326.50		18,884.10		12,773.00		7,454.20	
2019-20	32111.40		13,727.10		23,181.70		29,377.00		9,385.10	
Average	8,775.78		11,570.53		16625.1		15415		7550.475	
Post										
2020-21	21,397.00	33.58	23,655.00	-33.38	24,682.80	65.19	21,864.00	98.59	11,378.50	19.3
2021-22	-999.90		34,397.90		29,579.30		16,232.00		9,914.50	
2022-23	16,907.20		18,080.00		25,134.70		26,128.00		10,513.90	
2023-24	28,581.80		15,760.00		40,772.50		43,420.00		13,570.80	
Average	16471.525		22,973.23		30042.325		26911		11344.425	
Overall Average/ Growth	25,247.30	14192.87	34,543.75	-3.05	46667.425	202.96	42326	210.84	18894.9	29.13

The above table shows the information on Profit After Tax during the Pre and Post-COVID periods. The Profit After Tax is very high in Sun Pharmaceuticals Industries Ltd., Cipla Ltd. and Dr Reddy Laboratories Ltd. compared to other pharmaceutical companies during the Pre-COVID period while Profit After Tax is highest in Dr Reddy

Laboratories Ltd. followed by Cipla Ltd., Sun Pharmaceuticals Industries Ltd. and Torrent Pharmaceuticals Ltd. while Divi's Laboratories Ltd. profit goes down (negative) in Post-COVID period.

Paired Samples T-Test

In this study, the Paired Samples T-Test is used to assess differences in various parameters of the financial performance of selected pharmaceutical companies during the Pre and post-COVID period.

Paired Samples T-Test I: Comparison of the Total Sales of a Selected Pharmaceuticals Industry.

H0: There is no significant difference in the total sales of the selected pharmaceutical companies during the Pre and Post-COVID period.

H1: There is a significant difference in the total sales of the selected pharmaceutical companies during the Pre and Post-COVID period.

Paired Samples Test

Pair		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre_SP_TS - Post_SP_TS	-77201.4000	22374.2568	11187.1284	-112803.8354	-41598.9646	-6.901	3	.006
Pair 2	Pre_DL_TS - Post_DL_TS	-32188.7250	12292.8064	6146.4032	-51749.3231	-12628.1269	-5.237	3	.014
Pair 3	Pre_C_TS - Post_C_TS	-35484.4750	4794.2050	2397.1025	-43113.1250	-27855.8250	-14.803	3	.001
Pair 4	Pre_DR_TS - Post_DR_TS	-56614.0000	17178.9503	8589.4752	-83949.5435	-29278.4565	-6.591	3	.007
Pair 5	Pre_T_TS - Post_T_TS	-21623.5250	3141.9783	1570.9891	-26623.1136	-16623.9364	-13.764	3	.001

The above table shows the details regarding the Paired Samples Test to assess the difference in the total sales during the Pre and post-COVID period of selected pharmaceutical companies. The **P-value is less than 0.05** for all the selected pharmaceutical companies which means that there is a significant difference in the total sales of selected pharmaceutical companies during the Pre and Post-COVID period.

Paired Samples T-Test II: Comparison of the Total Revenue of a Selected Pharmaceuticals Industry.

H0: There is no significant difference in the total revenue of the selected pharmaceutical companies during the Pre and Post-COVID period.

H1: There is a significant difference in the total revenue of the selected pharmaceutical companies during the Pre and Post-COVID period.

Paired Samples Test

Pair		Paired Differences					T	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre_SP_TR - Post_SP_TR	-70820.0250	20134.3131	10067.1565	-102858.2101	-38781.8399	-7.035	3	.006
Pair 2	Pre_DL_TR - Post_DL_TR	-33001.0750	11744.3978	5872.1989	-51689.0326	-14313.1174	-5.620	3	.011
Pair 3	Pre_C_TR - Post_C_TR	-36706.8000	6029.8989	3014.9494	-46301.7147	-27111.8853	-12.175	3	.001
Pair 4	Pre_DR_TR - Post_DR_TR	-59013.7500	16965.1393	8482.5697	-86009.0724	-32018.4276	-6.957	3	.006
Pair 5	Pre_T_TR - Post_T_TR	-19735.2500	3735.1606	1867.5803	-25678.7240	-13791.7760	-10.567	3	.002

The above table shows the details regarding the Paired Samples Test to assess the difference in the total revenue during the Pre and post-COVID period of selected pharmaceutical companies. The **P-value is less than 0.05** for all the selected pharmaceutical companies which means that there is a significant difference in the total revenue of selected pharmaceutical companies during the Pre and Post-COVID period.

Paired Samples T-Test III: Comparison of the Cost of Material Consumed of a Selected Pharmaceuticals Industry.

H0: There is no significant difference in the cost of material consumed of the selected pharmaceutical companies during the Pre and Post-COVID period.

H1: There is a significant difference in the cost of material consumed of the selected pharmaceutical companies during the Pre and Post-COVID period.

Paired Samples Test

Pair		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre_SP_CMC - Post_SP_CMC	-19159.2500	6083.0466	3041.5233	-28838.7346	-9479.7654	-6.299	3	.008
Pair 2	Pre_DL_CMC - Post_DL_CMC	-11606.5000	5116.2233	2558.1117	-19747.5530	-3465.4470	-4.537	3	.020
Pair 3	Pre_C_CMC - Post_C_CMC	-1572.2250	3614.5492	1807.2746	-7323.7794	4179.3294	-.870	3	.448
Pair 4	Pre_DR_CMC - Post_DR_CMC	-11305.7500	3006.7844	1503.3922	-16090.2149	-6521.2851	-7.520	3	.005
Pair 5	Pre_T_CMC - Post_T_CMC	-3367.9750	1329.1383	664.5691	-5482.9306	-1253.0194	-5.068	3	.015

The above table shows the details regarding the Paired Samples Test to assess the difference in the Cost of Material Consumed during the Pre and Post-COVID period of selected pharmaceutical companies. The **P-value is less than 0.05** for all the selected pharmaceutical companies except Cipla Ltd. which means that there is a significant difference in the Cost of Material Consumed by selected pharmaceutical companies during the Pre and Post-COVID period and there is no difference in the Cost of Material Consumed during the Pre and Post-COVID period of Cipla Ltd..

Paired Samples T-Test IV: Comparison of the Net Profit of a Selected Pharmaceuticals Industry.

H0: There is no significant difference in the net profit of the selected pharmaceutical companies during the Pre and Post-COVID period.

H1: There is a significant difference in the net profit of the selected pharmaceutical companies during the Pre and Post-COVID period.

Paired Samples Test

Pair		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre_SP_NP - Post_SP_NP	-7695.7500	10570.3551	5285.1776	-24515.5438	9124.0438	-1.456	3	.241

Pair 2	Pre_DL_NP - Post_DL_NP	-11402.7000	10636.9619	5318.4810	-28328.4801	5523.0801	-2.144	3	.121
Pair 3	Pre_C_NP - Post_C_NP	-13417.2250	4941.6323	2470.8161	-21280.4647	-5553.9853	-5.430	3	.012
Pair 4	Pre_DR_NP - Post_DR_NP	-11496.0000	2761.3588	1380.6794	-15889.9381	-7102.0619	-8.326	3	.004
Pair 5	Pre_T_NP - Post_T_NP	-3793.9500	1048.8207	524.4104	-5462.8578	-2125.0422	-7.235	3	.005

The above table shows the details regarding the Paired Samples Test to assess the difference in the net profit during the Pre and post-COVID period of selected pharmaceutical companies. The **P-value is less than 0.05** for all the selected pharmaceutical companies except Sun Pharmaceuticals Industries Ltd. and Divi's Laboratories Ltd. which means that there is a significant difference in the profit after tax of selected pharmaceutical companies during the Pre and Post-COVID period and there is no significant difference in profit after tax during the Pre and Post-COVID period of Sun Pharmaceuticals Industries Ltd. and Divi's Laboratories Ltd.

LIMITATIONS OF THE STUDY:

1. The study is limited to secondary data only.
2. Other factors may also influence the pharmaceutical sector during this period.
3. The study only covers from 2016-17 to 2023-24.

CONCLUSION:

The pharmaceutical industry is a key part of India's economy and is expected to grow further. The above analysis concluded that selected pharmaceutical companies grew significantly after the post-COVID period. Revenue from operations and Profit after tax are in increasing trends of selected pharmaceutical companies. The result of the Paired Samples t-Test also suggests that there is a difference in financial performance indicators in the Pre and post-COVID period for the selected pharmaceutical companies. It is also important to know that in some pharmaceutical companies, there is no change in the cost of material consumed but their profit increases significantly, which means that they might have raised their selling price of medications. So far as the pharmaceutical industry is concerned, India is a major player, renowned for its strong and superior production capabilities to satisfy domestic demand. This sector exports medications worldwide, which is vital to global healthcare. The pharmaceutical industry plays a vital role by providing medication at a reasonable price that prevents illness and cures

diseases. Some important medicines should be provided free of cost through government assistance. Through programs like Bulk Drug Parks and the PLI scheme (Production Linked Incentive), the government has assisted the pharmaceutical industry, leading to remarkable growth in the future.

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“A Comparison of Urban and Rural Mutual Fund Investors Buying Behavior for Making Investment in Mutual Funds: A Study of Surat District”

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ABSTRACT:

In recent years, the financial markets have seen a dramatic change due to the widespread availability of information and advances in technology. Currently, investors are able to access an infinite amount of data, market news, and research, which empowers them to make well-informed decisions. The buying behavior of investors are an essential and important part of the financial markets, that influence the dynamics of portfolio management, market movements, and investment decisions. With the assistance of qualified management and the advantages of diversification, mutual funds provide investors with an easy and accessible means to participate in the financial markets. However, this study has been conducted to examine the difference between buying behavior of urban and rural investors of Surat district for making investment in mutual fund. In order to fulfill this objective a structure questionnaire is prepared in google form and 104 investors of Surat's urban and rural mutual fund investors were surveyed. Collected data was analyze by using statistical tools such as frequency and 5-point Likert scale. By analyzing the data, it was found that there are significant disparities between urban and rural mutual fund investors demographic and socioeconomic characteristics, As compare to rural mutual fund investors, urban investors often have higher income levels, greater access to financial products and services, and more knowledge about financial education. In spite of these differences, there is some common patterns in

buying behavior of urban and rural mutual fund investors, because mutual funds are preferred by both urban and rural mutual fund investors for long-term financial planning (goal) and for wealth accumulation. This study will become useful for the mutual fund companies and financial institutions to provide financial knowledge to various segments of the country and tailor their product offerings, marketing tactics and distribution networks to efficiently target and cater to both market segments.

Key words: Mutual funds, buying behavior, urban and rural investors

INTRODUCTION:

Buying Behavior:

The way in which people and organizations make decisions, take actions, and use tactics while they are making investments in the financial markets are referred to as investor's buying behavior. It includes a wide variety of tasks, such as diversifying investment portfolio creation, choosing certain financial instruments like stocks, bonds, or real estate, and deciding whether to buy or sell assets. Simply said, analyzing investor buying behavior entails figuring out why investors select the stocks or ventures they do.

Investors buying behavior is affected by many factors, these factors are of three types namely; psychological, economic and market-related factors. In which psychological factors includes emotions, cognitive biases, individual risk tolerance and behavioral preferences; economic factors include macro-economic circumstances, inflation, interest rates and overall condition of the economy; and market related factors includes the changing pattern of demand and supply, market sentiments and effect of external factors on financial markets.

Mutual Fund:

A mutual fund is a sort of investment vehicles made up of a pool of money that is gathered from several individuals and used to purchase securities like money market instruments, stocks, bonds and other assets. Expert asset managers or investment advisers oversee these funds, allocating assets and trying to generate income or capital gains for fund investors.

Mutual funds come in a variety of forms: 1. balance funds, which invest in a mixture of stocks and bonds; 2. money market funds, which invest in short-term, minimal-risk

securities; 3. specialty funds, which concentrate on particular industries or investment strategies; and 4. equity funds, which invest in stocks.

REVIEW OF LITERATURE:

(Mr.K.Riyazahmed & Dr.MG.Saravanaraj, 2016) studied that consumer psychology-based behavioral theories try to explain how investors' own emotions influence their investment decisions. The psychology that underpins behavioral finance suggests that human decision-making is prone to a number of cognitive biases and illusions (four illusions are: market factors, prospect factors, herding factors and heuristic factors). They found that the decision-making of individual investors in the Indian stock market is significantly influenced by the behavioral characteristics of four factors: herding prospect and market variables.

(Ritter, 2003) studied that the foundation of behavioral finance is psychology, which contends that there are several cognitive illusions that might influence how people make decisions. The two categories of these illusions are those resulting from heuristic decision-making processes and those originating from the enactment of mental frames categorized in the prospect theory.

(Le, Phuoc & Doan, Thi, Thu, 2011) found that there are three factors that have impact on investment decision; first one is prospect (which includes mental accounting, loss aversion, and regret aversion), second one is heuristic (which includes overconfidence and gambler's fallacy), and third one is herding (which includes buying and selling, choosing trading stocks, and speed of herding). Also found that the investment performance is observed to be most positively impacted by heuristic behaviors, while herding behaviors are said to positively influence investment success at a lesser level and also found that the investment is negatively impacted by the behaviors of the prospects.

(Kannan G, 2023)Conducted a study and noticed that there were notable variations in urban and rural consumers buying behavior in terms of brand selection, frequency of purchases, and selection criteria. It was also found that urban consumers were more brand conscious and prefer national and international brands, while rural consumers were more price sensitive and prefer local brands. Also found that quality is also an important element for consumers of both urban and rural areas.

(Panda, 2020) Conducted a study to know whether there is any difference between buying behavior of rural and urban consumers for online shopping or not. By analyzing

the data, it was found that there is a notable difference between buying behavior of rural and urban consumers because rural people have very less knowledge, experience and have trust issues in online shopping. It was also found that demographic, geographic factors, economic standard, standard of living and profession have a positive impact on attitude, perception or buying behavior of rural and urban consumers.

OBJECTIVES OF THE STUDY:

1. To examine various Demographical factors like; Gender, Age, Education, Occupation, Marital Status, Income, Residencial Area and Family Size of Urban and Rural Mutual fund investors of Surat district.
2. To compare Urban and Rural Mutual fund Investors of Surat district in order to find similarities or dissimilarities in their buying behavior for making investment in mutual funds.
3. To examine the goal and Importance level of Urban and Rural Mutual fund Investors of Surat district for making investment in Mutual fund.

LIMITATIONS OF THE STUDY:

1. The major source of information for this study is primary data; hence, the inferences drawn are completely based on responses received from respondents, So the possibility of biased opinion cannot be eliminated.
2. This study has a geographical limitation as it is limited to Surat city only. It may happen that its findings may not be applicable to India's other urban and rural areas or worldwide.
3. This study's findings may have time limit, as investors buying behavior may change by change in time, change in policy, economic fluctuations and other external factors.
4. In this study sampling biased may be involved, if the sample of population does not accurately represent Surat city's total urban and rural population.

RESEARCH DESIGN:

This research study is primarily descriptive in nature, and it is related to examine buying behavior of urban and rural mutual fund investors of Surat city. For this purpose, a structured questionnaire was prepared in google form and 104 investors were surveyed from Surat city's urban and rural areas.

SOURCES OF DATA:

- In this research study, primary data is the main source of data and it is collected through a structured questionnaire made in google form.
- In this research study, secondary data is also collected from numerous books, websites, journal article etc.

SAMPLING PLAN:

- **Population** – Surat district
- **Sampling Unit** – Retail Mutual fund investors from Urban and Rural areas of Surat district
- **Sampling Method** – Non-probability sampling method, i.e., Convenient Sampling
- **Sample Size** – 104, i.e., 52 from Urban area and 52 from Rural area

STATISTICAL TOOLS:

There are a number of statistical methods and tools are available for data analysis and interpretation. Here in this study statistical tools like frequency and 5-point Likert scale is used to analyze the goal of urban and rural mutual fund investors for making investment in mutual fund by comparing their importance level.

DATA ANALYSIS & INTERPRETATION:

Table:1 Respondents invested in mutual fund

		Area of Residence		Total
		Rural	Urban	
Gender	Female	6	16	22
	Male	46	36	82
	Total	52	52	104

The above table shows that in rural area out of 52 respondents, 6 were female and 46 were male, while in urban area out of 52 respondents, 16 were female and 36 were male, which shows that in rural area very few female have invested in mutual fund as compare to male, while in urban area also female investors are less as compare to male but the difference is less, which indicates that urban female have knowledge about mutual fund and would like to invest in mutual fund as compare to rural female. It was also shows

that as compare to urban male rural male have much more knowledge about mutual fund and also, they make investment in mutual fund.

Table:2 Respondents invested in mutual fund

		Area of Residence		Total
		Rural	Urban	
Age	Below 25	36	28	64
	25-35	1	9	10
	36-45	8	8	16
	46-55	7	5	12
	56 and above	0	2	2
	Total	52	52	104

The above table shows that in rural area as well as urban area majority of investors are included in age group category of below 25 which indicates that young generation have knowledge about mutual fund and faith on mutual fund which motivates them to make investment in mutual fund. It was also found that senior citizens have very less knowledge about mutual fund that's why they did not have faith which restrict them to make investment in mutual fund.

Table:3 Respondents invested in mutual fund

		Area of Residence		Total
		Rural	Urban	
Education	Below Higher Secondary	6	3	9
	Higher Secondary	12	6	18
	Diploma	0	1	1
	Bachelor's Degree	31	30	61
	Postgraduation	1	6	7
	Above Postgraduation	2	6	8
	Total	52	52	104

The above table shows that majority of the investors both in rural area and in urban were educated and have Bachelor's degree, so we can say that educated respondents have knowledge about mutual fund and have invested in mutual fund. It was also shows that rural investors having diploma certificate have not invested in mutual fund, while only 1 urban investor have invested in mutual fund.

Table:4 Respondents invested in mutual fund

		Area of Residence		Total
		Rural	Urban	
Occupation	Salaried	19	26	45
	Professional	3	8	11
	Self Employed	3	1	4
	Business	9	7	16
	Other	18	10	28
	Total	52	52	104

The above table shows that both in urban area and rural area majority of investors have salaried occupation which indicates that investors having salaried occupation have knowledge about mutual fund and have invested in mutual fund, and very few investors have invested in mutual fund who have self-employed occupation.

Table:5 Respondents invested in mutual fund

		Area of Residence		Total
		Rural	Urban	
Marital Status	Single	37	31	68
	Married	14	20	34
	Divorced	1	1	2
	Total	52	52	104

Table:7 Respondents invested in mutual fund

	Area of Residence		Total
	Rural	Urban	
No. of children in Family .0	17	22	39
1.0	3	9	12
2.0	20	14	34
3.0	5	5	10
4.0	3	2	5
5.0	3	0	3
12.0	1	0	1
Total	52	52	104

The above table shows that in rural area 37 respondents were single that's why they can make investment in mutual fund, and in urban area 31 respondents were single that's why they can make investment in mutual fund but as compare to single urban mutual fund investors single rural mutual fund investors have more knowledge about mutual fund which motivate them to make investment in mutual fund. The above table also shows that as compare to married urban mutual fund investors, married rural mutual fund investors are less.

	Area of Residence		Total
	Rural	Urban	
No. of Members in a Family 2 members	1	1	2
3-5 members	41	45	86
6-10 members	9	4	13
10 and above	1	2	3
Total	52	52	104

Table:6 Respondents invested in mutual fund

The above table shows that majority of the urban and rural mutual fund investors who have 3-5 members in family have invested in mutual fund but as compare to urban investors rural investors are less. Both in urban and rural area, very few investors have invested in mutual fund who have 10 or more family members and 2 family members.

The above table shows that in urban area majority of investors who have no children in family have invested in mutual fund, while in rural area majority of investors who have 2 children in family have invested in mutual fund. The above table also shows that 0 investors or very less investors have invested in mutual fund who have more than 5 Childrens in family.

Table:8 Respondents invested in mutual fund

		Area of Residence		Total
		Rural	Urban	
Monthly Income	Below 15000	25	15	40
	15001 - 25000	15	13	28
	25001 - 35000	3	5	8
	35001 - 45000	0	3	3
	45001 and above	9	16	25
Total		52	52	104

The above table shows that majority of the rural mutual fund investors who earn monthly income below Rs.15000 have invested in mutual fund, while majority of the urban investors who earn monthly income between 45001 and above. The table also shows that no mutual fund investment is made by rural investors who have monthly income between 35001 – 45000, while very less urban mutual fund investors have invested in mutual fund who earn monthly income between 35001 – 45000.

Table:10 Importance level of mutual fund investors

		Area of Residence		Total
		Rural	Urban	
Rate the Goal of your investment. [Children's Education]	Very	11	9	20
	Unimportant			
	Un-important	4	2	6
	Neutral	5	13	18
	Important	5	10	15
	Very Important	27	18	45
Total		52	52	104

The above table shows that majority of the rural and urban mutual fund investors who have monthly saving below Rs. 3000 have invested in mutual fund but as compare to urban mutual fund investors rural mutual fund investors were more. The above table also shows that very less rural mutual fund investors have invested in mutual fund who have monthly saving between Rs.5001 – 10000 while very less urban mutual fund investors who have monthly saving between Rs.15001 and above.

Here 5-point Likert scale is used to know the importance level of rural and urban mutual fund investors for their goal (Children's Education) for making investment in mutual fund. By analyzing the data, it was found that majority of rural and urban investors have for making investment in mutual fund. While very less urban and rural mutual fund investors have invested in mutual fund considered their goal (children's Education) Unimportant for making investment in mutual fund.

Table:11 Importance level of mutual fund investors

		Area of Residence		Total
		Rural	Urban	
Rate the Goal of your investment. [Family Tour]	Very			
	Unimportant	6	5	11
	Un-important	9	10	19
	Neutral	12	13	25
	Important	10	14	24
	Very Important	15	10	25
Total		52	52	104

Here 5-point Likert scale is used to know the importance level of rural and urban mutual fund investors for their goal (Family Tour) for making investment in mutual fund. By analyzing the data, it was found that majority of rural investors have invested in mutual fund considered their goal (Family Tour) very important for making investment in mutual fund. While majority of Urban investors have invested in mutual fund considered their goal (Family Tour) Important for making investment in mutual fund. The table also shows that very less urban and rural mutual fund investors have invested in mutual fund considered their goal (Family Tour) very unimportant for making investment in mutual fund.

Table:12 Importance level of mutual fund investors

	Area of Residence		Total
	Rural	Urban	
Rate the Goal of your investment.			
Very Unimportant	8	5	13
[Children's Marriage] Un-important	6	4	10
Neutral	10	15	25
Important	9	15	24
Very Important	19	13	32
Total	52	52	104

Here 5-point Likert scale is used to know the importance level of rural and urban mutual fund investors for their goal (Children's Marriage) for making investment in mutual fund. By analyzing the data, it was found that majority of rural investors have invested in mutual fund considered their goal (children's Marriage) very important for making investment in mutual fund. While majority of Urban investors have invested in mutual fund considered their goal (Children's Marriage) Important and Neutral for making investment in mutual fund. While very less urban and rural mutual fund investors have invested in mutual fund considered their goal (children's Marriage) Unimportant for making investment in mutual fund.

Table:13 Importance level of mutual fund investors

		Area of Residence		Total
		Rural	Urban	
Rate the Goal of your investment. [Retirement]	Very Unimportant	9	7	16
	Un-important	4	5	9
	Neutral	12	8	20
	Important	8	9	17
	Very Important	19	23	42
	Total	52	52	104

Here 5-point Likert scale is used to know the importance level of rural and urban mutual fund investors for their goal (Retirement) for making investment in mutual fund. By analyzing the data, it was found that majority of rural and urban investors have invested in mutual fund considered their goal (Retirement) very important for making investment in mutual fund. While very less urban and rural mutual fund investors have invested in mutual fund considered their goal (Retirement) Unimportant for making investment in mutual fund.

Table:14 Importance level of mutual fund investors

		Area of Residence		Total
		Rural	Urban	
Rate the Goal of your investment. [Other]	Very Unimportant	8	7	15
	Un-important	6	1	7
	Neutral	17	16	33
	Important	5	12	17
	Very Important	16	16	32
	Total	52	52	104

Here 5-point Likert scale is used to know the importance level of rural and urban mutual fund investors for their goal (Other than above goal) for making investment in mutual fund. By analyzing the data, it was found that majority of urban and rural investors have invested in mutual fund considered their goal (Other than above goal) neutral for making investment in mutual fund. While very less urban and rural mutual fund investors have invested in mutual fund considered their goal (Other than above goal) Unimportant for making investment in mutual fund.

CONCLUSION:

In this study, buying behavior of urban and rural mutual fund investors were examined and compared. Through comparative analysis various significant findings revealed, that provide insight into the different variables that affect mutual fund investment decision making by urban and rural mutual fund investors. It was also found that there are significant disparities between urban and rural mutual fund investors' demographic and socioeconomic characteristics. As compared to rural mutual fund investors, urban investors often have higher income levels, greater access to financial products and services, and more knowledge about financial education. In spite of these differences, there are some common patterns in buying behavior of urban and rural mutual fund investors, because mutual funds are preferred by both urban and rural mutual fund investors for long-term financial planning (goal) and for wealth accumulation.

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A Study of Corporate Governance Disclosure Practices of Adani Enterprise Ltd.

- Chintan Modi

Abstract

A key component of the contemporary corporate regulation framework is CG disclosure, which includes a company's many forms of information sharing with the public. This paper examines CG disclosure practices in India in the context of CG compliance requirements and disclosure standards as envisioned by Clause 49 of the Listing Agreement. The Report on CG and the Annual Report of Adani Enterprise for the fiscal year 2023–2024 are two main secondary sources of information that we have used.

We have created our own model as a "working" method for this Adani Enterprise study. To determine this company's level of compliance with CG standards, a "point-value-system" has been used. With an overall score of 150 points, we determine that this company has demonstrated "very good" performance based on the disclosures made by the company and a thorough analysis of the outcomes. Notwithstanding many drawbacks, this study will assist us in determining the efficacy of the CG procedures that the Adani group employs. Our research leads us to the conclusion that, while Adani Enterprise Group is leading the way in implementing "best CG practices in India," there is still room for improvement.

Keywords: Corporate Governance, Disclosure Practices, SEBI's Clause 49, Listing Agreement, Adani Enterprise

1. Introduction

Numerous high-profile corporate crises in the United States and other countries during the 1990s led to a thorough examination of the government's regulatory role in safeguarding shareholders' interests. Numerous governance "norms," "codes," "best practices," and "standards" have emerged globally as a result of the increasing number of crises and the widespread public and media outrage that followed. The most well-known of these are probably the OECD corporate governance standards, the Cadbury Committee's recommendations for EU firms, and the Sarbanes-Oxley Act in the United States. Prioritizing disclosure as "a mechanism for accountability," the Cadbury Committee (1992) emphasized the necessity of raising reporting standards to fend off the

danger of regulation. In the 1990s, several high-profile corporate crises in the United States and other countries led to a thorough examination of the government's regulatory role in safeguarding shareholders' interests. The increasing frequency of scandals and the ensuing widespread public and media uproar have led to the emergence of numerous governance "norms," "codes," "best practices," and "standards" all over the world. Among them, the most well-known are perhaps the OECD corporate governance standards, the Cadbury Committee's recommendations for EU corporations, and the Sarbanes-Oxley law (USA). In order to avoid the possibility of regulation, the Cadbury Committee (1992) emphasized the need to enhance reporting standards and promoted disclosure as "a mechanism for accountability."

In the years following the Asian crisis of 1997, there has been considerable pressure placed on the Asian companies to improve their CG. This has included calls for improved transparency, stronger external monitoring, and heightened investor protection (Nowland, 2008). However, rather than taking a regulatory approach (such as the Sarbanes-Oxley Act in the U.S.), Asian countries have implemented "voluntary" CG Codes, advising Companies how to improve their governance and disclosure practices. In recent years, India's thoughts on the CG issue have progressively "crystallized" into the creation of standards for publicly traded corporations. "The codes do encourage companies to implement stronger CG structures and release more information in a timely manner to market participants," to paraphrase Sareen (2009). A reform effort that started in the late 1990s led to the current standards for disclosures of CG activities in India (Verma and Gupta, 2004). Since the mid-1990s, India has really seen the introduction of a number of CG initiatives. The first came in 1998 when the Confederation of Indian Industry (CII) created the "first" CG Voluntary Code (Chakrabarti et al., 2008). As stated in Clause 49 of the listing agreement, the second was conducted by the "Securities Exchange Board of India (SEBI, www.sebi.gov.in). The third was the 2002 report from the Naresh Chandra Committee. SEBI's Narayana Murthy Committee, which also filed its findings in 2002, was the fourth. In August 2003, SEBI amended Clause 49 of the listing agreement based in part on the recommendations of these two committees. Regretfully, the issue is still mostly unresolved for private corporations, which make up the great majority of Indian corporate formations. However, with industry groups and chambers of commerce

themselves advocating for an enhanced CG system, the future of CG in India looks to be noticeably better than the past. It should be noted that even the most prudent norms can be swayed in a system beset by pervasive corruption (Subramanian, 2006).

2. Research Methodology

Following an overview of the concept of CG disclosure and India's experiences with related requirements, a detailed discussion on CG as implemented in Adani Enterprises is presented. This study additionally includes a literature review related to the Adani group overall and specifically to CG at Adani, which serves as the secondary data. Several informal and unstructured interviews were held with a selection of executives from the Adani group to gather primary data on the research subject. The yearly reports of Adani Enterprise were examined with particular attention to "CG Best Practices," as detailed in the Report on CG.

This study employs the "case study" method to examine the corporate governance practices of the Indian company. The company is included in both the BSE Sensex and the NSE Nifty. This firm has been chosen because it is the biggest private sector company and its stock prices affect the fluctuations of the Indian stock market. The choice of the specified period is due to the easy accessibility of the CG Report and Annual Report for the year 2023-2024. This research would provide us with insight into the current status of CG practices and disclosure standards in relation to the recent SEBI Clause 49 of the Listing Agreement. To evaluate the framework and procedures for corporate governance implemented by Adani Enterprise, and to determine its efficacy regarding the substance and quality of corporate governance disclosures in the annual report, we conducted the study in alignment with the statutory and non-mandatory criteria set forth by the revised Clause 49 of the Listing Agreement, along with the provisions outlined in the Companies Act of 2013.

3. Analysis and Discussion of the Findings

The Company recognizes that good CG is a continuing exercise and reiterates its commitment to pursue highest standards of CG in the overall interest of all stakeholders. For implementing the CG practices, Adani Enterprise has a well-defined policy framework, and their effective implementation underpin the commitment of the Company to uphold highest principles of CG. With expert assistance from Indian and international firms, the Company had initiated a program to review its policies and practices of CG with a clear goal, not merely to comply with statutory requirements in

letter and spirit, but also to implement the best international practices of CG, in the overall interest of all the stakeholders. Adani is in the forefront of implementation of CG “best practices”. Keeping in view the Company’s size, complexity, global operations and corporate traditions, the Adani governance framework is based on the following principles:

- Constitution of a Board of Directors of appropriate composition, size, varied expertise and commitment to discharge its responsibilities and duties.
- Ensuring timely flow of information to the Board and its Committees to enable them to discharge their functions effectively.
- Independent verification and safeguarding integrity of the Company’s financial reporting.
- A sound system of risk management and internal control.
- Timely and balanced disclosure of all material information concerning the Company to all stakeholders.
- Transparency and accountability.
- Compliance with all the applicable rules and regulations.
- Fair and equitable treatment of all its stakeholders including employees, customers, shareholders and investors.

Table 1: Application of Self-Developed CGDI on Adani Enterprise

Disclosure Requirement		Score
Whether at least one woman director is there in board of directors?		1
Whether at least fifty percent of the board of directors comprise of non-executive directors?		1
Where the chairman is non-executive director, whether at least one-third of Board comprise of independent directors and in case, chairman is not a regular non-executive director, whether at least half of the board of directors comprise of independent directors?		1
Chairman & CEO Duality		3
1	Promotersexecutive chairmancum-MD/CEO	
2	Non-Promotersexecutivechairmancum-MD/CEO	
3	PromoterNon-Executivechairman	
4	NonPromoterNon-Executive chairman	
5	Non-Executiveindependentchairman	
Appointment of Lead Independent Director		1
Independent Directors:		
Disclosure of all the criteria for being Independent Directors (Definition) is satisfied? (Section 149(6) of The Companies Act, 2013)		1
Limit on Number of Directorships		
Whether a person serve as an independent director in not more than seven listed		1

entities?	
Whether any person who is serving as a whole time director in any listed entity, serve as an independent director in not more than three listed entities?	1
Maximum Tenure of Independent Directors	
Whether is in accordance with the Companies Act, 2013 and rules made thereunder?	1
Formal letter of appointment	
Disclosure of formal letter of appointment along with the detailed profile of independent director on the Website	1
Performance Evaluation of Independent Directors	
Disclosure of the criteria for performance evaluation of independent directors laid down by the Nomination Committee?	1
Whether the performance evaluation of independent directors done by the entire Board of Directors (excluding the director being evaluated)?	1
Whether to extend or continue the term of appointment of the independent director is determined on the Basis of the report of performance evaluation?	1
Separate Meetings of Independent Directors	
Whether the independent directors of a company hold a meeting where only independent directors remain present and no other member or director?	1
Whether the independent directors in the meeting review the performance of non-independent directors and the Board as a whole?	1
Whether the independent directors in the meeting review the performance of the chairperson of the listed entity, taking into account the views of executive directors and non-executive directors?	1
Whether the independent directors in the meeting assess the quality, quantity and timeliness of flow of information between the management of the listed entity and the board of directors that is necessary for the board of directors to effectively and reasonably perform their duties?	1
Training of Independent Directors	
Disclosure of training to independent director to familiarize them with the company, their roles, rights, responsibilities in the company, nature of industry and business model of company	1
Non-Executive Directors' Compensation and Disclosures:	
Whether the compensation payable to Non-Executive Directors, fixed by the Board of Directors?	1
Whether the approval of shareholders is obtained in general meeting with regard to all fees or compensation, paid to non-executive directors beyond the limits prescribed under the Companies Act, 2013?	1
Whether shareholder's resolution specifies the limits for the maximum number of stock options that can be granted to non-executive directors, in any financial year and in aggregate?	0
Other Provisions as to Board and Committees:	
Whether the Board has met at least 4 times a year, with a maximum time gap of 120 days between any two meetings?	1
Whether minimum information to be made available to the Board is as given in Annexure IA to Clause 49 of Listing Agreement / Part A of Schedule II to SEBI Listing Regulations?	1
Whether any of the Directors has informed the company about the committee positions he occupies in other companies and notify changes as and when they take place?	1

Whether any of the Directors is member of not more than 10 Committees in all the companies where he is designated as a director?	1
Whether any of the Directors is a chairman of not more than 5 Committees in all the companies where he is designated as a director?	1
Whether the Board reviewed all the compliance reports of every law applicable to the Company and rectify instances of non-compliances?	1
Whether the independent director Resigns/Removed has been replaced by a new independent Director as per companies act, 2013?	1
Disclosure of plans for orderly succession for appointment to the board and senior management.	1
Code of Conduct:	
Whether the Board of Directors has laid down a code of conduct for all the Board members and senior management of the company?	1
Whether the said code of conduct has been posted on the website of the Company?	1
Whether all members of the board of directors and senior management personnel affirm compliance with the code of conduct of board of directors and senior management on an annual basis?	1
Whether the declaration signed by the chief executive officer stating that the members of board of directors and senior management personnel have affirmed compliance with the code of conduct of board of directors and senior management?	1
Whether the code of conduct suitably incorporate the duties of independent directors as laid down in the Companies Act, 2013?	1
Whether an independent director is held liable, only in respect of such acts of omission or commission by the listed entity which had occurred with his knowledge, attributable through processes of board of directors, and with his consent or connivance or where he had not acted diligently with respect to the provisions contained in these regulations?	1
Whistle Blower Policy:	
Whether the Company has established a vigil mechanism to report unethical behavior or any sort of violation of the company's code of conduct, any actual or suspected fraud?	1
Whether the mechanism provide for safeguards against victimization of the personnel availing it and provide for direct access to the chairman of the audit committee, when needed?	1
Audit Committee:	
Composition:	
Whether the terms of reference of Audit Committee have been approved by the Board of Directors?	1
Whether the Audit Committee has minimum three directors as members out of which at least two/third are independent directors?	1
Whether all the members are financially literate? At least one member is an expert in accounting or related financial management?	1
Whether the Chairman of the Audit Committee is an Independent Director?	1
Whether the chairman of the Audit Committee has remained present at the Annual General Meeting to answer shareholder's query?	1
Whether Company Secretary has acted as a secretary to Audit Committee?	1
Meeting of Audit Committee	
Whether the Audit Committee met at least four times in a year?	1

Whether a gap of not more than four months in between two meetings?	1
Whether the quorum was formed of two members or one third of the total members whichever is greater, and whether minimum two independent directors remained present?	1
Powers of Audit Committee:	
Whether the Audit Committee has exercised the following powers?	
(a) Investigate activity within its terms of reference	1
(b) Seek information from any employee	1
(c) Obtain outside legal or professional advice	1
(d) Secure attendance of outsider with relevant expertise; if necessary	1
Role of Audit Committee:	
oversight of the listed entity's financial reporting process and the disclosure of its financial information to ensure that the financial statement is correct, sufficient and credible;	1
recommendation for appointment, remuneration and terms of appointment of auditors of the listed entity;	1
approval of payment to statutory auditors for any other services rendered by the statutory auditors;	1
reviewing, with the management, the annual financial statements and auditor's report thereon before submission to the board for approval, with particular reference to:	1
(a) matters required to be included in the director's responsibility statement to be included in the board's report in terms of clause (c) of sub-section (3) of Section 134 of the Companies Act, 2013;	
(b) changes, if any, in accounting policies and practices and reasons for the same;	
(c) major accounting entries involving estimates based on the exercise of judgment by management;	
(d) significant adjustments made in the financial statements arising out of audit findings;	
(e) compliance with listing and other legal requirements relating to financial statements;	
(f) disclosure of any related party transactions;	
(g) qualifications in the draft audit report;	
reviewing, with the management, the quarterly financial statements before submission to the board for approval;	1
reviewing, with the management, the statement of uses / application of funds raised through an issue (public issue, rights issue, preferential issue, etc.), the statement of funds utilized for purposes other than those stated in the offer document / prospectus / notice and the report submitted by the monitoring agency monitoring the utilisation of proceeds of a public or rights issue, and making appropriate recommendations to the board to take up steps in this matter;	1
reviewing and monitoring the auditor's independence and performance, and effectiveness of audit process;	1
approval or any subsequent modification of transactions of the listed entity with related parties;	1
valuation of undertakings or assets of the listed entity, wherever it is necessary;	1
evaluation of internal financial controls and risk management systems;	1
reviewing, with the management, performance of statutory and internal auditors, adequacy of the internal control systems;	1

reviewing the adequacy of internal audit function, if any, including the structure of the internal audit department, staffing and seniority of the official heading the department, reporting structure coverage and frequency of internal audit;	1
discussion with internal auditors of any significant findings and follow up there on;	1
reviewing the findings of any internal investigations by the internal auditors into matters where there is suspected fraud or irregularity or a failure of internal control systems of a material nature and reporting the matter to the board;	1
discussion with statutory auditors before the audit commences, about the nature and scope of audit as well as post-audit discussion to ascertain any area of concern;	1
Finding the reasons for substantial defaults in the payment to the depositors, debenture holders, shareholders (in case of non-payment of declared dividends) and creditors;	1
review the functioning of the whistle blower mechanism;	1
approval of appointment of chief financial officer after assessing the qualifications, experience and background, etc. of the candidate;	1
Carrying out any other function as is mentioned in the terms of reference of the audit committee.	1
Review of information by Audit Committee	
Whether the Audit Committee mandatorily review the following information:	
Management discussion and analysis of financial condition and results of operations;	1
Statement of significant related party transactions (as defined by the Audit Committee), submitted by management;	1
Management letters / letters of internal control weaknesses issued by the statutory auditors;	1
Internal audit reports relating to internal control weaknesses;	1
The appointment, removal and terms of remuneration of the chief internal auditor shall be subject to review by audit committee	1
Nomination and Remuneration Committee:	
Whether this committee comprises of at least three directors?	1
Whether all directors of the committee are non-executive directors?	1
Whether at least fifty percent of the directors are independent directors?	1
Whether the Chairman of the Committee is an independent director?	1
Whether the Chairman of the Committee remain present at the Annual General Meeting, to answer the shareholders' queries?	1
Role of Committee	
(1) formulation of the criteria for determining qualifications, positive attributes and independence of a director and recommend to the board of directors a policy relating to, the remuneration of the directors, key managerial personnel and other employees;	1
(2) formulation of criteria for evaluation of performance of independent directors and the board of directors;	1
(3) devising a policy on diversity of board of directors	1
(4) identifying persons who are qualified to become directors and who may be appointed in senior management in accordance with the criteria laid down, and recommend to the board of directors their appointment and removal;	1
(5) Disclose the remuneration policy and the evaluation criteria in its Annual Report.	1
Subsidiary Company:	
Whether at least one independent director on the board of directors of the listed entity is a director on the board of directors of an unlisted material subsidiary, incorporated in India?	1

Whether the audit committee of the listed entity review the financial statements, in particular, the investments made by the unlisted subsidiary?	1
Whether the minutes of the meetings of the board of directors of the unlisted subsidiary are placed at the meeting of the board of directors of the listed entity?	1
Whether the management of the unlisted subsidiary periodically bring to the notice of the board of directors of the listed entity, a statement of all significant transactions and arrangements entered into by the unlisted subsidiary?	1
Whether the company formulate a policy for determining 'material' subsidiaries and disclose in annual report?	1
Whether a special resolution is passed in General Meeting before disposing of shares in its material subsidiary resulting in reduction of its shareholding to less than fifty percent or cease the exercise of control over the subsidiary? (Except in cases where such divestment is made under a scheme of arrangement duly approved by a Court/Tribunal.)	1
Whether a prior approval of shareholders by way of special resolution is obtained for selling, disposing and leasing of assets amounting to more than twenty percent of the assets of the material subsidiary on an aggregate basis during a financial year?	1
Risk Management:	
Whether the company lay down procedures to inform Board members about the risk assessment and minimization procedures?	1
Whether the board of directors constitute a Risk Management Committee?	1
Whether majority of members of Risk Management Committee consist of members of the board of directors?	1
Whether the Chairperson of the Risk management committee is a member of board of directors?	1
Whether the board of directors define the role and responsibility of the Risk Management Committee and delegate monitoring and reviewing of the risk management plan to the committee and such other functions as it may deem fit?	1
Related Party Transactions:	
Whether the listed entity formulate a policy on materiality of related party transactions and on dealing with related party transactions?	1
Whether all related party transactions are approved by the audit committee?	1
Whether an approval of shareholders through special resolution is obtained for all material related party transactions? (The related parties shall abstain from voting on such resolutions.)	1
Disclosures:	
Related Party Transactions	
Disclosures of materially significant related party transactions	1
Disclosure of web link of policy regarding Related party Transactions provided in the Annual Report	1
Disclosure of Accounting Treatment:	
If any different accounting standard or treatment is being used while preparing the financial statement, whether the same must be disclosed with management's explanation?	1
Remuneration of Directors	
Disclosure of all pecuniary relationship & transactions with non-executive directors in the Annual Report	1
Details of remuneration as prescribed In the Annual Report	1

(All elements of remuneration package of directors categorized under groups, details of performance linked incentives along with performance criteria, service contracts, notice period, severance fees, stock option detail if any, disclosure of convertible shares or instruments held by non-executive directors, publish criteria regarding payment making procedure of non-executive directors in its annual report.)	
Disclosure of criteria of payment of non-executive directors in the Annual Report & on the Website of the Company	1
Disclosure of number of shares and convertible instruments held by non-executive directors	1
Disclosure of shareholding, held either by non-executive directors or on a beneficial basis for any other persons in the listed entity in which they are proposed to be appointed as directors, in the notice to the general meeting called for appointment of such director?	1
Management	
Disclosure of Management Discussion & Analysis should include discussion on the following matters:	1
a. Industry structure and developments.	
b. Opportunities and Threats.	
c. Segment—wise or product-wise performance.	
d. Outlook	
e. Risks and concerns.	
f. Internal control systems and their adequacy.	
g. Discussion on financial performance with respect to operational performance.	
h. Material developments in Human Resources / Industrial Relations front, including number of people employed.	
Whether senior Management disclose every financial or commercial transaction where they have a personal interest which may have conflict with the interest of the company.	1
Disclosure of Code of Conduct for the Board of Directors and the senior management	1
Shareholders	
In case of the of a new director or re-appointment of a director whether the shareholders, provided with the following information:	1
a. A brief resume of the director;	
b. Nature of his expertise in specific functional areas;	
c. Names of companies in which the person also holds the directorship and the membership of Committees of the Board	
disclosure of relationships between directors inter-se	0
Disclosure of the quarterly results and presentations	1
Stakeholders Relationship Committee:	
Whether the listed entity constitute a Stakeholders Relationship Committee to specifically look into the mechanism of redressal of grievances of shareholders, debenture holders and other security holders?	1
Whether the chairperson of this committee is a non-executive director?	1
Whether the board of directors has right to decide other members of this committee?	1
Whether the Committee consider and resolve the grievances of the security holders of the listed entity including complaints related to transfer of shares, non-receipt of annual report and non-receipt of declared dividends?	0
To expedite the process of share transfers, whether the Board of the company delegate the power of share transfer to an officer or a committee or to the registrar and share	0

transfer agents? Whether the delegated authority attend to share transfer formalities at least once in a fortnight?	
Disclosure of Resignation of Directors	
Disclosure of Letter of resignation along with reason provided by the Director disclose on website not later than 1 working day from the date of receipt of the letter of resignation.	0
Disclosure of formal letter of appointment	
Disclosure of Letter of appointment of the Independent Director along with the detailed profile discloses on the websites of the company not later than one working day from the date of such appointment.	1
Disclosures in Annual report	
Whether the details of training imparted to Independent Directors disclosed in the Annual Report?	1
Whether the details of establishment of vigil mechanism is disclosed by the company on its website and in the Board's report?	1
Whether the company disclose the remuneration policy and the evaluation criteria in its Annual Report?	1
Proceed from public issue, right issue, preferential issue, etc.	1
Code for prevention of insider trading practices	1
Non-compliance related to capital market matters during last three years	1
CEO/CFO Certification:	
Whether the CEO (or the Managing Director or in their absence a whole-time director and the CFO) certify that they have reviewed the financial statements, and the cash flow statements to the best of their knowledge	1
Whether the CEO (or the Managing Director or in their absence a whole-time director and the CFO) certify that the company to the best of their knowledge hasn't entered any transaction which is violative of Company's Code of Conduct, illegal or fraudulent?	1
Whether the CEO (or the Managing Director or in their absence a whole-time director and the CFO) establish and maintain internal controls for financial reporting and that they have evaluated the effectiveness of internal control systems of the company pertaining to financial reporting and they have disclosed to the auditors and the Audit Committee, deficiencies in the design or operation of such internal controls, if any, of which they are aware and the steps they have taken or propose to take to rectify these deficiencies?	0
Whether the CEO (or the Managing Director or in their absence a whole-time director and the CFO) indicate to the auditors and the Audit Committee any significant changes made in internal control over financial reporting, changes in accounting policies which have been disclosed in the financial statement, instances of significant fraud that they have come across?	0
Report on Corporate Governance:	
Whether a separate section in the Annual report on Corporate Governance is made along with the detailed compliance report on corporate governance?	1
Whether non-compliance of any mandatory requirement with reason there of is highlighted specifically?	1
Non-mandatory Requirement	
Whether a non-executive chairperson is entitled to maintain a chairperson's office at the listed entity's expense and also allowed reimbursement of expenses incurred in	0

performance of his duties?	
Whether a half-yearly declaration of financial performance including summary of the significant events in last six-months, is sent to each household of shareholders?	0
Whether the listed entity move towards a regime of financial statements with audit opinion?	0
Whether the listed entity appoint separate persons to the post of chairperson and managing director or chief executive officer?	0
Whether the internal auditor report directly to the audit committee?	0
Compliance:	
Whether the Company has obtained a certificate regarding compliance of corporate governance and annexed this certificate with the annual report?	1
Additional compliance with regard to stakeholder interest	
Environment, Health and Safety Measures	1
HRD Initiatives	0
Corporate social responsibility	1
Quality improvement programs & certification	1
Research & Development initiatives undertaken	1
Industrial relationship	0
Women security & empowerment	1
Energy conservation initiative	1
Total	134

4. Conclusion

At Adani Enterprise, corporate governance is founded on the ideals of integrity, fairness, equity, transparency, accountability, and dedication to values. Alongside meeting the legal obligations, robust governance systems and practices for transparency, disclosures, internal controls, and the promotion of workplace ethics have been established. The Company acknowledges that effective CG is an ongoing effort and reaffirms its dedication to uphold the highest CG standards for the benefit of all stakeholders. With professional support, the Company launched an initiative to assess its corporate governance policies and practices with a specific aim, not just to adhere to legal obligations in both letter and spirit, but also to adopt exemplary international corporate governance practices, benefiting all stakeholders involved.

To examine the CG practices of Adani Enterprise, the CG segment of the Annual Report has been scrutinized. Following a thorough review and assessment of the governance frameworks, procedures, and disclosures presented in the Corporate Governance Report, the subsequent inquiry is about the level and caliber of governance attained by Adani Enterprise. Certainly, there have been a few real challenges during the course of this research. As a substitute, we created our own model as a 'practical' approach. The approach utilized in this evaluation of the corporate governance standards and quality at Adani Enterprise has taken into account all pertinent conditions outlined in Clause 49 of the Listing Agreement and the requirements of the Companies Act, 2013. To determine the extent of this company's adherence to governance standards, a point-value system has been implemented, assigning appropriate point weightings to these conditions based on their significance. Consequently, Adani Enterprise has received points based on "essential criteria," which make up the governance process within the company. These essential governance parameters and the benchmark for assessing governance standards have been chosen on a hindered-point scale.

Once the overall score was calculated using these criteria, Adani Enterprise and the industry were assessed on a scale displayed in the Table. An assessment of the outcomes indicates that the Company has displayed “very good” performance with a total of 134 points. It also indicates that Adani Enterprise specifically, along with the textile, synthetics, and petrochemical sectors broadly, have demonstrated “very good” results in upholding the standards and achieving quality governance practices.

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A Study of Financial Performance of Merger and Acquisition of Bank of Baroda, Dena Bank, and Vijaya Bank

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ABSTRACT

The merger of Bank of Baroda, Dena Bank, and Vijaya Bank, effective April 1, 2019, marked a significant milestone in the Indian banking sector, aimed at creating a stronger and more competitive financial institution. This study examines the financial performance of the merged entity, focusing on key indicators such as profitability, operational efficiency, asset quality, and shareholder value. By comparing pre and post-merger metrics, including Business per Employee, Earnings per Share, Net Profit Margin, Profit per Employee, Return on Assets and Return on Equity, the study evaluates the merger's impact on financial stability and growth.

The analysis reveals that while the initial phase of integration presented challenges like operational restructuring and cost management, the merger achieved long-term benefits, including enhanced market presence, improved capital adequacy, and better risk management. The study underscores the strategic significance of mergers in achieving economies of scale and addressing systemic issues within the banking sector.

This research provides valuable insights into the outcomes of large-scale banking consolidations and offers a framework for evaluating future mergers in India's financial landscape.

Keywords: Merger, Financial Performance, Bank

1. Introduction

The Indian banking industry plays a crucial role in the country's economic development and has undergone significant reforms over the past three decades. It is categorized into two main types: Scheduled Commercial Banks and Non-Scheduled Commercial Banks. Scheduled Commercial Banks are those registered under Schedule II of the Reserve Bank of India (RBI) Act of 1934, and they are further divided into Public-Sector Banks,

Private-Sector Banks, and Foreign Banks. Public-Sector Banks include nationalized banks, the State Bank of India (SBI) and its associate banks, as well as Regional Rural Banks. Private-Sector Banks are further split into Old Private-Sector Banks and New Private-Sector Banks. Regional Rural Banks, which operate in rural areas, are sponsored by specific banks and supported by state and central governments.

Mergers and acquisitions (M&A) have become key strategies for growth in the banking industry. As defined by Godbole (2013), a merger is “the combination of all the assets, liabilities, loans, and businesses of two or more companies such that one of them survives.” Firms worldwide use mergers and acquisitions to accelerate business growth, expand their reach, reduce competition, and create larger entities.

According to Narayanswamy (2017), financial analysis involves studying a company’s annual report to provide valuable information to decision-makers. When a firm seeks to acquire another, it must evaluate the financial performance of the target company, as a merger can significantly affect the financial position and wealth of all stakeholders. A merger may either positively or negatively impact the acquiring firm’s financial performance, making it essential to carefully assess the target company before proceeding with the deal. A poorly executed merger can result in disappointing financial outcomes.

Mergers can take five distinct forms:

1. **Vertical Merger:** This occurs between two non-competing companies, where one firm’s product is a necessary component of the other’s. It typically happens between companies in different stages of the production or supply chain.
2. **Horizontal Merger:** This involves two companies in the same industry that operate in the same or similar lines of business. They are direct competitors.
3. **Accretive Merger:** This happens when a company with a high price-to-earnings (P/E) ratio acquires a company with a lower P/E ratio, which leads to an increase in the acquirer’s earnings per share (EPS).
4. **Conglomerate Merger:** This type of merger occurs when there is no economic relationship between the acquiring and acquired companies, typically involving businesses from completely different industries.
5. **Dilutive Merger:** A merger is considered dilutive if the acquiring company’s earnings per share (EPS) decrease after the merger. This can occur if the target company is underperforming financially.

In summary, mergers and acquisitions play a critical role in the expansion and evolution of the Indian banking industry, but they require careful financial assessment to ensure they generate the desired benefits.

2. Literature Review

Recent literature on pre- and post-merger financial performance highlights various findings from studies conducted across different countries. Many researchers have observed a positive impact of mergers on financial performance.

For instance, Harrison et al. (1991) analyzed the post-acquisition performance of 1,100 U.S. firms between 1970 and 1989 and found that acquisitions were beneficial for the acquiring companies, leading to improved profitability ratios. Similarly, Lees (1992) concluded that mergers were advantageous for acquiring firms, showing a significant increase in profitability post-merger. Shanmugam and Nair (2004) examined the impact of mergers on the financial performance of 54 Malaysian banks from 1990 to 2000, using a paired t-test, and found that mergers strengthened the financial position of the banks, improving profitability ratios. Feroz et al. (2005) also found a significant enhancement in financial performance following mergers, with improved financial ratios.

Mumcu and Zenginobuz (2005) studied the Turkish banking sector and found that mergers had a positive and significant impact on profitability. In India, Demirbag et al. (2007) found that mergers in the pharmaceutical sector led to increases in return on investment (ROI) and net profit margins. Ramakrishnan (2008) examined mergers in the Indian financial sector between 1996 and 2003 and found improvements in financial performance and rapid growth. A follow-up study by Ramakrishnan (2010) covering 1996–2002 confirmed that mergers enhanced the long-term performance of firms. Similarly, Kilic (2011) studied the financial performance of 10 Turkish banks using data envelopment analysis and observed a significant improvement in profitability post-merger. Dobre et al. (2012) assessed Romanian corporate firms over 2005–2011 and found that mergers improved financial performance and profitability ratios. Francoeur et al. (2012) analyzed Canadian firms from 1990 to 2003 and concluded that mergers resulted in significant improvements in profitability.

Meghouara and Sbai (2013) observed that the merger of the Commercial Bank of Morocco led to a notable increase in profitability. Reddy et al. (2013) investigated Indian banks from 2000 to 2006 and found positive financial performance after mergers.

Ahmed and Ahmed (2014) assessed the performance of Pakistani manufacturing companies from 2000 to 2009, concluding that mergers led to a substantial improvement in profitability. Arvanitis and Stucki (2015) analyzed mergers among small and medium-sized Swiss firms from 2008 to 2010 and found that mergers positively impacted profitability. Joash and Njangiru (2015) concluded that mergers in Kenyan banks between 2000 and 2014 resulted in significant increases in return on investment (ROI) and earnings per share. Rani et al. (2015) studied 305 Indian firms and found that mergers led to significant improvements in return on equity (ROE), return on capital employed (ROCE), and net profit margins. Daniya et al. (2016) examined 24 Nigerian banks and found that profitability ratios increased significantly after mergers. Al-Hroot (2016) found that mergers in seven Jordanian firms improved overall performance.

Das (2014) studied regional rural banks in India and found a positive impact on financial performance, particularly in terms of profitability, following mergers. Patel and Shah (2016) also concluded that mergers in the Indian banking industry (2001–2014) had a positive and significant impact on financial performance.

However, some researchers have found only an average impact of mergers on financial performance, with profitability improving but not to a significant degree. Pawaskar (2001) analyzed the merger activities of Indian corporates between 1996 and 2000 and found no significant improvement in financial performance. Kumar and Bansal (2008) used correlation and chi-square tests to study 74 companies and concluded that while mergers improved financial performance, the improvements were not substantial. Kumar (2009) found that mergers in Indian manufacturing firms between 1999 and 2002 did not lead to significant financial improvements. Uddin and Boateng (2009) examined 373 firms and found that while mergers had a positive effect, the impact on financial performance was not significant. Sufian et al. (2012) analyzed Malaysian banks from 1996 to 2009 and found no significant difference in financial performance post-merger. Ghosh and Dutta (2014) studied 10 telecom companies between 2000 and 2010 and found only a modest improvement in financial performance. Jayaraman et al. (2014) found that Indian banks' financial performance did not show significant improvement immediately after mergers, though profitability began to rise in the third year. Duggal (2015) concluded that mergers in Indian pharmaceutical firms from 2000 to 2006 led to short-term improvements in profitability but no long-term benefits. Patel and Patel (2015) examined four Indian banks from 2005 to 2012 and found limited improvements

in financial performance. Rashid and Naeem (2017) found that mergers in Pakistani corporate firms between 1995 and 2012 did not have a significant impact on financial performance, though profitability ratios showed some improvement.

Some researchers have identified a negative impact of mergers on financial performance. Mantravadi and Reddy (2008) analyzed the financial performance of Indian firms from 1991 to 2003 and found that mergers led to a decrease in various profitability ratios. In another study, Mantravadi and Reddy (2008) concluded that mergers among Indian banking and financial service firms resulted in only marginal improvements in profitability. Kemal (2011) found that mergers between two Pakistani banks from 2006 to 2009 failed to improve financial performance and led to decreased profitability. Lakstutiene et al. (2015) analyzed the post-acquisition performance of 10 Lithuanian firms from 2000 to 2010 and found a negative impact on profitability. Vulcanovic (2017) reported that mergers had a negative effect on the financial performance of industrial firms, with a decline in profitability ratios post-merger. Igbinosa et al. (2017), Singh & Bansal (2017), and Shijaku (2017) found that financial ratios are an essential tool for measuring performance.

Despite the large body of research, most studies on pre- and post-merger financial performance have focused primarily on financial ratios, with fewer considering other important variables, especially those specific to the banking industry. This study aims to address this gap by incorporating additional variables that could provide a more comprehensive analysis of the impact of mergers on financial performance. Based on the literature review, the appropriate variables and statistical tests have been selected for this study.

3. Research Methodology

The aim of this study is to examine the long-term profitability of selected Indian bank Bank of Baroda before and after its merger with Dena Bank, and Vijaya Bank. Specifically, it seeks to compare the financial performance of these banks with the industry average, both prior to and following the merger.

The research employs a descriptive research design and adopts a basic research approach for its analysis.

To evaluate the financial performance, various profitability ratios are used, with reliable data sourced from the bank's official website, as well as reports and publications from the Reserve Bank of India and the Indian Bankers' Association.

3.1 Data

Merger of Vijaya Bank and Dena Bank with Bank of Baroda was effective from April 1 2019. The study considers data from five years before and five years after the merger event, resulting in a total study period of ten years.

So, years before merger are financial years 2014-15, 2015-16, 2016-17, 2017-18 and 2018-19 and years after merger are financial years 2019-20, 2020-21, 2021-22, 2022-23 and 2023-24.

3.2 Variables

To conduct the financial analysis, a range of ratios and variables are utilized, including Business per Employee, Earnings per Share, Net Profit Margin, Profit per Employee, Return on Assets, Return on Equity. These variables have been selected based on their use in previous research studies. While Business per Employee and Profit per Employee are specific to the banking industry, they are crucial for evaluating financial performance in relation to human resources, and therefore, are included in the present study.

A paired t-test is employed to compare the long-term profitability before and after the merger. This test is considered essential for assessing comparative performance and has been widely used by researchers in past studies.

3.3 Hypothesis

The hypotheses for the paired t-test, based on each variable, are outlined below.

H₀₁ : There is no significant difference between Return on Equity (ROE) before and after merger.

H₀₂ : There is no significant difference between Return on Assets (ROA) before and after merger.

H₀₃ : There is no significant difference between Earnings per Share (EPS) before and after merger.

H₀₄ : There is no significant difference between Net Profit Margin (NP) before and after merger.

H₀₅ : There is no significant difference between Business per Employee (BPE) before and after merger.

H₀₆ : There is no significant difference between Profit per Employee (PPE) before and after merger.

The above Null Hypothesis alongwith their respective alternate hypothesis are shown in table below. In this context, the period before the merger is referred to as **PRE**, and the period after the merger is referred to as **POST**.

Variable	Null Hypothesis	Alternate Hypothesis
Return on Equity (ROE)	$ROE_{PRE} = ROE_{POST}$	$ROE_{PRE} \neq ROE_{POST}$
Return on Assets (ROA)	$ROA_{PRE} = ROA_{POST}$	$ROA_{PRE} \neq ROA_{POST}$
Earnings per Share (EPS)	$EPS_{PRE} = EPS_{POST}$	$EPS_{PRE} \neq EPS_{POST}$
Net Profit Margin (NP)	$NP_{PRE} = NP_{POST}$	$NP_{PRE} \neq NP_{POST}$
Business per Employee (BPE)	$BPE_{PRE} = BPE_{POST}$	$BPE_{PRE} \neq BPE_{POST}$
Profit per Employee (PPE)	$PPE_{PRE} = PPE_{POST}$	$PPE_{PRE} \neq PPE_{POST}$

Table 1: Variable wise hypothesis

4. Result and Discussion

Each variable here is compared on the basis of the average value of five years before and five years after the merger, respectively. The results of are depicted below:

Variable	Duration	Mean	S.D.	t-value	Sig.
Return on Equity (ROE) (%)	Pre-Merger	-1.2240	8.5055	-1.900	0.1302
	Post-Merger	8.1000	7.1182		
Return on Assets (ROA) (%)	Pre-Merger	-0.0840	0.4932	-2.069	0.1073
	Post-Merger	0.5500	0.4958		
Earnings per Share (EPS) (₹)	Pre-Merger	-2.2360	15.3719	-1.883	0.1327
	Post-Merger	15.7760	14.8816		
Net Profit Margin (NP) (%)	Pre-Merger	-1.1520	7.8775	-2.050	0.1097
	Post-Merger	8.7620	7.4706		
Business per Employee (BPE) (in Lakh ₹)	Pre-Merger	1935.2804	117.0167	-2.066	0.1077
	Post-Merger	2456.9067	536.8706		
Profit per Employee (PPE) (in Lakh ₹)	Pre-Merger	-0.8989	6.6712	-2.101	0.1036
	Post-Merger	10.6152	10.3730		

Table 2: Pre- and post-merger financial performance of Bank of Baroda

Table 2 shows the comparative profitability situation of Bank of Baroda.

The average Return on Equity (ROE) was - 1.2240 before merger but after merger it has increased to 8.1000. t-value 1.900 and sig value 0.1302 ($p > 0.05$) reveals that after merger the ROE has increased but not increased significantly.

The average Return on Assets (ROA) was - 0.0840 before merger but after merger it has increased to 0.5500. t-value -2.069 and sig value 0.1073 ($p > 0.05$) reveals that after merger the ROA has increased but not increased significantly.

The average Earnings per Share (EPS) was ₹ - 2.2360 before merger but after merger it has increased to ₹ 15.7760. t-value -1.883 and sig value 0.1327 ($p > 0.05$) reveals that after merger the EPS has increased but not increased significantly.

The average Net Profit Margin (NP) was – 1.1520 before merger but after merger it has increased to 8.7620. t-value -2.050 and sig value 0.1097 ($p > 0.05$) reveals that after merger the NP has increased but not increased significantly.

The average Business per Employee (BPE) (in lakhs) was ₹ 1935.2804 before merger but after merger it has increased to ₹ 2456.9067. t-value -2.066 and sig value 0.1077 ($p > 0.05$) reveals that after merger the BPE has increased but not increased significantly.

The average Profit per Employee (PPE) (in lakhs) was ₹ - 0.8989 before merger but after merger it has increased to ₹ 10.6152. t-value -2.101 and sig value 0.1036 ($p > 0.05$) reveals that after merger the PPE has increased but not increased significantly.

5. Summary and Conclusion

The paper employs a paired t-test to analyze the long-term profitability of selected Indian bank before and after their mergers during the period from 2014-15 to 2023-24. The financial performance was evaluated using specific financial variables. All the variables showed positive outcomes. Notably, the profitability of this bank has improved in the post-merger period. However, the increase in these variable are not statistically significant.

While mergers may initially strain financial performance due to integration costs and disruptions, they have the potential to enhance profitability, efficiency, and competitiveness in the long term if managed effectively. The actual impact varies

depending on factors like the strategic fit between merging entities, market conditions, and execution of the merger plan.

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A Study of the Effects of Work-Life Balance on Job Satisfaction

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Abstract:

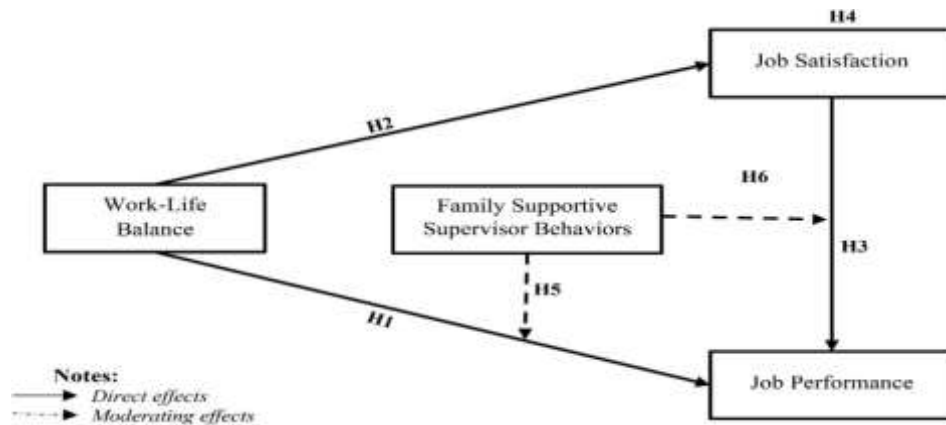
This study explores the effects of work-life balance on job satisfaction, focusing on the historical, current, and future perspectives of the concept. It investigates various strategies and approaches for achieving a healthy work-life balance, such as flexible work arrangements, organizational support, and role management. The research reviews existing literature on work-family conflict, organizational factors, and the role of social support in shaping work-life balance. It also highlights emerging trends, including remote work and technological advancements. The study emphasizes the need for organizations to prioritize work-life balance to enhance employee satisfaction, engagement, and productivity, while also identifying challenges such as emotional exhaustion and work-family conflict that may hinder balance. Recommendations for future research include examining the influence of personality traits, technological advancements, and the impact of organizational policies across diverse settings.

Keywords:

Work-life balance, Job satisfaction, Organizational support, Work-family conflict, Flexible work arrangements

1.1 Introduction:

Work-life balance has become an increasingly important concept in recent years. As the demands of modern workplaces continue to grow, many employees are finding it challenging to strike a healthy balance between their work and personal lives. This imbalance can lead to higher stress levels, which may result in lower job satisfaction and reduced productivity (Adams & Jex, 1999).



Source:

<https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2022.906876/full>

There are several ways to support work-life balance within an organization. Encouraging flexible work arrangements, offering childcare or eldercare services, and providing employee assistance programs are just a few strategies that can help workers maintain a good balance (Allen, Herst, Bruck, & Sutton, 2000). Promoting work-life balance can enhance productivity, improve employee retention, and boost job satisfaction (Baral & Bhargava, 2010). It is widely recognized that work-life balance significantly contributes to job satisfaction. Additionally, recent studies show that it is a strong predictor of employee engagement (Beauregard & Henry, 2009). A healthy work-life balance leads to happier, more productive employees who are more committed to their work, ultimately benefiting business outcomes for employers.

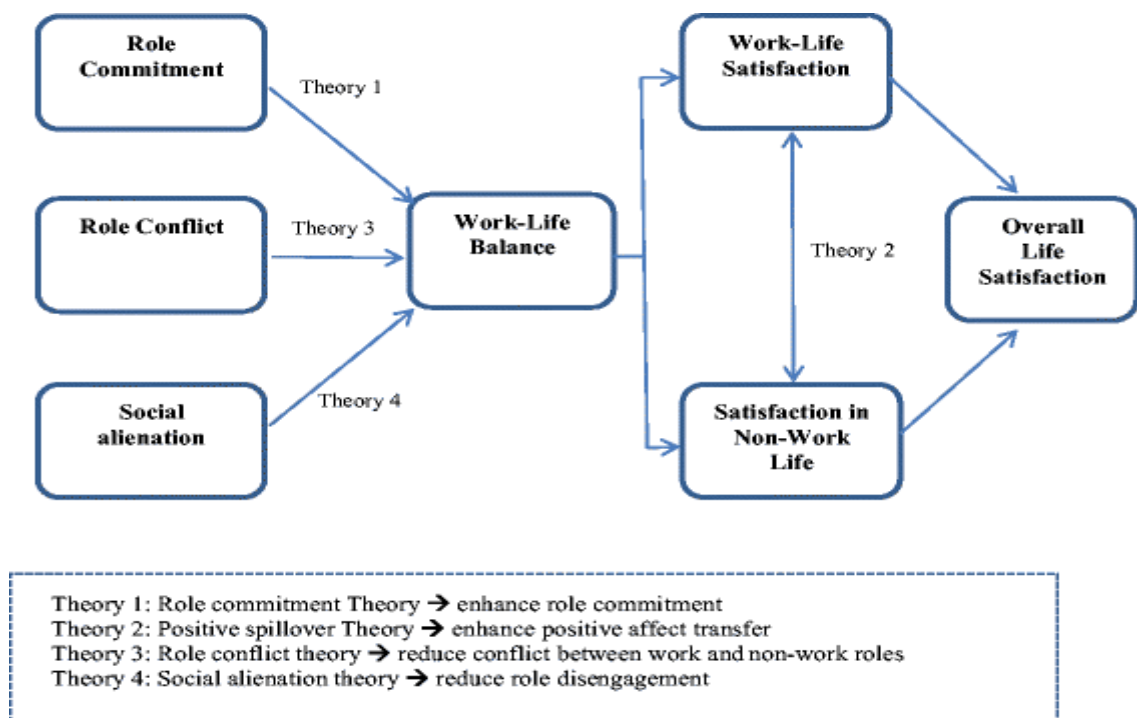
2. The Historical, Current, and Future Perspectives of Work-Life Balance:

Historically, work-life balance was not a significant concern, as work hours were rigid and largely dictated by industrial-era schedules. In the past, employees often worked long hours with limited attention to personal life, as the workplace culture prioritized productivity over well-being (Bianchi & Milkie, 2010).

In the present, there has been a growing recognition of the importance of work-life balance due to changes in societal expectations, technological advancements, and the increasing participation of women in the workforce. Flexible working arrangements, remote work, and employee wellness programs have become common practices as

companies acknowledge the link between employee satisfaction and performance (Carlson, Kacmar, & Williams, 2000).

Looking toward the future, work-life balance is expected to become even more integral to organizational success. Innovations such as AI and automation may reduce working hours, while an emphasis on mental health and well-being will drive companies to adopt more supportive policies (Clark, 2000).



Source: <https://link.springer.com/article/10.1007/s11482-015-9419-6>

As work dynamics continue to evolve, organizations will increasingly prioritize a balanced and flexible approach to foster employee satisfaction and productivity, reducing work-family conflict and enhancing job satisfaction (Dikkers, de Weerth, & van Geert, 2004).

3.Review of Literature:

Adams, G. A., & Jex, S. M. (1999) explored the relationship between time-based stressors and employee strain, with a focus on work-based social support. The study aimed to understand how time-based stressors impact strain and how social support can mitigate these effects. The findings showed that social support plays a significant role in reducing the negative effects of time-based stressors on employees.

Allen, T. D., Herst, D. E. L., Bruck, C. S., & Sutton, M. (2000) reviewed the consequences of work-to-family conflict. The study aimed to explore how work-to-family conflict affects employees and suggested future research directions. The results revealed that work-to-family conflict has a detrimental effect on job satisfaction and overall employee well-being.

Baral, R., & Bhargava, S. (2010) investigated the impact of work-family conflict on organizational commitment and job satisfaction in India. The study aimed to examine the relationship between work-family conflict and these organizational factors. The findings indicated that work-family conflict negatively affects both organizational commitment and job satisfaction.

Beauregard, T. A., & Henry, L. C. (2009) aimed to establish a link between work-life balance and organizational performance. The study focused on how work-life balance influences business outcomes. The results showed that promoting work-life balance leads to improved organizational performance and employee satisfaction.

Bianchi, S. M., & Milkie, M. A. (2010) reviewed research on work and family dynamics. The study aimed to summarize key findings from the first decade of the 21st century. The findings highlighted the growing importance of balancing work and family life and its impact on well-being and job satisfaction.

Carlson, D. S., Kacmar, K. M., & Williams, L. J. (2000) aimed to develop and validate a multidimensional measure of work-family conflict. The study focused on constructing a reliable tool to assess various aspects of work-family conflict. The findings demonstrated the validity of the measure, providing a robust tool for further research on work-family conflict.

Clark, S. C. (2000) proposed the work/family border theory, which offers a new perspective on work-family balance. The study aimed to explain how individuals manage the boundaries between work and family roles. The findings highlighted the importance of borders in managing the balance between work and family life and its impact on individual well-being.

Dikkers, J. S. E., de Weerth, C., & van Geert, P. (2004) explored the role of social support in mitigating work-family conflict and its effect on job satisfaction. The study aimed to investigate how social support in both the work and family domains influences job satisfaction. The findings revealed that social support plays a critical role in reducing the negative impact of work-family conflict on job satisfaction.

Eby, L. T., Casper, W. J., Lockwood, A., Bordeaux, C., & Brinley, A. (2005) conducted a content analysis and review of work and family research in industrial/organizational and organizational behaviour fields. The study aimed to summarize existing literature on work-family issues from 1980-2002. The findings identified key themes in the work-family conflict literature and proposed directions for future research in this area.

Gore, J. S., & Levenson, A. (2006) examined the role of organizational factors in the relationship between work-family conflict and job satisfaction. The study aimed to understand how organizational factors influence the impact of work-family conflict on job satisfaction. The findings indicated that organizational support and policies can help mitigate the negative effects of work-family conflict on job satisfaction.

Greenhaus, J. H., & Beutell, N. J. (1985) investigated the sources of conflict between work and family roles. The study aimed to identify and categorize the sources of work-family conflict. The findings revealed several key sources of conflict, such as time pressures and role strain that hinder individuals' ability to balance work and family life.

Greenhaus, J. H., & Allen, T. D. (2011) reviewed and extended the literature on work-family balance. The study aimed to provide a comprehensive review of research on work-family balance and its implications. The findings highlighted the complex nature of work-family balance and emphasized the need for further exploration of policies and interventions that support it.

Haar, J. M., Russo, M., Suñe, A., & Ollier-Malaterre, A. (2014) explored the relationship between work-life balance and turnover intention, focusing on the mediating role of emotional exhaustion. The study aimed to understand how emotional exhaustion mediates the relationship between work-life balance and employees' intention to leave the organization. The findings revealed that emotional exhaustion significantly mediates this relationship, suggesting that improving work-life balance can reduce turnover intentions.

Higgins, C. A., Duxbury, L. E., & Irving, R. H. (1992) examined work-family conflict in dual-career families. The study aimed to explore how dual-career couples manage work-family conflict. The findings indicated that dual-career families experience significant work-family conflict, which affects their well-being and job satisfaction.

Hill, E. J., Ferris, M., & Martinson, V. (2003) studied the impact of work-site support factors on psychological strain. The study aimed to compare how different work-site

support factors affect employees' psychological strain. The findings showed that organizational support and flexible work arrangements reduce psychological strain and improve employee well-being.

Kossek, E. E., & Ozeki, C. (1998) reviewed the relationship between work-family conflict, policies, and job-life satisfaction. The study aimed to examine how work-family conflict influences job satisfaction and how policies can mitigate these effects. The findings emphasized the importance of supportive work policies in reducing work-family conflict and enhancing job satisfaction.

Lazarus, R. S., & Folkman, S. (1984) published a foundational book on stress, appraisal, and coping. The aim was to understand how individuals cope with stress and how appraisal processes affect stress outcomes. The findings provided a comprehensive model for understanding stress and coping, which has influenced subsequent research on work-life balance.

Maertz, C. P., & Boyar, S. L. (2011) explored work-family conflict, enrichment, and balance under "levels" and "time-based" approaches. The study aimed to examine how different approaches to work-family conflict affect work-life balance. The findings suggested that both conflict and enrichment play critical roles in shaping work-family balance and its effects on employees.

Parker, S. K., & Allen, T. D. (2001) investigated the effects of work-family conflict on job satisfaction, organizational commitment, and turnover intentions. The study aimed to understand how work-family conflict influences various work outcomes. The findings showed that work-family conflict negatively affects job satisfaction and increases turnover intentions.

Robinson, S. P., & Judge, T. A. (2019) authored a textbook on organizational behaviour. The aim was to provide an in-depth understanding of organizational behaviour theories and practices. The findings presented in the book offer insights into how organizational dynamics, including work-life balance, affect employee behaviour and organizational performance.

3.1 Research Gap:

Despite extensive research on work-life balance, several gaps remain. While studies have explored the effects of work-family conflict on job satisfaction, more research is needed on the impact of emerging work trends like remote work. Additionally, the specific role of different types of social support in various organizational contexts has

not been fully explored. Further investigation is also needed into how organizational policies, such as flexible hours, influence work-life balance, especially in diverse settings. Moreover, the impact of personality traits, like resilience, and technological changes on employee well-being remains under-researched.

3.2 Objectives:

1. To explore the impact of flexible work policies on work-life balance.
2. To assess how social support affects work-family conflict.
3. To examine the effect of work-life balance on employee productivity.
4. To investigate how personality traits influence work-life balance.
5. To analyse the role of technology in shaping work-life balance.

4. Approaches for Achieving a Healthy Work-Life Balance:

Achieving a healthy work-life balance requires both organizational and individual strategies to effectively manage the demands of work and personal life. Several approaches can be implemented to support this balance, as suggested by various scholars.

1. **Flexible Work Arrangements:** One of the most widely recommended strategies is offering flexible work options, such as telecommuting, flexible working hours, or compressed workweeks. This enables employees to better manage their time, balancing work with personal or family responsibilities (Eby et al., 2005). Flexible schedules help employees avoid burnout and improve their overall well-being.
2. **Organizational Support:** Organizational factors, such as supportive workplace cultures, play a critical role in facilitating work-life balance. Providing resources like child care assistance, wellness programs, and parental leave policies can help alleviate the strain between work and family roles (Gore & Levenson, 2006). Such support not only enhances employee satisfaction but also boosts organizational loyalty and commitment.
3. **Role Management:** Greenhaus and Beutell (1985) emphasize the importance of role management, where individuals are encouraged to clearly define and differentiate their work and family roles. Strategies such as setting boundaries, prioritizing tasks, and managing expectations can reduce role conflict and promote balance.

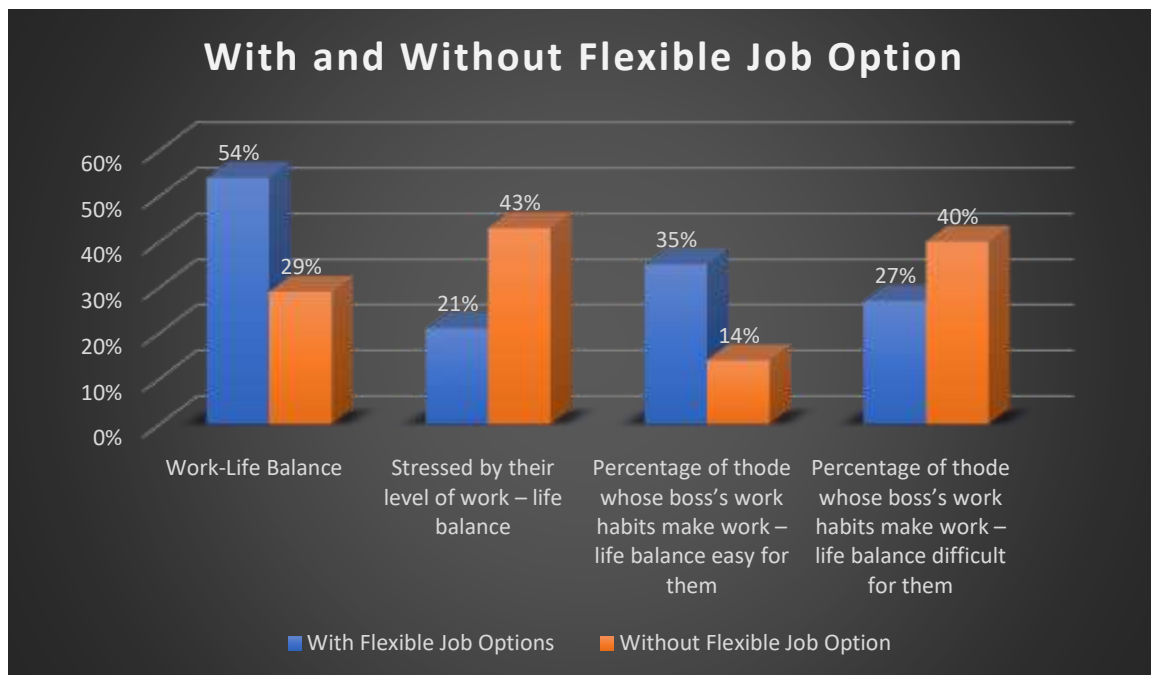
4. **Time Management and Prioritization:** Greenhaus and Allen (2011) suggest that effective time management and prioritization of tasks are essential for managing both work and family responsibilities. By organizing their schedules and focusing on essential tasks, employees can reduce stress and improve productivity at both work and home.
5. **Stress Management Techniques:** Implementing stress-reduction practices, such as mindfulness, relaxation exercises, and time for self-care, is another effective approach to work-life balance. These techniques help employees manage stress and improve their resilience, ensuring they can cope with the pressures of both work and personal life (Eby et al., 2005).

By integrating these strategies, both organizations and employees can create an environment where work-life balance is prioritized, leading to improved job satisfaction, increased employee engagement, and better overall productivity.

Table 1: With and Without Flexible Job Option (Source: <https://clockify.me/work-life-quality-balance>)

Aspect	With Flexible Job Options	Without Flexible Job Option
Work-Life Balance	54%	29%
Stressed by their level of work – life balance	21%	43%
Percentage of those whose boss's work habits make work – life balance easy for them	35%	14%
Percentage of those whose boss's work habits make work – life balance difficult for them	27%	40%

Graph 1: With and Without Flexible Job Option



The data shows that flexible job options greatly improve work-life balance. 54% of employees with flexibility report a good balance, compared to 29% without it. Only 21% of those with flexible options feel stressed by work-life balance, while 43% without flexibility experience stress. Additionally, 35% of employees with flexible work feel their boss's habits make balancing easier, compared to just 14% without flexibility. On the flip side, 40% of those without flexible options feel their boss's work habits complicate balance, compared to 27% of those with flexibility. Overall, flexibility and supportive leadership reduce stress and improve balance.

5. Time Management and Prioritization

Time management and prioritization are crucial for maintaining work-life balance, especially in contexts of dual-career families and workplaces offering different levels of support. Proper time management strategies allow employees to allocate their time effectively between work and personal responsibilities, reducing stress and enhancing job satisfaction.

In their study, **Higgins et al. (1992)** explore the challenges of work-family conflict within dual-career families. They discuss how time management and role prioritization are critical to managing the competing demands of work and home life. The study highlights that individuals in dual-career families often face difficulty allocating time to both their professional and personal roles, leading to conflict. Proper time management strategies, such as scheduling and task prioritization, can help mitigate these challenges.

The ability to organize and prioritize tasks is essential for minimizing stress and avoiding burnout.

Hill et al. (2003) examine how different work-site support factors, such as flexible work arrangements and organizational support, impact psychological strain. One key finding is that better time management can be supported by organizational policies, like flexible working hours, which allow employees to prioritize personal tasks without neglecting their work responsibilities. They argue that effective time management is not just an individual skill, but something that can be influenced by organizational policies and practices. By fostering an environment that allows employees to manage their time effectively, organizations can reduce the psychological strain caused by work-life conflict.

In their review, **Kossek and Ozeki (1998)** analyse work-family conflict and its relationship with job-life satisfaction, highlighting the importance of policies that aid in time management. The study suggests that organizations offering supportive work-family policies (e.g., flexible schedules, telecommuting) can help employees better manage their time. These policies allow employees to prioritize their personal life without sacrificing professional commitments. The authors emphasize that when employees can better manage and prioritize their work and personal time, they are likely to experience higher job satisfaction and lower work-family conflict.

6. Challenges and Opportunities for Maintaining Work – Life Balance

Emotional Exhaustion: Employees often experience burnout due to constant work demands, leading to emotional exhaustion, which can impact work-life balance (Haar et al., 2014).	Employee Assistance Programs (EAPs): Organizations can implement EAPs to provide emotional and mental support, helping employees cope with stress and reduce emotional exhaustion (Haar et al., 2014).
Work-Family Conflict: Balancing work and family responsibilities can create role strain, especially in dual-career families (Higgins et al., 1992).	Flexible Work Arrangements: Offering flexible work hours or remote work options can ease work-family conflict, allowing employees to manage both work and family responsibilities (Higgins et al., 1992).

Lack of Organizational Support: Many workplaces lack sufficient policies or resources to help employees manage work-life balance, leading to dissatisfaction and higher turnover (Haar et al., 2014).	Supportive Workplace Culture: Cultivating a supportive organizational culture that values work-life balance can enhance job satisfaction and reduce turnover (Haar et al., 2014).
Inflexible Job Structures: Traditional job structures with rigid hours and high workload demands can make it difficult for employees to find time for personal or family obligations (Higgins et al., 1992).	Job Redesign: Modifying job roles to include flexible work options and task-sharing can reduce stress and increase work-life balance (Higgins et al., 1992).
Overwork and Job Insecurity: Employees may feel pressure to overwork to meet job demands or job insecurity, leading to unhealthy work-life integration (Haar et al., 2014).	Work-Life Balance Policies: Introducing policies like paid parental leave, wellness programs, and time-off policies can encourage employees to take breaks and maintain a healthy work-life balance (Haar et al., 2014).

This table highlights the key challenges employees face in balancing work and life, as well as the opportunities that can help organizations and employees foster a healthier work-life balance.

Conclusion:

Work-life balance is a critical factor influencing job satisfaction, employee well-being, and organizational productivity. As modern work environments evolve, the importance of promoting a balance between professional and personal life has grown significantly. Various factors, such as flexible work arrangements, organizational support, and the adoption of supportive workplace cultures, play a crucial role in achieving work-life balance. However, challenges such as emotional exhaustion, work-family conflict, and lack of organizational support persist. Addressing these challenges through comprehensive policies and initiatives can lead to enhanced employee satisfaction, reduced turnover, and improved organizational outcomes. Looking forward, as technology and societal norms continue to evolve, work-life balance will remain an essential component of workplace success.

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A Study on Common Fraudulent Practices and Possible Prevention Mechanism with special reference to Chartered Accountants of Gujarat.

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Abstract

Fraud is as old as falsehood and as versatile as human ingenuity. Fraud essentially includes deliberate deception or concealment made with an intention of obtaining unfair advantages that we are not entitled. As mentioned in an article of The New India Express, India has been losing a staggering 100 crore every day over the last seven years to fraud when it comes to financial services sector. Globally companies are constantly dealing with fraud and compliance challenges. Surprisingly, out of all cases of frauds only 10% cases are registered and others remained to be unnoticed for very long time until it becomes giant and threaten the survival of the company or cause huge economic damage. It is very important for company management as well as regulators to detect the fraud as early as possible to reduce the large impact on economy at the same time enough attention must be given on preventive mechanism that shrinks opportunities for the frauds to be committed. The presented paper emphasis on finding out the most common types of fraudulent practices followed by companies in Gujarat and with the help of descriptive analysis top 5 common frauds and preventive mechanism has been found. For this, first hand data has been collected from Chartered Accountant who usually is responsible to detect frauds. From the study it has been found that E-commerce, internet and cyber frauds and internal reporting are on the top out of 5 most common frauds. Where else, an efficient whistle blower program and zero tolerance for graft tone at the top would be the best solution to avoid any future fraud.

Key words: Corporate fraud, fraudulent practices, fraud detection, fraud prevention

Introduction

The root of the word fraud is traced back from the Latin word “Fraus, Fraudis”, which means “Trick”. It largely covers activities such as theft, corruption, conspiracy,

embezzlement, money laundering, bribery and extortion. It can be found present with us for long in one or other forms. In the world of business, opportunities for the fraud have increased due to highly integrated and volatile Global economies coupled with increasing business & technological complexities. Companies at a global level, constantly deal with fraud and compliance challenges. In current economic conditions where individuals and companies suffered a lot financially, management is more tempted to engage in the illegitimate act of deception to maintain the lifestyle and business position they enjoyed in their good times. It has been found that; media has reported high profile, multi-million and multi-national frauds whereas, small companies are found to be more vulnerable to frauds and such frauds are difficult to be noticed easily. As per the ACFE report, small business with less than 100 employees, suffer fraud more frequently than large organisations and are hit by higher average losses.

With the passage of time, companies have become crafty in committing frauds. In addition to the traditional fraudulent practices, white collar crimes are found to be increasing. Involvement of management and employees as well as use of technology and crypto currency becomes new weapons to extort undue benefits. This does not only jeopardise the very existence of the company in long run but also affects the economy and investors at large. It has been observed that most of the frauds are undetected for so long that when uncovered, it has damaged the economy of the country severely. It becomes immensely important to detect the underlying fraud before it gets bigger and more importantly institutionalising system that prevent future possibilities of frauds.

Types of Fraud

Fraud is broad legal concept covering different intentional activities undertaken to secure an unfair or illegitimate gain. These deliberate activities against the good of companies be classified in to three; Internal, External and Fraud against Individuals.

Internal Fraud:- Internal fraud is a category of frauds committed by people inside organisation. The fraudster may be manager, executive or any member of board who is engaged in manipulative activities in order to fulfil the personal financial goals at the cost of business or people at large. It includes; asset misappropriation, fraudulent statement and corruption etc. Most of the companies are found heavily involved in this type of frauds in comparison to other two.

External Fraud:- External fraud is committed by outsiders. As the scope of the business has extended both geographically and business portfolio wise, there are many outside

partners such as; suppliers, distributors, dealers and other fraudsters not associated with business or company. It may include; bid rigging schemes, bad cheques, offering and demanding bribes, cyber-crime, identity theft, theft of intellectual property etc. In this case, companies are found to be victim and will have to face the losses which may lead to the losses to government, banking system and investors.

Fraud against Individuals:- These category of frauds includes variety of schemes to cheat individuals. Most of these schemes are investment frauds such as Ponzi schemes and Pyramid schemes, which offers lucrative return to investors. Other schemes include phishing schemes and identity theft, cloning of cards wherein individuals are cheated by asking personal confidential information. India has witness very infamous case of Sharda Chit fund and Sahara where in companies have promised high return but fail to return even principle amount yet.

Fraud Prevention Mechanism

Current practices of fraud detection is heavily relied on audit however, to prevent fraud, an effective control system may prove to be important. There is an existence of rules/guidelines and strong adherence of the same will ensure fair reporting of data. There are sophisticated softwares used for data mining, processing and reporting. However, use of such tools alone cannot deal with future possibilities of fraud. These techniques merely help in detecting on-going fraud, but in order to reduce or eliminate the future possibilities of fraudulent activities, an effective internal control system is required. Existence of such a system enables organisations to create environment that encourages ethical conduct and prove to be a long term solution to deal with the problem of fraud.

There are different approaches to deal with frauds. These may range from creating ethical environment by establishing code of conduct in the organisation, developing an organisational structure discouraging fraudulent activities to the more sophisticated software for data mining and data analysis. This variety of ways reduces the opportunities present in the organisation that discourage the fraudsters and fraudulent behaviour.

Objective of the study

The study is intended to know common types of fraud that companies are engaged into and some preventive mechanism suggested by auditors of Gujarat state.

Literature Review

Albrecht et al (1995 cited in Allyne& Howard 2005) classified fraud in to “employee embezzlement, management fraud, investment scams, vendor fraud, customer fraud and miscellaneous expenses. Wilks and Zimbelman (2004) highlight the importance of audit policy and action plans to improve fraud prevention and detection. Pollick (2006) fraud also involves complicated financial transactions conducted by white collar criminals, business professionals with specialized knowledge and criminal intent. Bhasin (2013) has conducted an empirical study on skills required for accountant to locate frauds. The researcher observed that accounting frauds and scams are perpetual, fraud occur in all countries across organization irrespective of industry, size or location. And to detect fraud, forensic accountants or experts need some special and extraordinary skills along with the sixth’ sense. He has also suggested in his another study in (2015) need for stiff penalties, exemplary punishments and effective enforcement of law with the right spirit to lower the increasing rate of white collar crimes.

Research design

To carry out this research, researcher has used a mix of Exploratory and Descriptive approach. For the study, data has been collected with the help of questionnaire from 362 Chartered Accountants of Gujarat state and people directly associated with the firms and are experts in the field of accounting having experience of more the 10 years. To fulfil the objective of the study, descriptive analysis and coefficient of variation is used to find top five types of fraud experience and most favoured mechanism to prevent future frauds.

Data Analysis

✦ Most serious Type of Fraud

CAs were asked to give their opinion about how much serious a particular type of fraud is and interestingly it is found that for most of the types of frauds respondents are either strongly agree or agree indicating irrespective of type of fraud, any fraudulent practice is definitely considered to be serious. However, more specifically study revealed 47% respondents strongly agree that managerial fraud is most serious followed by corruption and bribery with 39% and Fraud for personal gains over organisational with 34%. Whereas, if responses in favour of agree considered, 53% respondents agree that asset misappropriation is the serious fraud followed by financial statement fraud (50%), corruption and bribery (43%) and fraud for personal gain over organisational (41%).



Figure:-1

✦ Most Common Type of Fraud

The following chart showcase the most heard and experience fraud by the respondents in this study. Out of all bribery and corruption is the most experienced fraud (87%) followed by E-commerce, internet and cyber related fraud (61%). Financial statement fraud (60%), Diversion/theft of funds or goods (58%), regulatory non-compliance (45%) and money laundering (43%) are widely experienced frauds. At the same time intellectual property fraud (44%) and internal reporting fraud (39%) are moderately experienced.

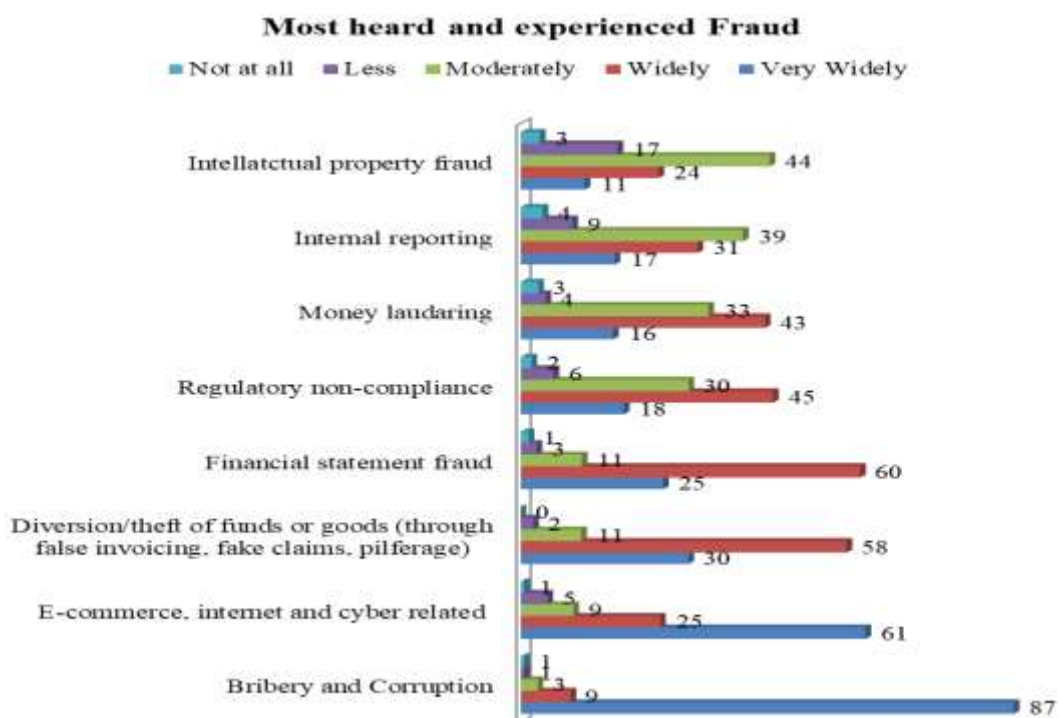


Figure:-2

✦ **Top five common Type of Frauds**

From the descriptive analysis it can be seen that, E-commerce, internet and cyber related fraud has the highest coefficient of variation i.e. 55.27% and thus, is the 1st ranked fraud followed by bribery and corruption (47.15%), Internal reporting (39.57%), financial statement fraud (39.44%) and e-commerce, regulatory non-compliances (39.19%)

Descriptive Statistics						
	N	Mean	Std. Deviation	Variance	Coefficient of Variation	Rank
Bribery and corruption	362	1.1878	.56004	.314	47.15%	2
E-commerce, internet and cyber related fraud	362	1.5967	.88245	.779	55.27%	1
Diversion/theft of funds or goods (through false invoicing, fake claims, pilferage)	362	1.8564	.68730	.472	37.02%	
Financial statement fraud	362	1.9530	.77030	.593	39.44%	4
Regulatory non-compliance	362	2.2873	.89647	.804	39.19%	5
Money laundering	362	2.3481	.90878	.826	38.70%	
Internal reporting (example: MIS reports related fraud)	362	2.5249	.99900	.998	39.57%	3
Intellectual Property Fraud	362	2.7680	.97405	.949	35.19%	

(counterfeiting, piracy)						
Valid N (list wise)	362					

Table:- 1

★ Solution to reduce Future Frauds

The following figure shows that respondents are strongly agreed for commitment towards duties (66%) and use of XBRL (eXtensible Business Reporting Language) mode of accounting (61%) as most preferred solution to reduce future fraud. On the same line those solutions which are agreed by respondents are corporate responsibility (79%) and ethical climate creation (70%). For rest of the solutions around 30 to 40 % respondents are strongly agreed as well as agreed.

Solutions to reduce future frauds

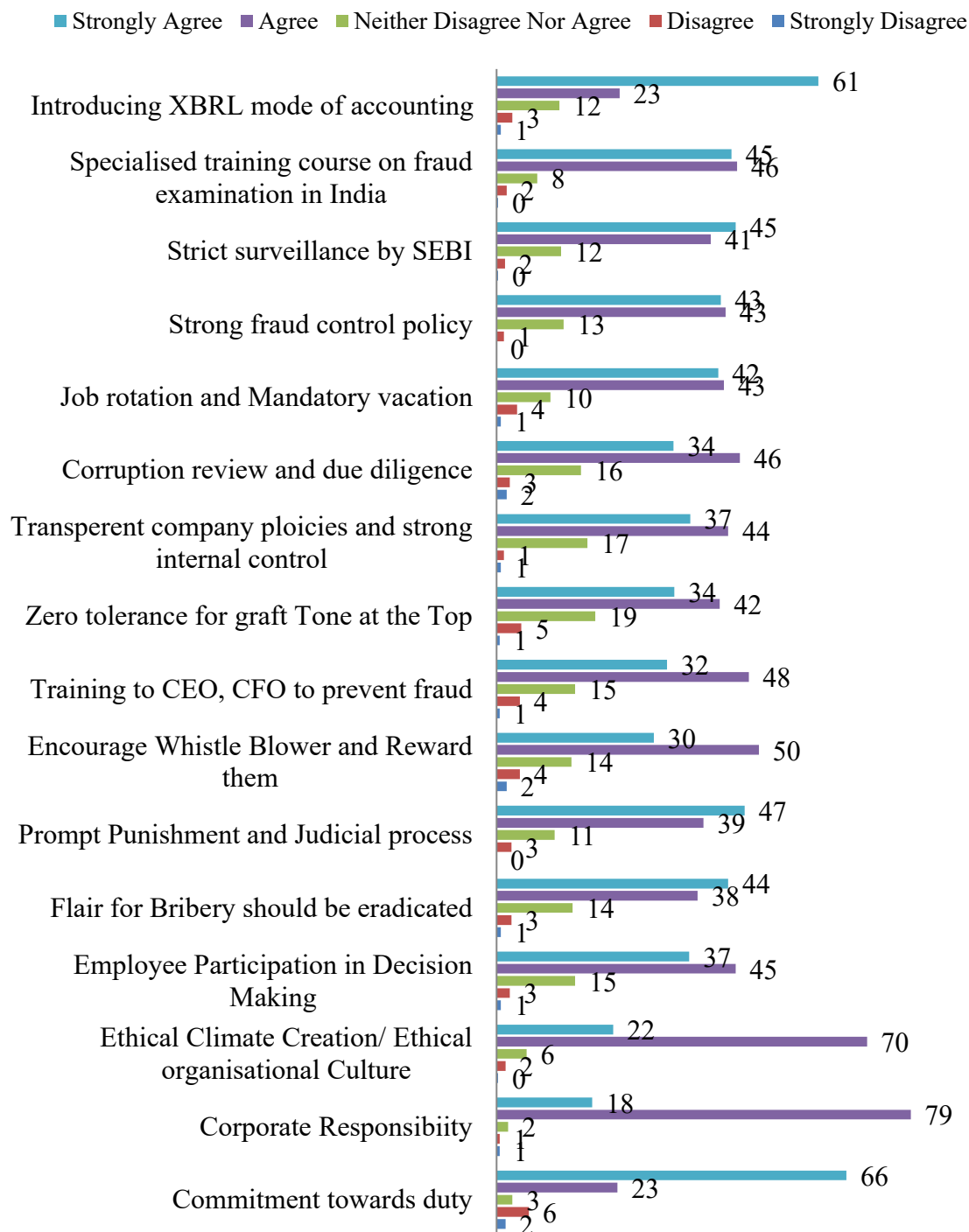


Figure:- 3

★ Top five solutions to prevent future frauds

From the descriptive analysis of solutions to reduce future frauds, encouraging whistle blowers and rewarding them is the one on the first place with highest coefficient of

variation of 21.19% and subsequently followed by zero tolerance for graft tone at the top (21.63%), corruption review and due diligence (21.52%), commitment towards duty (20.97%) and training of auditors/internal auditors/CEO/CFO relating to prevention of frauds (20.50%).

Descriptive Statistics						
	N	Mean	Std. Deviation	Variance	Coefficient of Variation	Rank
Commitment towards duty	362	4.4613	.93554	.875	20.97%	4
Corporate responsibility	362	4.1326	.50929	.259	12.32%	
Ethical climate creation/ethical organization culture	362	4.1215	.59697	.356	14.48%	
Employee participation in decision making	362	4.1409	.81844	.670	19.76%	
Flair for bribery should be eradicated	362	4.2155	.85060	.724	20.18%	
Prompt Punishment and judicial process	362	4.3039	.77455	.600	17.98%	
Encouraging whistle blowers and rewarding them	362	4.0110	.89001	.792	22.19%	1
Training of auditors/ internal auditors, CEO, CFO relating to prevention of frauds	362	4.0691	.83430	.696	20.50%	5
Zero tolerance for graft tone at the top	362	4.0387	.87352	.763	21.63%	2
Transparent company policies and strong internal control	362	4.1436	.80602	.650	19.45%	
Corruption review and due diligence	362	4.0663	.87503	.766	21.52%	3
Due diligence on third parties for	362	4.0939	.83352	.695	20.36%	

fraud						
Job rotation and mandatory vacation	362	4.2155	.84078	.707	19.95%	
Strong fraud control policy	362	4.2707	.73207	.536	17.14%	
Strict surveillance by SEBI	362	4.2901	.76369	.583	17.80%	
Specialized training course on fraud examination in India like CFE.	362	4.3204	.72324	.523	16.74%	
Introduction of XBRL mode of accounting.	362	4.4061	.87328	.763	19.82%	
Valid N (list wise)	362					

Table:- 2

Conclusion

It is evident from the data that, companies definitely follow regulatory compliances however; greatly involved in bribery/corruption, e-commerce & cyber-crimes and financial statement frauds to take undue financial gain. It has also been seen that companies are engaged in manipulating financial data to speculate stock market so as to get advantage of market volatility at the cost of investors' interest. Increasing financial greed and global level of competition has made companies tempted to engage in unethical practices. Such behavioural ingenuity and lake of integrity along with the increasing risk of cyber-crime seem to be major threats which can only be taken care of by an effective internal control system and use of monitoring software that leaves no room for fraud. Companies should emphasis on developing a rewarding and safe whistle blower programme that encourages employees to report any malpractices undergoing in the organisation. Lastly, it is extremely important to create an environment that fosters due diligence and ethical behaviour.

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A Study on Trends of FinTech Funding in India

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Abstract:

The Indian fintech ecosystem has been emerged as a dynamic and rapidly evolving sector. The Fintech ecosystem is divided into various segments such as BankingTech, LendingTech, PayTech, RegTech, WealthTech, and InsureTech. Each have shown diverse funding trajectories and reflects growth opportunities. This study explores various key aspects of fintech funding in India by analyzing the trends in funding across different segments and by conducting a comparative study on funding patterns among these segments. A trend analysis conducted using linear regression models revealed statistically significant positive growth trend for BankingTech segment. Other segments revealed positive trends, but they are not statistically significant due to high variability or limited growth. One-way ANOVA test was conducted to study difference in funding pattern, which indicated significant disparities across segments. The post-hoc analysis using Tukey's HSD test showed that PayTech segment received significantly higher fundings compared to RegTech, WealthTech and InsurTech segments. The findings of the study emphasized the uneven distribution of funding between various fintech segments. Established segments like PayTech and BankingTech are attracting substantial investments. At the same time the segments like RegTech, WealthTech, and InsureTech which are new in the FinTech ecosystem have received considerably less funding amount.

1. INTRODUCTION

Financial Technology, or fintech, refers to the combination of technology and financial services for improvement in usage and efficiency. Fintech uses advanced technologies like artificial intelligence (AI), blockchain, and big data analytics, to reshape the traditional banking, payments, lending, insurance and wealth management. Fintech

makes the financial services democratic by making it more accessible and also contribute to the economic growth by increasing financial inclusion.

In India, fintech has emerged as a key driver of digital transformation, which aligns with the government efforts for a digital and cashless economy. India's fintech journey began in the early 2000s with the onset of internet banking and credit card services. The sector showed rise after 2010 with the increasing usage of smartphones, the rollout of 4G internet and introduction of UPI (Unified Payments Interface) in 2016 which became a key milestone in India's fintech journey.

In present time, India is one of the fastest-growing fintech markets globally. There are over 9,000 fintech startups in India and an expected market size of \$ 111.14 billion in 2024. India ranked at third position globally in terms of highest number of FinTech entities which constitutes around 14% of total startup funding in the country. The Indian fintech market is to reach \$ 421.48 billion by 2029 showing an exceptional CAGR of 30%. The fintech adoption rate of India is 87% which is highest globally, while the global average adoption rate is at 64%. Such high adoption rate could be attributed to key factors such as rapid digitalisation in the country, accessibility and affordability of connectivity and mobile devices, smart and innovative products and robust digital infrastructure.

Fintech Segments

1. **BankingTech:** Banking technology is a segment of FinTech which refers to solutions that implements advanced technology for a better and seamless banking experience. BankingTech includes sectors such as CBS (Core Banking System), CRM (Customer Relationship Management), Digital banking platforms, Trade Finance & Treasury Management System, BaaS (Banking as a Service), Account Aggregators and Neo-Banking. BankingTech companies operating in India are Infosys Finacle, CRMnext, TCS BaNCS, Finastra, Open Financial Technologies, Perifos, Jupiter (Neo Bank), etc.
2. **LendingTech:** Lending Technology is a FinTech segment in which lending is made more accessible and seamless for businesses and individuals with the use of technology. This segment comprises of sectors like LOS (Loan Origination Systems), LMS (Loan Management Systems), Business Rule Engine, Collection Platforms, Lending as a Service and SME Lending. LendingTech companies

operating in India include IFinance, Finsire, Experian, Credgenics, Roopiya, Lendingkart, etc.

3. **PayTech:** Payment Technology is one of the very rapid growing segment of FinTech. PayTech makes use of technology to make payments. PayTech encompasses sectors like Payment Gateway, POS (Point of Sale) devices, PaaS (Payments as a Service), Cross Boarder Platforms, Switch & Card Management Systems, Escrow & Cash Management Systems. PayTech companies operating in India include Paytm, PhonePe, BharatPe, Razorpay, Pine Labs, Cashfree Payments, EximPe, OneCard, Escrowpay, etc.
4. **RegTech:** Regulatory Technology, a segment of FinTech which help businesses comply with regulations with the use of cutting-edge technologies like AI, machine learning, big data and cloud computing. RegTech automates regulatory requirements and control procedures for businesses in an efficient way. RegTech comprises of services like Identity Management, AML & Fraud Risk Management, Cybersecurity, Risk Management, GRC (Governance Risk Compliance) and Regulatory Reporting. RegTech companies operating in India are IDfy, Finlock, Appknox, Finemechanics, Axiom, Pingsafe, etc.
5. **WealthTech:** Wealth Technology is the FinTech segment that uses innovative technology to automate and investment and wealth management services. WealthTech includes sectors such as Wealth Management Platforms and WaaS (Wealth as a Service). Some of the WealthTech companies in India are Zerodha, Groww, Smallcase, INDwealth, KFintech, etc.
6. **InsurTech:** Insurance Technology, is a segment of FinTech that integrates technology in insurance industry. InsurTech uses AI, big data, blockchain, machine learning and is efficient in terms of time and resources. InsurTech makes the entire process of buying insurance and claims settlement more customer centric by making it more personalized. InsurTech includes sectors such as IaaS (Insurance as a service), Policy Administration, Claims Management and Underwriting. Some of the InsurTech companies operating in India are Symbo Insurance, PolicyBazaar, InsuranceDekho, Acko, Digit Insurance, Claimbuddy, etc.

2. LITERATURE REVIEW

Chatterjee, R., Srivastava, T., & Kaur, N. (2023) conducted a study on evolution, acceptance, and adaptation of Fintech. The study The researchers found the pivotal role of FinTech in financial inclusion and attainment of Sustainable Development Goals (SDGs). The researchers observed that sustainable goals were attained because of acceptance of FinTech services. They also highlighted that in terms of funding in FinTech sector, India surpassed China. The researchers concluded growth of FinTech led financial inclusion in India, still cybersecurity challenges pose as a considerable threat for FinTech sector.

Katkar, S., & Nikam, U (2023) conducted a study on the rapid growth of the FinTech sector in India. To study the relationship between customer attitudes and FinTech adoption tools like multiple regression analysis and ANOVA were used. The researchers found positive effect of integration of technology and finance on efficiency of financial services. They also highlighted that FinTech has been successful in substituting traditional banking services. The researchers identified certain key drivers of FinTech adoption like ease of use, cost-effectiveness, accessibility, and enhanced customer experience. The researchers also highlighted cybersecurity concerns as a major issue.

Kaur, J., & Dogra, M. (2019) made a study to examine the growth and development of FinTech companies in India. The researchers studied the growth of top ten FinTech ventures based on their vision, mission and types of funding received in them. The researchers found that FinTech companies in India have exhibited significant growth during recent years. The researchers observed that rapid digitalization was possible because of various government initiatives like Jan Dhan Yojana and UPI. Such initiatives successfully created opportunities for FinTech companies to promote financial inclusion. The study disclosed high growth rate of FinTech companies in contrast to security concerns and privacy threats which poses as challenges to FinTech firms.

Pant, S. K. (2020) studied the Emerging trends of Fintech. The researcher identified the role of advanced and innovative technology which is used by Fintech industry to deliver banking and financial solutions. The researcher found that India is one of the fastest-growing markets for fintech startups. The study focuses on emerging trends in fintech which includes cross border payments using blockchain, augmented reality to improve customer satisfaction, digital insurance, digital invoicing, crowdfunding and more. The

researcher concludes in the study that there is a need for new regulations which could address risks of the evolving fintech products.

Vijai, C (2019) has explored the opportunities and challenges of fintech in India. From the research he found that Fintech in India is rapidly evolving, presenting opportunities for alternative lending, robo advisory services, and the acceleration of digital payments. The researcher also came to know that despite the rapid growth, the fintech industry in India faces challenges such as regulatory transparency, technological integration, and limited innovation for low-income groups. The researcher concluded that collaboration and adoption rates in digital payments are increasing which reflects a positive trend in the industry.

3. RESEARCH METHODOLOGY

Objectives of the study

- 1) To study trends of funding across various fintech segments in India.
- 2) To compare the average funding amounts between various fintech segments in India.

Research design

Quantitative research design is followed to study the trends of funding in six different fintech segments and compare the average funding amounts between different segments.

Data collection

The data collection process for this study involves gathering secondary data from various fintech enterprise reports, RBI reports, NPCI publications, official websites, doctoral thesis and relevant papers. The data are collected from F.Y. 2018-19 to F.Y. 2023-24 for the purpose of study. The data regarding fundings received (in USD million) are collected for six different fintech segments.

Hypotheses for the study

1. Null hypothesis (H_0): There is no significant trend in funding across various fintech segments in India.
Alternative hypothesis (H_1): There is significant trend in funding across various fintech segments in India.
2. Null hypothesis (H_0): There is no significant difference in the average funding amounts across fintech segments in India.
Alternative hypothesis (H_1): There is a significant difference in the average funding amounts across fintech segments in India

Tools and Techniques

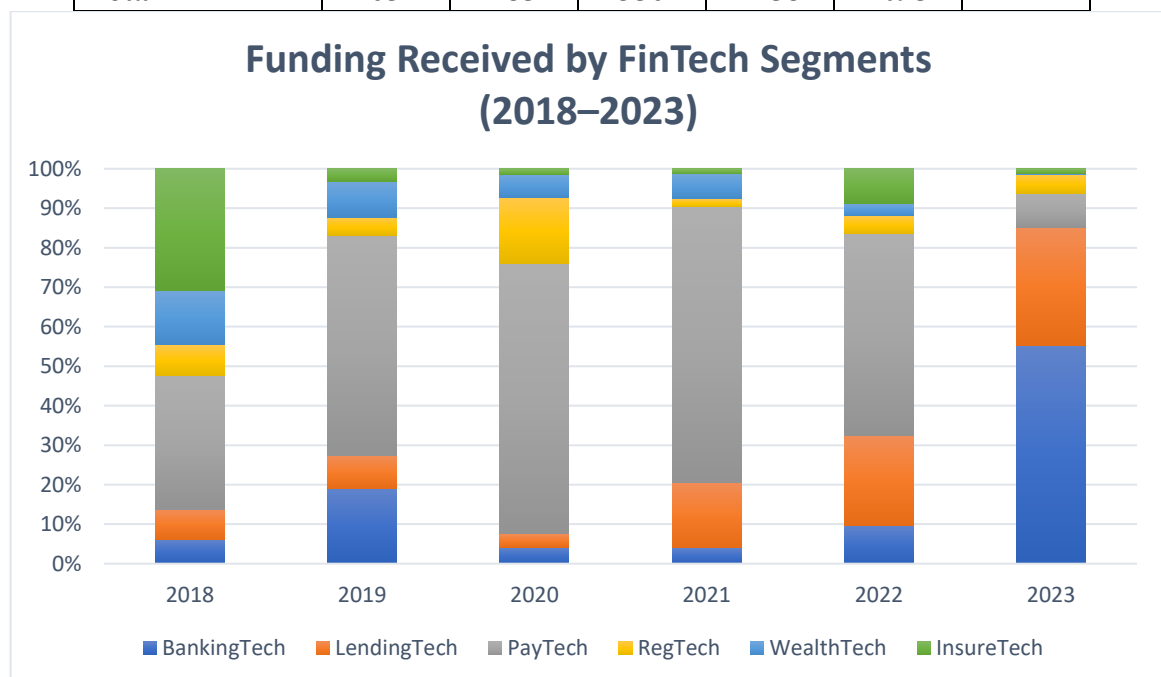
In this study, Linear Regression Analysis was performed to study whether or not statistically significant trends are present in fundings received different fintech segments over the period of time. One Way ANOVA was conducted to study whether or not statistically significant difference was there in average funding amount received across fintech segments in India.

Limitations of the study

- 1) Only past six years data is considered for study.
- 2) Limitations of using secondary data.

4. RESULTS AND DISCUSSION

4.1 Table showing amounts of funding received by FinTech Segments						
Fintech Segments	Fundings (USD Million)					
	2018	2019	2020	2021	2022	2023
1. BankingTech	4	54	15	60	107	233
2. LendingTech	5	24	12	238	249	125
3. PayTech	22	159	244	1019	559	37
4. RegTech	5	13	59	30	50	20
5. WealthTech	9	26	21	93	34	1
6. InsureTech	20	9	5	18	96	5
Total	65	285	356	1458	1095	421



4.2 Stacked Bar Diagram showing amounts of funding received by FinTech Segments

4.3 Table showing results of Linear Regression Analysis

Fintech Segment	Slope	P-Value	R-Squared	Significant Trend
BankingTech	38.542857	0.028298	0.738412	YES
LendingTech	42.885714	0.114365	0.50332	NO
PayTech	58.571429	0.58534	0.080703	NO
RegTech	4.485714	0.437941	0.156259	NO
WealthTech	1.6	0.863264	0.008356	NO
InsureTech	5.685714	0.559659	0.091698	NO

4.4 Table showing results of One Way ANOVA

Source	Sum of Squares	df	Mean Squares	F	Sig.
Between Groups	440544.22	5	88108.84	3.08	0.0231
Within Groups	856850	30	28561.67		
Total	1297394.22	35			

4.5 Table showing results of Tukey HSD Post-Hoc

(I) Segment	(J) Segment	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval		Significant difference
					Lower Bound	Upper Bound	
BankingTech	LendingTech	-30.000	97.573	1.000	-326.78	266.78	NO
	PayTech	-261.167	97.573	0.110	-557.95	35.61	NO
	RegTech	49.333	97.573	0.996	-247.45	346.11	NO
	WealthTech	48.167	97.573	0.996	-248.61	344.95	NO
	InsurTech	53.333	97.573	0.994	-243.45	350.11	NO
LendingTech	BankingTech	30.000	97.573	1.000	-266.78	326.78	NO
	PayTech	-231.167	97.573	0.199	-527.95	65.61	NO
	RegTech	79.333	97.573	0.963	-217.45	376.11	NO
	WealthTech	78.167	97.573	0.965	-218.61	374.95	NO
	InsurTech	83.333	97.573	0.954	-213.45	380.11	NO
PayTech	BankingTech	261.167	97.573	0.110	-35.61	557.95	NO
	LendingTech	231.167	97.573	0.199	-65.61	527.95	NO
	RegTech	310.500*	97.573	0.036	13.72	607.28	YES
	WealthTech	309.333*	97.573	0.037	12.55	606.11	YES
	InsurTech	314.500*	97.573	0.033	17.72	611.28	YES
RegTech	BankingTech	-49.333	97.573	0.996	-346.11	247.45	NO
	LendingTech	-79.333	97.573	0.963	-376.11	217.45	NO
	PayTech	-310.500*	97.573	0.036	-607.28	-13.72	YES
	WealthTech	-1.167	97.573	1.000	-297.95	295.61	NO
	InsurTech	4.000	97.573	1.000	-292.78	300.78	NO

WealthTech	BankingTech	-48.167	97.573	0.996	-344.95	248.61	NO
	LendingTech	-78.167	97.573	0.965	-374.95	218.61	NO
	PayTech	-309.333*	97.573	0.037	-606.11	-12.55	YES
	RegTech	1.167	97.573	1.000	-295.61	297.95	NO
	InsurTech	5.167	97.573	1.000	-291.61	301.95	NO
InsurTech	BankingTech	-53.333	97.573	0.994	-350.11	243.45	NO
	LendingTech	-83.333	97.573	0.954	-380.11	213.45	NO
	PayTech	-314.500*	97.573	0.033	-611.28	-17.72	YES
	RegTech	-4.000	97.573	1.000	-300.78	292.78	NO
	WealthTech	-5.167	97.573	1.000	-301.95	291.61	NO
*. The mean difference is significant at the 0.05 level.							

Major Findings

BankingTech exhibited a slope of 38.54, p-value of 0.0283 which is less than 0.05. This indicates the existence of statistically significant trend at 95% confidence level. The R-squared value of 0.738 also explains strong explanatory power of regression.

LendingTech exhibited a slope of 42.89 and p-value of 0.114 which is more than 0.05. This indicates that trend is not statistically significant at 95% confidence level. Also, R-squared value is 0.503, which indicates moderate explanatory power of regression.

PayTech exhibited highest slope of 58.57 and p-value 0.585 which is more than 0.05. This indicates that the trend is statistically not significant at 95% confidence level. The R-squared value is also very low at 0.081 which suggests weak relationship between variables.

RegTech, WealthTech and InsurTech segments exhibited low value of slope and high p values which indicates that trends in those segments are statistically not significant at 95% confidence level. The R-squared value of these three segments is also less which suggests weak relationship between variable.

The One-Way ANOVA test revealed that significant differences were observed in average funding amount across different FinTech Segments with F-statistic of 3.08 and p-value of 0.023 which is less than 0.05.

Post-hoc comparisons using the Tukey HSD test indicated that average funding amount received in PayTech segment was significantly more than RegTech (MD = 310.5, p-value = 0.0362), WealthTech (MD = 309.33, p-value = 0.0372) and InsurTech (314.5, p-value = 0.0328).

5. CONCLUSION

The above findings revealed various trends and differences in fundings amount received in various FinTech segments. Linear regression analysis exhibited BankingTech as the only segment to show statistically significant increasing trend. Other segments exhibited revealed higher variability and insignificant trends. The funding amount reached at its peak in 2021, after which it started declining. With One Way ANOVA test it was found that significant differences existed between average funding amount in different FinTech segments. From the post-hoc Tukey HSD test it was found that PayTech segment received statistically higher funding amount compared to RegTech, WealthTech and InsurTech. PayTech was also the most dominant segment attracting the highest amounts of funding over the period of time, which indicates its rapid growth and growing popularity in the Indian market. The segments like RegTech, WealthTech and InsurTech demonstrated relatively lower funding levels and insignificant growth trends, highlighting the presence of untapped potential in such areas. The established segments like BankingTech and PayTech are thriving with BankingTech having significantly higher growth. Other segments are having inconsistent growth which may indicate a lot of untapped potential for investment and innovation in such segments.

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An Analytical Study of Accounting Methods in Small Businesses in Valsad

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Abstract

Small businesses are a vital component of the economy, contributing significantly to employment and regional development. However, financial mismanagement remains a major challenge, leading to inefficiencies and, in many cases, business failures. This study critically examines the accounting methods employed by small businesses in Valsad, focusing on their effectiveness, limitations, and potential for improvement. Using a combination of primary and secondary data, the research explores the prevalent accounting practices, the challenges faced by small business owners, and a proposed framework for improving financial management. The study aims to provide valuable insights for business owners, policymakers, and financial institutions to promote better financial practices and sustainability in small enterprises.

Keywords: Small business accounting, financial management, digital accounting, Valsad,

1. Introduction

Small businesses play a crucial role in regional economic development by creating jobs, fostering entrepreneurship, and contributing to local trade. In India, small businesses form the backbone of the economy, particularly in semi-urban and rural areas like Valsad. However, a significant challenge these businesses face is maintaining proper accounting records and financial management.

Accounting serves as the foundation of any business, enabling owners to track financial performance, ensure regulatory compliance, and make informed decisions. However, many small businesses in Valsad continue to rely on outdated or inefficient accounting

methods, such as manual bookkeeping, which leads to errors and inefficiencies. In contrast, digital accounting solutions offer improved financial management, but their adoption remains limited due to cost constraints, lack of awareness, and technological resistance.

This research investigates the accounting practices followed by small businesses in Valsad, identifying key challenges and proposing an improved framework for enhanced financial management. By understanding these factors, policymakers and business support organizations can take appropriate measures to facilitate better accounting practices.

2. Literature Review

Accounting practices in small businesses have been extensively studied in various contexts. Researchers have highlighted the importance of adopting systematic accounting methods to ensure business sustainability and growth.

2.1 Traditional vs. Modern Accounting Practices

A study by Smith (2018) emphasized that small businesses predominantly rely on manual bookkeeping due to its simplicity and cost-effectiveness. However, manual systems often result in errors, inefficiencies, and difficulties in tracking financial transactions. In contrast, digital accounting solutions, such as Tally, QuickBooks, and Zoho Books, provide automation, accuracy, and ease of reporting but require investment and technical knowledge (Gupta, 2020).

2.2 Challenges in Adopting Digital Accounting Systems

Sharma (2021) highlighted that the primary barriers to adopting modern accounting solutions include lack of financial literacy, reluctance to change, and the perception that accounting software is complex and expensive. Small businesses often operate with minimal financial expertise, leading to inconsistent record-keeping and non-compliance with tax regulations.

2.3 Regulatory Compliance and Financial Reporting

Research by Patel (2022) found that many small businesses struggle with regulatory compliance due to frequent changes in taxation laws and reporting requirements. Without proper accounting records, businesses face difficulties in tax filing, accessing loans, and making strategic financial decisions.

This study builds upon existing research by analyzing these factors in the context of Valsad's small business sector and suggesting an improved framework tailored to their needs.

3. Objectives of the Study

This research aims to:

1. Identify the accounting methods used by small businesses in Valsad.
2. Analyze the effectiveness of these methods in financial management.
3. Examine the challenges faced by small business owners in implementing systematic accounting practices.
4. Propose a framework for improving accounting practices in small businesses.
5. Evaluate the potential benefits of digital accounting adoption for small enterprises.

4. Research Methodology

This study employs a mixed-method approach, combining qualitative and quantitative research techniques to gain a comprehensive understanding of accounting practices in small businesses in Valsad.

4.1 Data Collection

- **Primary Data:** Collected through structured surveys and interviews with 50 small business owners from different industries, including retail, manufacturing, and services.
- **Secondary Data:** Gathered from academic journals, financial reports, government publications, and previous research studies on small business accounting practices.

4.2 Sampling Technique

A purposive sampling method was used to select small businesses based on factors such as size, industry, and the accounting methods they use. This ensures a diverse representation of businesses from various sectors in Valsad.

4.3 Data Analysis

Data was analyzed using statistical tools, including descriptive analysis, comparative analysis, and thematic analysis, to identify patterns, challenges, and opportunities for improvement in accounting practices.

5. Analysis of Accounting Practices in Small Businesses

5.1 Common Accounting Methods Used

- **Manual Bookkeeping:** Used by 60% of the surveyed businesses due to its simplicity but prone to errors and inefficiencies.
- **Excel-Based Accounting:** Preferred by 25% of businesses as it offers better organization but requires manual data entry.
- **Accounting Software (Tally, QuickBooks, Zoho Books):** Used by 15% of businesses, providing automation and accuracy but requiring technical skills and financial investment.

5.2 Financial Reporting and Compliance

- Many businesses do not maintain systematic financial records, leading to challenges in tax filing and loan approvals.
- Businesses using digital accounting solutions reported fewer compliance issues compared to those relying on manual methods.

6. Challenges in Accounting Practices

1. **Lack of Financial Literacy:** Many small business owners lack basic knowledge of accounting principles.
2. **High Cost of Professional Services:** Hiring professional accountants is often expensive for small enterprises.
3. **Reluctance to Adopt Technology:** Many businesses are hesitant to transition to digital accounting solutions due to perceived complexity.
4. **Regulatory Challenges:** Frequent changes in tax laws and compliance requirements create difficulties in financial management.
5. **Inconsistent Record-Keeping:** Lack of proper documentation leads to financial discrepancies and errors.

7. Proposed Framework for Improved Accounting Practices

1. **Financial Literacy Programs:** Conducting workshops for small business owners on basic accounting and financial management.
2. **Affordable Accounting Software:** Encouraging government and financial institutions to provide subsidized or free accounting software for small businesses.
3. **Encouraging Standardized Record-Keeping:** Promoting the use of structured accounting templates for better financial tracking.

4. **Access to Professional Support:** Offering government incentives for small businesses to hire accountants or financial advisors.
5. **Regulatory Awareness Campaigns:** Conducting educational campaigns on tax policies and compliance requirements.

8. Expected Contribution to the Field

This study contributes by:

- Providing empirical data on accounting challenges faced by small businesses in Valsad.
- Suggesting a practical framework for improving accounting practices.
- Enhancing awareness among small business owners regarding the benefits of systematic financial management.
- Assisting policymakers in designing targeted support programs for small enterprises.

9. Conclusion

Efficient accounting practices are essential for the sustainability and growth of small businesses. This study highlights the prevalent accounting methods used in Valsad, identifies key challenges, and proposes a framework for improvement. By adopting digital tools, financial literacy programs, and regulatory awareness initiatives, small businesses can enhance their financial management and ensure long-term success. The findings of this study offer valuable insights for business owners, policymakers, and financial institutions, paving the way for better financial management in the small business sector.

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Analysing the Impact of Fraud on Non-Performing Assets in Indian Public Sector Banks

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Abstract:

The Indian banking sector, a critical pillar of economic stability, has witnessed significant evolution alongside increasing exposure to fraudulent activities. This research examines the multifaceted impact of fraud on public sector banks, focusing on its economic, operational, and reputational dimensions. The study utilizes data spanning 2019-20 to 2023-24, analyzing trends in fraud frequency and associated monetary losses. Regression analysis reveals a positive correlation between fraud occurrences and rising Non-Performing Assets (NPAs), emphasizing the detrimental effects on asset quality and profitability. Key findings highlight an increasing number of fraud cases, albeit with declining monetary value per instance, indicating a shift in fraud typologies. The study provides actionable insights to mitigate fraud risks and restore public confidence in the Indian banking sector while fostering systemic resilience.

Key words:

Banking fraud, Non-Performing Assets (NPAs), Public sector banks, Fraud mitigation strategies

Introduction:

The banking sector is a cornerstone of economic stability and growth in any country, playing a pivotal role in facilitating financial transactions, mobilizing savings, and enabling investments. In India, the banking sector has undergone significant transformations over the years, evolving from traditional practices to adopting modern technological advancements. However, this growth has also exposed the sector to various risks, one of the most pressing being financial fraud.

Fraudulent activities in the banking sector have far-reaching consequences, impacting not only the financial health of institutions but also eroding public trust and confidence in the system. In recent years, high-profile cases of banking fraud in India have brought this issue into the spotlight, prompting extensive debates and regulatory interventions.

These incidents have underscored the urgent need to understand the root causes, mechanisms, and impacts of fraud on the Indian banking sector.

This research paper aims to explore the multifaceted impact of fraud on the Indian banking sector, delving into its economic, operational, and reputational dimensions. By examining recent trends, case studies, and mitigation strategies, this study seeks to provide insights into the challenges posed by fraud and the measures required to safeguard the integrity of the banking system. The findings of this research will contribute to a deeper understanding of the dynamics of fraud in the Indian banking context and offer recommendations for strengthening institutional resilience and regulatory frameworks.

Literature Review:

Rodney D'Silva(2019) analysed impact of frauds on Indian Banking Sector. The paper highlighted the impact of frauds on Non Performing Assets as well as on Profitability of Indian Banking Sector. It concluded that increase in frauds severely leads to increase in NPAs and adversely affected profits of banks. Research paper also discussed ways to mitigate the rising problem of frauds.

Pawan & Swati Singh (2023) made study to assess current trend of banking frauds and their role in Non Performing Assets in India. The study also analysed the impact of bank frauds on profitability of banks. Results of the study supported that the increasing number of bank frauds leads to increasing NPAs and negatively harming Indian Banking sector's profitability. Study concluded with suggestions to improve the conditions of frauds in India.

Roy Deepankar and Sarika Lohana (2024) investigated the nature and types of bank frauds, as well as their consequences, as well as bank perceptions of factors causing bank frauds, regulatory framework views, and fraud prevention mechanisms. some bank managers were also interviewed to understand the modus operandi of frauds and prevention mechanisms. Based on the analysis and findings, it also intends to revisit the risk management architecture in banks and provide recommendations to prevent bank fraud incidents.

Zala Krushnavirsinh R. (2023) made study on economic consequences of banking fraud by evaluating various factors responsible for fraudulent activities within banks. The paper investigated the extent to which bank employees adhere to various fraud prevention measures, including those recommended by the Reserve Bank of India. In

addition to this, it also provided insights into the perspectives of bank employees regarding preventive measures and their awareness of various types of fraud. Study focused on 100 employees working in banks located in Gujarat.

Ojha D. and Jain P. (2021) made study on impact of fraud on Indian Banking Sector. Study showed rising trend of frauds over the past few year in India. It evaluated the magnitude of fraud cases in different banking groups and its area of operation on basis of secondary data available from reliable sources. Paper also discussed about the classification, types and causes of bank frauds. The paper finally proposed some recommendations to reduce future occurrence of frauds in Indian banking sector.

Sharanraj (2020) made a comparative study of banks financial fraud and profitability. The study found negative impact of financial fraud on the profitability of banks. Researcher showed that the highest contribution factor to financial fraud is advances by the banks and off balance sheet factors. Further, it also made suggestions to mitigate detrimental effects of financial frauds.

Objectives of the Study

- To analyse the trend of frauds of Public Sector Banks in India.
- To examine the impact of frauds in the continuous rise of NPAs in the Indian Public Sector Banks.

Hypothesis

H1: Frauds do not have a significant impact on Non-Performing Assets in the Indian Public Sector Banks.

Research Methodology

The research design for present study is descriptive and analytical in nature. For the purpose of study, all public sector banks have been taken from Indian Banking Sector as they occupied major share in Indian Banking Sector. Data for the research study is collected from secondary source such as journals, articles, RBI publications, speech and RBI Bulletin. The period of study is from 2019-20 to 2023-24, i.e., five years.

Data Analysis

Sr. No.	Name of Banks	As on 31-03-2020		As on 31-03-2021		As on 31-03-2022		As on 31-03-2023		As on 31-03-2024	
		No. of Frauds	Amount involved (in crores)	No. of Frauds	Amount involved (in crores)	No. of Frauds	Amount involved (in crores)	No. of Frauds	Amount involved (in crores)	No. of Frauds	Amount involved (in crores)
1	BOB	350	12971.14	248	9796.31	280	3990.12	784	1780.99	12061	402.42
2	BOI	203	1066.71	177	12184.32	216	5793.22	208	582.59	209	866.7
3	BOM	242	3348.29	804	2321.91	188	502.79	105	933.27	472	74.06
4	CB	2132	14237.27	153	7885.25	90	3245.18	158	2871.01	157	1079.31
5	CBI	900	3993.76	1026	4518.31	1243	773.33	533	1108.57	2399	195.24
6	IB	226	2252.1	219	3759.68	211	2036.71	429	493.31	6059	204.91
7	IOB	207	6939.82	105	3738.9	70	1450.51	48	1309.14	16	13.39
8	P&S	67	397.28	144	3825.86	159	454.59	132	1363.22	245	43.55
9	PNB	509	14633.27	714	10947.51	431	9579.8	289	1809.1	7112	1803.59
10	SBI	6964	44622.45	5724	10085.92	4192	7100.65	2755	4878.18	1586	3406.87
11	UCO	118	5384.48	379	3336.96	114	611.53	219	1163.45	171	149.47
12	UBI	415	9196.98	579	12791.43	638	3942.37	366	5504.38	122	2292.69

(Source: Annual Report of Banks)

Table 1 : Number of Frauds reported and Amount involved in Frauds (in crores) for Indian Public Sector Banks

Above Table 1 shows number of frauds reported and amount involved in frauds for all public sector banks in India during period of five years from 2019-20 to 2023-24. During period of 2020-21, most of public sector banks have been merged with other public sector banks. Results of Table 1 shows increase in number of frauds reported for all public sector banks while amount involved in fraud has been decreased over years. Chart 1 and 2 show the trend of number of frauds and amount involved in frauds for the study period.

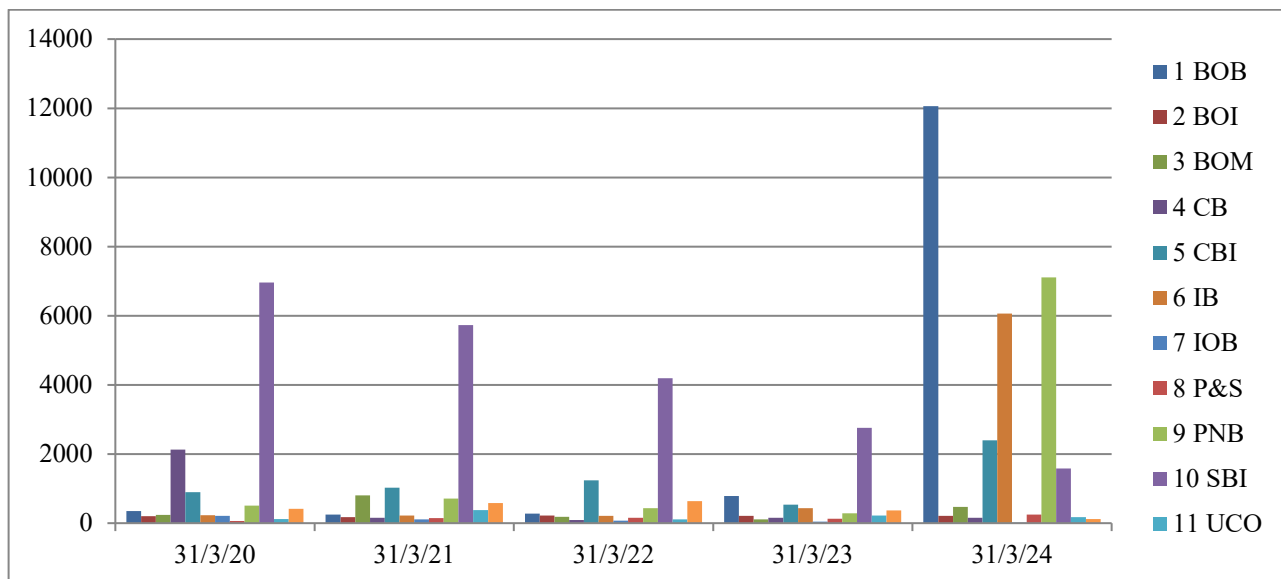


Chart 1 Number of Frauds reported during period of 2019-20 to 2023-24 for Indian Public Sector Banks

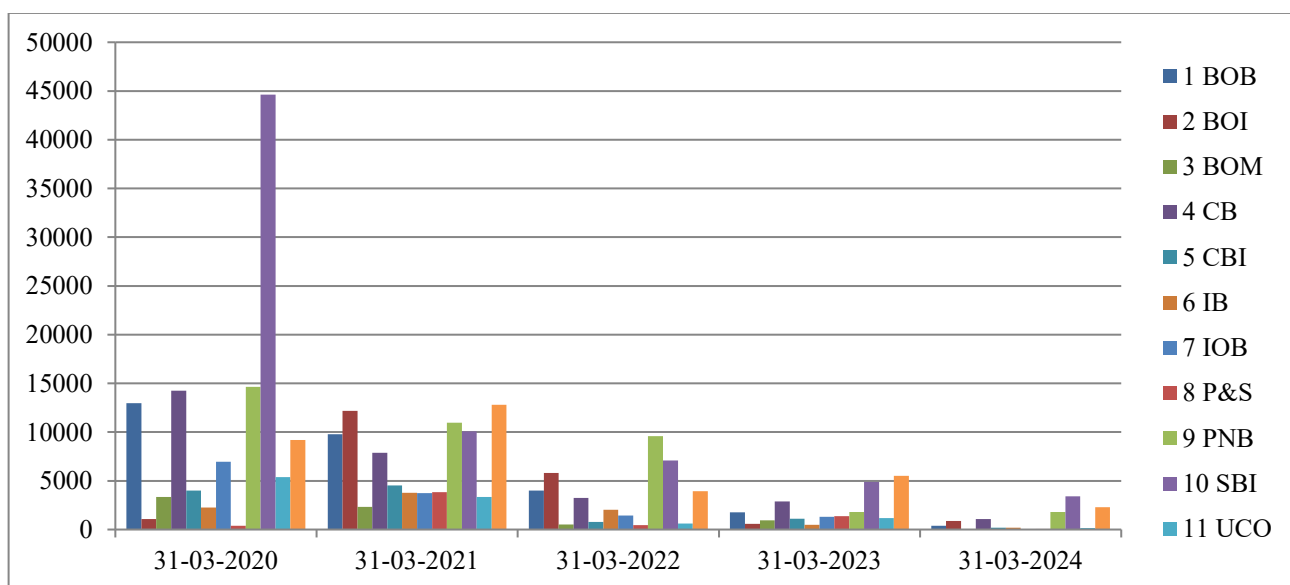


Chart 2 Amount involved in frauds (in crores) during period of 2019-20 to 2023-24 for Indian Public Sector Banks

Regression Statistics	
R Square	.595
Coefficients	.771
Sig. Value	.000

Predictors: (Constant): Amount involved in fraud

Dependent Variable: Net NPA

Table 2: Impact of Fraud on Rising Non-Performing Assets in Indian Public Sector Banks

Table 2 shows regression analysis for which amount involved in fraud has been considered as independent variable and Net NPA as dependent variable. Here R Square is 0.595 which implies that 59.5% variations in Non-Performing Assets are explained by frauds. Coefficient value (0.771) shows that there is positive correlation between increase in frauds and rise in NPAs. Moreover, Significance value of 0.000 can be interpreted that there is a significant impact of frauds on Non Performing Assets at 5 percent level of significance. So here null hypothesis has been rejected and conclude that frauds have a significant impact on Non Performing Assets in Indian Public Sector Banks.

Conclusion:

The study highlights the concerning trend of an increasing number of fraud cases reported in Indian Public Sector Banks, accompanied by a notable decrease in the average monetary value of these fraudulent activities. This suggests a shift in the nature and scope of frauds, with smaller yet more frequent cases posing challenges to the banking system. The regression analysis further establishes a positive correlation between fraud occurrences and the level of Non-Performing Assets (NPAs), emphasizing how fraudulent activities exacerbate the already critical issue of asset quality deterioration. These findings underline the pressing need for systemic reforms to mitigate fraud and its cascading effects on the financial health of banks.

Suggestions and Recommendations

1. **Strengthening Internal Controls:** Banks must enhance their internal control mechanisms, focusing on proactive fraud detection systems powered by advanced technologies like AI and machine learning.

2. **Staff Training and Awareness:** Regular training programs should be conducted to sensitize bank employees about the latest fraud techniques and equip them with tools to identify and prevent suspicious activities.
3. **Robust Monitoring and Auditing:** Strengthening internal and external audit frameworks can help identify vulnerabilities and ensure compliance with operational protocols.
4. **Legal and Regulatory Reforms:** Policymakers should consider stricter penalties for fraudulent activities and ensure quicker resolution of fraud cases to deter future incidents.
5. **Public Awareness Campaigns:** Educating customers about fraud prevention and reporting mechanisms can create a collaborative defense system against fraud.
6. **Data Sharing and Collaboration:** Banks should enhance coordination and data sharing across institutions to identify repeat offenders and address systemic risks effectively.

Implementing these measures can not only curb the rising incidence of frauds but also stabilize the financial ecosystem by reducing the adverse impact on NPAs and fostering public trust in the banking sector.

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ANALYSIS OF CRISIL'S TOP-RANKED EQUITY MUTUAL FUND SCHEMES: A PERFORMANCE PERSPECTIVE

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Abstract:

Mutual funds as an investment vehicle, comprise the savings from numerous investors in various financial instruments to enable investors in achieving their financial goals. To fulfill the expectations of millions of retail investors, close monitoring and evaluation of mutual funds in terms of risk-return relationship on continuous basis has become very important as with the passage of time this industry has become the major player of the financial system. Various mutual fund ranking agencies are working in evaluating the performance of mutual funds and provides different evaluation parameters to help the investors in selecting the top performing mutual funds. In this regard the main objective of this study is to analysis the performance of selected equity mutual fund schemes ranked 1 by CRISIL for the quarter ended on 30th September, 2024 in terms of risk-return relationship, through the usage of statistical parameters such as beta, standard deviation, Sharpe ratio, Treynor ratio and Jensen Alpha. The analysis shows that majority of the evaluated mutual fund schemes achieved strong market performance, by outperforming the benchmark during the 3year investment period.

Keywords:

Mutual Fund; CRISIL; Performance measures; Sharpe ratio; Treynor.

Introduction:

Over the years, India has emerged as an attractive investment destination driven by economic reforms and a large consumption base (<https://www.ibef.org/>). This wealth creation phenomenon makes it necessary for Indian investors to look beyond the traditionally offered investment options and move towards mutual funds. In October 2024, Mutual Fund SIP accounts reached 10.12 crore, generating an impressive collection of Rs. 25,323 crores through SIP inflow. Mutual Fund AMCs or Asset Management companies manage clients pool of money by investing them indirectly in various asset classes of capital markets. Investors who either lack large sums for

investments, or investors who want to grow their wealth but neither have the inclination nor the time to research the market can have mutual funds as an effective investment vehicle. Though mutual funds offer an excellent investment avenue for retail investors to reap the benefit from market uptrends but investors usually look at investments in mutual fund only from the perspective of generating maximum returns. But there are two sides to a coin, one is return and other is risk. Return is generally mathematical and easily tracked from various sources & numbers like 10%, 20% returns are available, but risk is associated with vague terms like high risk, low risk or medium risk. Measures like risk-return trade-off, time horizon determines the selection of appropriate mutual fund. In this regard various mutual fund rating agencies regulated by the SEBI represents the performance of various mutual funds categories with appropriate benchmarks and provides retail investors simple method to evaluate the top mutual funds. CRISIL is one among the leading mutual fund rating agencies in India who has created indices that reflects the fund performance at an aggregate level. CRISIL Mutual fund Ranking (CMFR) has developed a methodology of ranking mutual fund schemes on a scale of 1 to 5 within a peer group, to provide information to the investors regarding best performing funds at a given point of time to supplement their internal evaluation process in investment decision making.

Scope of the study:

Investors due to psychological biases focused more on the top-rated mutual fund schemes. Therefore, this study's analysis of CRISIL's top-ranked equity mutual fund schemes aims to provide investors with key insights to make rational and objective investment decisions.

Literature review:

(Khurana & Bhatia, 2023) analyzed the factors affecting large-capital equity mutual fund selection and evaluated the 5-year performance from 2018 to 2022. The findings show consistent strong performance among the funds. Safety and liquidity were key considerations, evaluated using tools like Sharpe and Treynor ratios, beta, and standard deviation. (Virparia, 2022) evaluated mutual fund schemes using financial tools such as annual return, standard deviation, beta and ratios like Sharpe, Treynor, and Jensen. The study concluded that investment time horizon affects fund performance, with large-cap funds performing best initially, small-cap funds in the mid-term, and mid-cap funds sustaining returns throughout the mid-term period. (K. B. Sharma & Joshi, 2021) studied

the risk-return relationship of debt, equity, and hybrid mutual funds. The findings revealed that debt mutual funds performed better relative to equity and hybrid schemes. (N. Sharma & Moolchandani, 2020) assessed & compared the performance of top five direct funds of ELSS mutual funds category for tax saving purpose using mean and standard deviation. They found that ELSS category of mutual funds is one of the best alternative for tax savings under section 80C & gives reasonable return to unit holders as compared to FD, NPS, PPF and LIC. (Manoj & Avinash, 2020) studied the analysis of performance of the 12 growth-oriented equity diversified schemes using opening and closing NAVs for 5 months prior to outbreak of Covid-19 and 5 months during Covid-19 and concluded that the investing in mutual fund imply the necessity of studying the risk involved and the substantial value of return incurred. (Madhavi, 2019) worked to evaluate performance of 10 selected Equity and Debt Mutual Funds schemes floated by SBI mutual fund in terms of Net Asset Value, Value Addition Value, Expenses Ratio, Management Fee Ratio, Gross Income Ratio, Net Income Ratio, Portfolio Turnover Ratio. The study concluded that the high volatility in the stock market during the study period exerted great influence on the performance of selected schemes. (Rani & Singh Hooda, 2017) investigated the performance of ten mutual fund schemes ranked first by CRISIL during April 2016 to March 2017. Authors studied the analysis of performance of selected funds schemes using basic measures like mean returns, standard deviation, Sharpe's Ratio, Jensen's Ratio and Treynor's Ratio. Finally, the study conclude that, Tata Equity P/E Fund shows better performance than other selected funds in term of mean return and risk analysis. (Chandra Ojha & Chandra Ojha, 2017) analyzed the performance of Indian top 5 ranking equity diversified mutual funds scheme for the period from 1st Jan 2013 to 28th Feb 2017 using various tests like Average Return, Sharpe Ratio, Treynor Ratio, Standard deviation, Beta and Coefficient of Determination with aim of analyzing the relationship between risk and return, based on total and systematic risk.

Objectives of study:

- To analyze the risk adjusted performance of selected equity mutual fund schemes through Sharpe, Treynor and Jensen's Alpha methods.
- To determine whether the selected mutual fund schemes offer sufficient rewards relative to their variability and volatility.

- To compare the performance of mutual fund returns against their benchmark indices.

Research methodology:

Sample Size

The sample size for this study includes 24 equity growth-oriented mutual fund schemes including large Cap, Mid Cap, Small Cap, Flexi Cap Fund and ELSS Funds. These schemes were ranked 1 by CRISIL for the quarter ending 30th September, 2024 (with a reference period of three years from 1st December, 2021 to 30th November, 2024).

Sources of Data

This study relied entirely on secondary data sources. The daily closing NAVs of the selected mutual fund schemes were collected from www.amfiindia.com and www.mutualfundindia.com. To represent the market portfolio, the BSE SENSEX 50 was used with its daily closing values collected from www.bseindia.com. The yield on 91-day treasury bill, recorded at 6.429%, was used to represent the risk-free rate of return.

Statistical Tools

Microsoft Excel was utilized to compute various financial measures, including return, standard deviation, beta, Sharpe ratio, Treynor ratio and Jensen's Alpha.

The **daily returns of each mutual fund scheme returns** are computed as:

$$\text{Daily return} = \ln(\text{ending NAV} / \text{beginning NAV})$$

The **daily return of Benchmark BSE SENSEX50** is computed on similar lines as:

$$\text{Daily market return} = \ln(\text{ending Sensex} / \text{beginning Sensex})$$

Whereby **Annualized return of the selected mutual fund schemes** is computed as:

$$\text{Annualized return} = (\text{current NAV} / \text{original NAV})^{(1/\text{no. of years})} - 1$$

Similarly, **Benchmark BSE SENSEX 50 annualized market return** is computed as:

$$\text{Annualized market return} = (\text{current Sensex value} / \text{original Sensex value})^{(1/\text{no. of years})} - 1$$

Limitations of study:

- The accuracy of the secondary data used in this study cannot be completely assured.
- This study is confined only to selected equity growth oriented mutual fund schemes ranked 1 by CRISIL and that to for a period from 1st December, 2021 to 30th November, 2024. Consequently, the results may not reflect the performance of other mutual fund categories.

- For simplicity, performance evaluation parameters were limited to the Sharpe Ratio, Treynor Ratio, and Jensen's Alpha.

Empirical analysis:

Table-1: Analysis of Average Daily Return, Standard deviation, and Beta for Top-Ranked Equity Mutual Fund Schemes by CRISIL

Schemes	Average Daily Return	Standard Deviation	Beta
Nippon India Large Cap Fund - Direct Plan - Growth Option	0.04%	16.42%	0.501533
Nippon India Large Cap Fund - Growth Plan - Growth Option	0.04%	16.13%	0.501953
ICICI Prudential Bluechip Fund - Direct Plan - Growth Option	0.07%	13.00%	0.691521
ICICI Prudential Bluechip Fund - Growth Plan - Growth Option	0.07%	13.00%	0.691623
JM Flexi Cap Fund - Direct Plan - Growth Option	0.10%	15.84%	0.890657
JM Flexi Cap Fund - Regular Plan - Growth Option	0.10%	15.84%	0.890658
Bank of India Flexi Cap Fund - Direct Plan - Growth Option	0.09%	17.13%	0.941823
Bank of India Flexi Cap Fund - Regular Plan - Growth Option	0.08%	17.14%	0.942523
Motilal Oswal Flexi Cap Fund - Direct Plan - Growth Option	0.09%	15.64%	0.854887
Motilal Oswal Flexi Cap Fund - Regular Plan - Growth Option	0.08%	15.64%	0.854986
Motilal Oswal Mid Cap Fund - Direct Plan - Growth Option	0.13%	16.04%	0.828843
Motilal Oswal Mid Cap Fund - Regular Plan - Growth Option	0.12%	16.04%	0.828953
ITI Mid Cap Fund - Direct Plan - Growth Option	0.09%	16.72%	0.574914
ITI Mid Cap Fund - Regular Plan - Growth Option	0.08%	16.72%	0.575142
Bandhan Small Cap Fund - Direct Plan - Growth Option	0.10%	16.60%	0.691025
Bandhan Small Cap Fund - Regular Plan - Growth Option	0.10%	16.28%	0.695190
Nippon India Small Cap Fund - Direct Plan - Growth Option	0.11%	16.40%	0.882346

Nippon India Small Cap Fund - Growth Plan - Growth Option	0.10%	16.41%	0.882423
Motilal Oswal ELSS Tax Saver Fund - Direct Plan - Growth Option	0.10%	16.08%	1.000000
Motilal Oswal ELSS Tax Saver Fund - Regular Plan - Growth Option	0.09%	16.08%	1.000000
SBI Long Term Equity Fund - Direct Plan - Growth Option	0.09%	13.79%	0.663455
SBI Long Term Equity Fund - Regular Plan - Growth Option	0.09%	13.79%	0.663512
JM ELSS Tax Saver Fund - Direct Plan - Growth Option	0.08%	15.90%	0.913783
JM ELSS Tax Saver Fund - Regular Plan - Growth Option	0.07%	15.90%	0.913783
BSE SENSEX 50	0.05%	16.57%	1

Source: Calculated data by author

Inference:

Average Daily Return

Analysis of table-1 reveals that almost all selected equity schemes have earned higher returns in comparison to benchmark returns. Based on the average daily returns, Motilal Oswal Mid Cap Fund (Direct Plan - Growth Option) leads the ranking with 0.13%, followed closely by Motilal Oswal Mid Cap Fund – (Regular Plan - Growth Option) at 0.12%. In the small-cap category, Nippon India Small Cap Fund (Direct Plan - Growth Option) stands out with 0.11%, while Bandhan Small Cap Fund (both Direct Plan and Regular Plans) and JM Flexi Cap Fund (Direct and Regular Plans) follow at 0.10%. The ELSS category is topped by Motilal Oswal ELSS Tax Saver Fund (Direct Plan - Growth Option) with 0.10%. Among large-cap funds, ICICI Prudential Bluechip Fund (both Direct and Regular Plans) offer the highest return at 0.07% as compared to benchmark BSE SENSEX 50 post an average daily return of 0.05%.

Standard Deviation

Volatility of a mutual fund is measured by the standard deviation, higher the standard deviation of returns, higher will be the returns volatility & higher will be the risk. Based on the standard deviation analysis presented in table-1, the Bank of India Flexi Cap Fund - Regular Plan - Growth Option has the highest volatility at 17.14%, closely followed by its Direct Plan at 17.13%. The ITI Mid Cap Fund (both Direct and Regular Plans) also exhibits high volatility at 16.72%. In contrast, the ICICI Prudential Bluechip Fund (Direct and Regular Plans) has the lowest standard at 13.00%, suggesting relatively

lower risk. The SBI Long Term Equity Fund (Direct and Regular Plans) shows moderate volatility at 13.79%. The BSE SENSEX 50 benchmark stands at 16.57%, providing a point of comparison for the funds risk levels.

Beta

Beta as a relative measure gives perspective of relation between investment systematic risk and the market risk. Beta less than 1.0 indicates that the investment will be less volatile than the market, beta more than 1.0 indicates that the investment will be more volatile than the market. The beta analysis of mutual fund schemes shows their relative risk compared to the BSE SENSEX 50. The Motilal Oswal ELSS Tax Saver Fund (Direct and Regular) has the highest beta of 1.000. High-risk funds include the Bank of India Flexi Cap Fund (0.942) and JM Flexi Cap Fund (0.891). Moderate-risk funds are the Nippon India Small Cap Fund (0.882), JM ELSS Tax Saver Fund (0.914), and Motilal Oswal Mid Cap Fund (0.829). Lower-risk options are the ITI Mid Cap Fund (0.575) and Nippon India Large Cap Fund (0.502).

Table-2: Risk-Adjusted Performance Measure of Selected Mutual Fund Schemes

Schemes	Sharpe Ratio	Treynor Ratio	Jensen Alpha
Nippon India Large Cap Fund - Direct Plan - Growth Option	0.3145	0.1030	0.0229
Nippon India Large Cap Fund - Growth Plan - Growth Option	0.2814	0.0904	0.0166
ICICI Prudential Bluechip Fund - Direct Plan - Growth Option	0.9532	0.1792	0.0843
ICICI Prudential Bluechip Fund - Growth Plan - Growth Option	0.8989	0.1689	0.1773
JM Flexi Cap Fund - Direct Plan - Growth Option	1.3702	0.2437	0.1660
JM Flexi Cap Fund - Regular Plan - Growth Option	1.2805	0.2278	0.1519
Bank of India Flexi Cap Fund - Direct Plan - Growth Option	1.0673	0.1941	0.1289
Bank of India Flexi Cap Fund - Regular Plan - Growth Option	0.9587	0.1743	0.1103
Motilal Oswal Flexi Cap Fund - Direct Plan - Growth Option	1.0858	0.1986	0.1208
Motilal Oswal Flexi Cap Fund - Regular Plan - Growth Option	1.0186	0.1863	0.1103

Motilal Oswal Mid Cap Fund - Direct Plan - Growth Option	1.8699	0.3618	0.2523
Motilal Oswal Mid Cap Fund - Regular Plan - Growth Option	1.7751	0.3434	0.2372
ITI Mid Cap Fund - Direct Plan - Growth Option	1.1093	0.3226	0.1525
ITI Mid Cap Fund - Regular Plan - Growth Option	0.9616	0.2796	0.1278
Bandhan Small Cap Fund - Direct Plan - Growth Option	1.3069	0.3139	0.1773
Bandhan Small Cap Fund - Regular Plan - Growth Option	1.4200	0.3325	0.1913
Nippon India Small Cap Fund - Direct Plan - Growth Option	1.4375	0.2672	0.1852
Nippon India Small Cap Fund - Growth Plan - Growth Option	1.3704	0.2548	0.1743
Motilal Oswal ELSS Tax Saver Fund - Direct Plan - Growth Option	1.3295	0.2137	0.1564
Motilal Oswal ELSS Tax Saver Fund - Regular Plan - Growth Option	1.2339	0.1984	0.1411
SBI Long Term Equity Fund - Direct Plan - Growth Option	1.4087	0.2928	0.1563
SBI Long Term Equity Fund - Regular Plan - Growth Option	1.3483	0.2803	0.1479
JM ELSS Tax Saver Fund - Direct Plan - Growth Option	0.9390	0.1634	0.0969
JM ELSS Tax Saver Fund - Regular Plan - Growth Option	0.8601	0.1497	0.0844
BSE SENSEX 50	0.3459	0.1530	0.0358

Source: Calculated data by author

Inference:

Sharpe Ratio

Sharpe ratio describes the relationship between the portfolio's additional return over risk-free return and total risk of the portfolio. High Sharpe ratio indicates fund's superior risk-adjusted performance while low Sharpe ratio indicates unfavorable performance. Table-2 reveals that the majority of the funds generally outperform the benchmark BSE SENSEX 50. Motilal Oswal Mid Cap Fund - Direct Plan - Growth Option (1.8699) holds the top position, followed closely by its Regular Plan (1.7751). Nippon India Small Cap Fund - Regular Plan (1.4375) also show strong performance.

Treynor Ratio

Treynor reward to volatility ratio measures the relationship between fund's returns earned in excess over risk-free return. Greater the Treynor's ratio, better will be the portfolio performance. Analysis of table-2 reveals that BSE SENSEX 50 benchmark stands at 0.1530, suggesting that several funds surpass market performance. Motilal Oswal Mid Cap Fund - Direct Plan - Growth Option ranks highest with a ratio of 0.3618, followed by ITI Mid Cap Fund - Direct Plan - Growth Option (0.3226) and Bandhan Small Cap Fund - Regular Plan - Growth Option (0.3325).

Jensen Alpha

Incremental returns on investment portfolio is represented by Jensen alpha. Positive alpha indicates superior performance and negative alpha indicates inferior performance relative to the market. All the selected 24 equity schemes in the above table-2 are showing positive Jensen alpha values indicating superior selectivity skills of fund managers in earning superior return over the expected return. Overall, mid-cap and small-cap funds tend to outperform large-cap and index benchmarks, highlighting their potential for higher returns.

Table-3: Comparative Analyses between Fund and Bench Mark Return

Schemes	Fund Annualized Return	Benchmark Annualized Return	Performance
Nippon India Large Cap Fund - Direct Plan - Growth Option	11.59%	12.16%	Underperformed
Nippon India Large Cap Fund - Growth Plan - Growth Option	10.97%	12.16%	Underperformed
ICICI Prudential Bluechip Fund - Direct Plan - Growth Option	18.82%	12.16%	Outperformed
ICICI Prudential Bluechip Fund - Growth Plan - Growth Option	18.11%	12.16%	Outperformed
JM Flexi Cap Fund - Direct Plan - Growth Option	28.14%	12.16%	Outperformed
JM Flexi Cap Fund - Regular Plan - Growth Option	26.72%	12.16%	Outperformed

Bank of India Flexi Cap Fund - Direct Plan - Growth Option	24.71%	12.16%	Outperformed
Bank of India Flexi Cap Fund - Regular Plan - Growth Option	22.86%	12.16%	Outperformed
Motilal Oswal Flexi Cap Fund - Direct Plan - Growth Option	23.41%	12.16%	Outperformed
Motilal Oswal Flexi Cap Fund - Regular Plan - Growth Option	22.36%	12.16%	Outperformed
Motilal Oswal Mid Cap Fund - Direct Plan - Growth Option	36.41%	12.16%	Outperformed
Motilal Oswal Mid Cap Fund - Regular Plan - Growth Option	34.90%	12.16%	Outperformed
ITI Mid Cap Fund - Direct Plan - Growth Option	24.98%	12.16%	Outperformed
ITI Mid Cap Fund - Regular Plan - Growth Option	22.51%	12.16%	Outperformed
Bandhan Small Cap Fund - Direct Plan - Growth Option	28.12%	12.16%	Outperformed
Bandhan Small Cap Fund - Regular Plan - Growth Option	29.55%	12.16%	Outperformed
Nippon India Small Cap Fund - Direct Plan - Growth Option	30.01%	12.16%	Outperformed
Nippon India Small Cap Fund - Growth Plan - Growth Option	28.91%	12.16%	Outperformed
Motilal Oswal ELSS Tax Saver Fund - Direct Plan - Growth Option	27.80%	12.16%	Outperformed
Motilal Oswal ELSS Tax Saver Fund - Regular Plan - Growth Option	26.27%	12.16%	Outperformed
SBI Long Term Equity Fund - Direct Plan - Growth Option	25.86%	12.16%	Outperformed
SBI Long Term Equity Fund - Regular Plan - Growth Option	25.02%	12.16%	Outperformed

JM ELSS Tax Saver Fund - Direct Plan - Growth Option	21.36%	12.16%	Outperformed
JM ELSS Tax Saver Fund - Regular Plan - Growth Option	20.11%	12.16%	Outperformed

Source: Calculated data by author

Inference:

Table-3 illustrates that mid-cap, small-cap, and flexi-cap funds consistently outperformed large-cap funds during the period analyzed. The comparative analysis reveals that most of the analyzed mutual funds outperformed the benchmark return of 12.16%. Motilal Oswal Mid Cap Fund - Direct Plan achieved the highest annualized return at 36.41%, with the regular plan closely behind at 34.90%.

Conclusion:

The first objective of the present study was to analyze the risk adjusted performance of selected schemes and it was found out that majority of the selected mutual fund schemes delivered superior risk-adjusted performance compared to market index, as indicated by their Sharpe Ratio, Treynor Ratio and Jensen Alpha during the study period.

In terms of reward-to-variability and volatility, the analysis shows that the majority of the selected mutual fund schemes provide excess returns beyond their expected returns, considering both systematic and total risk. Furthermore, most of the funds have a beta below one, which indicates less risk than the market portfolio.

Benchmark as a standard for evaluating fund allocation, risk and return, concludes that 22 out of the 24 selected equity schemes, outperformed the benchmark S&P BSE SENSEX. This highlights the capability of the majority of these schemes to provide solid investment opportunities.

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Analysis Of The Performance Of Initial Public Offering In The Indian Stock Market

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ABSTRACT

This research paper explores the performance of Initial Public Offerings (IPOs) in the Indian stock market. The aim is to identify key trends and patterns that have emerged over the years and determine which stocks are underpriced or overpriced on the day of listing. The study highlights the importance of analyzing the performance of IPOs before investing and provides valuable insights for investors and market analysts. The research findings reveal that IPOs in India have shown a significant increase in the issue price over time, and certain factors like the size and age of the company, industry type, and market conditions play a crucial role in determining the performance of IPOs. The study also identifies some underpriced and overpriced stocks on the day of listing, which can be useful for investors looking to invest in IPOs. Overall, this research paper provides valuable insights into the performance of IPOs in the Indian stock market and can serve as a guide for investors and market analysts.

Keywords: IPO, Indian stock market, performance, trends, under-priced, overpriced, success, failure, financial characteristics, industry sector, size of IPO, pricing of shares, emerging markets, short-term performance, primary market, investors.

INTRODUCTION:

An Initial Public Offering (IPO) refers to the process by which privately held companies source capital to grow and expand their operations and issue shares of stock to the public for the first time, generally referred to as the primary market. This is one of the ways investors interested in the share market can invest their money in the equity shares of such issuing companies. The intention of investors investing in such IPOs usually is to earn some return, which means they expect the price of the shares of such companies which they buy in the IPO market at the allotment price/issue price to increase over time, including the day of listing. But there is no guarantee for such an increase in the share price of those companies bought in the IPO market. So the performance of IPOs, i.e.,

increase or decrease in the issue price over some time, need to be analysed and understood before any investors invest in the IPOs of any companies. And thus, analysis of the performance of IPOs has been a subject of interest for both investors and market analysts. In this background, the Researchers have examined the IPOs in the Indian stock market to identify key trends and patterns that have emerged over the years in Indian IPOs and also tried to find out the under-priced and overpriced stock in the Indian IPO market on the day of listing.

OBJECTIVES:

- To study the trend in Initial Public Offerings (IPOs) in India.
- To analyze the listing day performance of Initial Public Offering (IPOs) concerning under-pricing and over-pricing.
- To study the listing day performance of the Initial Public Offering compared to the market return.

STATEMENT OF THE PROBLEM

IPOs are usually an opportunity to achieve extraordinary returns on the listing day. However, there is uncertainty regarding the outcomes of several determinants, such as the promoters' holdings after the IPO, offering size, the company's age, over-subscription, and numerous other essential considerations. Investors are also uncertain whether to sell the stock on listing day or hold it briefly. Investors might be unable to properly examine the stock when developing an investment strategy if these issues are unresolved.

NEED FOR THE STUDY

An important point concerning the investment in IPOs is the listing day price determining the return on IPOs on listing day. Through this study, we will be able to study such returns on IPOs, analyse the performance of IPOs, and suggest opportunities to the Investors to make significant Gains in the Capital Market.

SCOPE OF THE STUDY

The study mainly concentrates on certain sectors and certain companies. The study would be helpful for the investors for making prudent investment. The companies are selected based on market capitalization of the shares. The major macro –economic factors are taken in to consideration.

LIMITATIONS OF THE STUDY

1. The performance of IPO is observed only for 10 Years.

2. The long-run performance is not taken into consideration.

REVIEW OF LITERATURE:

R. Pathak and A. Raj (2020) analysed the under-pricing and short-term performance of IPOs listed on the NSE between 2012 and 2018. The study found that the average under-pricing was 7.1%, indicating that the IPOs were priced lower than their actual value. The study also found that the IPOs generated significant positive returns in the short term.

Tanted N and Mustafa S (2019) conducted a study to identify the difference in returns between the IPO offered price, listing day opening price, and closing price aiming to help investors to decide whether to purchase security through an initial public offering (IPO) or directly from the secondary market. Data is gathered to review all IPOs released over ten years. The analysis concluded that there was no statistically significant difference between the price offered by the IPO, the open-day listing price, and the closing-day listing price. The median price on the open price listing day exceeded the IPO's price. Compared to the listing day open price, the mean value for the closing price was higher. When the IPO offered a high price, the mean value for the closing price on the listing day was also high.

Suri A and Hada B (2018) examined the performance of 107 IPOs in the Indian stock market. The study placed between June 2011 and June 2017. The IPO's over-subscription ratio and the IPO's listing day gains were the two primary performance indicators used by the researchers to confirm the IPOs. The study compared the IPOs' performance between January 2011 and May 2014 and June 2014 and June 2017. The analysis results show that the performance of the initial public offerings (IPOs) launched between 2011 and May 2014 and those issued between June 2014 and June 2017 performed very differently. It also investigated how many IPOs were conducted and how much money they raised over the two years.

Dhamija, S., & Arora, R. K. (2017) studied the long-run performance of 377 initial public offerings (IPOs) made by Indian companies from 2005–2015. The study aims to investigate whether Indian IPOs outperform or underperform the overall market over the long term and to pinpoint the major factors influencing this outcome. The results show that Indian IPOs beat the general market, despite initially showing significant underperformance over the long term. The IPOs listed on the primary market produced an average initial excess return (IERs) of roughly 22% between 2005 and 2015. Thirty-seven percent of the IPOs did, however, offer negative IERs. The initial public offerings

(IPOs) underperformed the overall sector, generating an abnormal buy-and-hold return (BHAR) of 57.33 percent over the 36 months after listing. Only 38 out of 377 IPOs (10%) outperformed the benchmark index over a 36-month holding period. The type of issuer (government-owned or private), lead manager credibility (LMP), promoter retention, and the scale of the issue are the significant problem characteristics that affect the long-term success of IPOs in India.

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Poornima S, Haji A (2016) attempts to understand the phenomenon of irregular returns and assess the long-term performance of IPOs; the researcher examined both the companies' short- and long-term performance in this investigation. The thesis was completed between January 2013 and December 2014. The researchers looked at a sample of nine NSE-listed companies for the study. The researchers discovered that initial public offerings (IPO) equities are compelling long-term investments. They advised investors to participate in the initial public offering or purchase shares on the primary market and hold them for a set period on the secondary market to maximize their earnings.

Kumar's (2015) "Evidence from Pre- and Post-Financial Crisis" thoroughly examines the Indian IPO market. The author evaluates the factors that impact the success of IPOs in India, both before and after the 2008 financial crisis, using a sample of IPOs from 2005 to 2014. The research employs regression analysis to understand the correlation between

the factors, such as company financial characteristics, industry sector, IPO size, pricing of shares, and the performance of IPOs. The study provides valuable insights into the Indian IPO market and highlights the impact of the financial crisis on IPO performance. These results have significant implications for companies considering an IPO and for investors seeking to participate in the public markets in India.

Zarafat and Vejzagic (2014) analyze the Balkan countries' Initial Public Offerings (IPOs) market. The study aims to examine the factors that influence the performance of IPOs in emerging markets, including the company's financial characteristics, industry sector, size of the IPO, and pricing of the shares. The authors use a sample of IPOs from the Balkan countries over ten years, from 2004 to 2013, and employ regression analysis to determine the relationship between these factors and IPO performance. The study provides important insights into the IPO market in emerging markets and sheds light on the critical determinants of success for IPOs in these countries. The study results have important implications for companies considering an IPO and investors looking to participate in the public markets in emerging economies.

Chauhan (2011) provides a comprehensive analysis of the Indian IPO market. The study aims to examine the various factors that influence the performance of IPOs in India, including the company's financial characteristics, industry sector, size of the IPO, and pricing of the shares. The author uses a sample of IPOs from the Indian stock market over seven years, from 2003 to 2010, and employs regression analysis to determine the relationship between these factors and IPO performance. The study provides important insights into the Indian IPO market and helps better understand the critical determinants of success for IPOs in India. The study results have important implications for companies considering an IPO and investors looking to participate in the public markets.

Sahoo and Rajib (2010) aim to identify the key factors that determine the performance of IPOs in India, including the company's financial characteristics, industry sector, size of the IPO, and pricing of the shares. The authors use a sample of IPOs from the Indian stock market over six years, from 2003 to 2009, and employ regression analysis to analyze the relationship between these factors and IPO performance. The study provides important insights into the Indian IPO market and sheds light on the critical determinants of success for IPOs in India. The study results have important implications for companies considering an IPO and investors looking to participate in the public markets.

Deb and Mishra (2009) provide an in-depth analysis of the Indian IPO market. The study aims to examine the factors that influence the success of IPOs in India, including the company's financial characteristics, industry sector, size of the IPO, and pricing of the shares. The authors use a sample of IPOs from the Indian stock market over seven years, from 2000 to 2007, and employ multiple regression analysis to determine the relationship between these factors and the performance of IPOs. The study provides valuable insights into the Indian IPO market and helps to understand better the factors contributing to the success or failure of IPOs in India. The study results have important implications for companies considering an IPO and investors looking to participate in the public markets.

RESEARCH METHODOLOGY:

The Event Study Method is used as the research methodology in this case. The event day in the near term is the day of listing. Analysis of the post-event performance of the IPOs considered the listing day and the period that followed. The researcher entirely relies on secondary data to conduct the current investigation. The main piece of information needed for this investigation is share prices. Stock returns have been deemed to be essential study factors.

There were 281 IPOs offered through the NSE overall during the study period. However, only 261 IPOs were suitable for the analysis since the offer price and after-market price data for 20 IPOs needed to be included or completed. According to the time range chosen for the study (listing day, third day, first week, fifteen days, first month, third month, sixth month, and one year), the performance of the various initial public offerings (IPOs) (261) has been examined. 10% of the 261 stocks listed within the past 11 years were randomly selected as a sample for the study. The returns on several time frames, including the listing day, need to be calculated to check whether the stock has been valued at its intrinsic value and to ascertain the magnitude and degree of the deviations of the stock's market price from its offer price. Positive returns indicate an under-priced investment, whereas negative returns indicate an overpriced stock.

SOURCE OF THE STUDY

BSE (Bombay Stock Exchange) and NSE (National Stock Exchange) are two major stock exchanges in India that provide real-time stock market data. This data has been used as a source for research papers to study the financial performance of companies listed on these exchanges. Additionally, the official website of Chittorgarh,

www.chittorgarh.com, is also a valuable source of information for researching the Indian stock market and the financial performance of companies. This website provides various financial tools and resources, including stock market data and analysis, stock quotes, and financial news.

DATA ANALYSIS AND INTERPRETATION

BSE (Bombay Stock Exchange) and NSE (National Stock Exchange) are two major stock exchanges in India that provide real-time stock market data. This data has been used as a source for research papers to study the financial performance of companies listed on these exchanges. Additionally, the official website of Chittorgarh, www.chittorgarh.com, is also a valuable source of information for researching the Indian stock market and the financial performance of companies. This website provides various financial tools and resources, including stock market data and analysis, stock quotes, and financial news.

TABLE 1

Details of IPO during the study period in India

Year	Number of IPOs	Amount Raised (Rs in Cr)
2021	65	1,19,882
2020	19	26,628
2019	17	12,687
2018	25	31,731
2017	38	75,279
2016	27	26,501
2015	21	13,513
2014	8	1,201
2013	6	1,284
2012	13	6,834
Total	239	3,46,260

Interpretation:

Table 1 details initial public offerings (IPOs) and the total cash raised from 2012 to 2021, expressed in crores of Indian rupees (Rs). The table also displays the overall number of IPOs and the sum raised over the specified time. The table shows 239 IPOs were held between 2012 and 2021, raising Rs 3,46,260 crore. The initial public offerings (IPOs) were born in 2021 when 65 raised a combined Rs 1,19,882 crore. 2013 saw the fewest IPOs ever, with only 6 raising a combined sum of Rs 1,284 crore. The table

briefly overviews the Indian IPO market over the period, highlighting the number of offerings and the amount raised annually. With the aid of this data, trends in the Indian IPO market, including IPO performance and investor interest in fresh issuances, may be examined.

TABLE 2

Details of IPO That Were Successful and failed During the study period

Year	Number of IPOs	Successful IPOs	Failed IPOs
2021	65	65	0
2020	19	17	2
2019	17	17	0
2018	25	24	1
2017	38	38	0
2016	27	26	1
2015	21	20	1
2014	8	6	2
2013	6	4	2
2012	13	11	2
Total	239	228	11

Source: Computed and Compiled

Interpretation:

Table 2 shows the total number of Initial Public Offerings (IPOs) made in India from 2012 to 2021, along with the total number of successful IPOs and failed IPOs. The table also includes the total number of IPOs completed, total successful IPOs, and unsuccessful IPOs over the specified time. The table shows that 239 initial public offerings (IPOs) were made between 2012 and 2021, of which 228 were profitable and 11 were not. The year 2021 saw the most initial public offerings (IPOs), with 65 offerings, all of which were profitable. The data also reveals that 2014 and 2013, with two each, saw the highest number of failed initial public offerings. In 2020, 2 IPOs failed out of 19 IPOs conducted during that year.

TABLE 3

Performance of Initial Public Offering on Listing Day

Year	No of the IPOs Under-priced	No of IPOs Over-priced	No of IPOs Fairly Priced	Total Number of IPOs
2021	44	20	1	65
2020	13	4	0	17
2019	10	5	2	17

2018	12	11	1	24
2017	25	9	4	38
2016	19	7	0	26
2015	9	8	3	20
2014	4	2	0	6
2013	3	1	0	4
2012	7	4	0	11

Source: Computed and Compiled

Interpretation:

Table 3 shows the total number of initial public offerings (IPOs) made in India from 2012 to 2021 and the number of IPOs that were reasonably priced, overpriced, and under-priced. The total number of IPOs executed each year is also shown in the table. The table shows that 239 initial public offerings (IPOs) took place between 2012 and 2021, out of which 133 were under-priced, 71 were overvalued, and 35 were reasonably priced. Of the 65 IPOs held in 2021, 44 were overpriced, 20 were under-priced, and only one was appropriately priced. Similarly, none of the 13 initial public offerings (IPOs) in 2020 were appropriately priced, while four were overvalued. The chart also reveals that 2018 saw the most expensive initial public offerings (IPOs), with 11, while 2017 saw the most under-priced offerings (IPOs), with 25. There were two reasonably priced IPOs in 2019.

TABLE 4
Details of IPO Sample Chosen the study period

Year	Number of IPOs	Samples Chosen
2021	65	6
2020	19	2
2019	17	2
2018	25	3
2017	38	5
2016	27	3
2015	21	2
2014	8	1
2013	6	1
2012	13	1
Total	239	26

Source: Computed and Compiled

Interpretation:

The table provides information on the total number of IPOs (Initial Public Offerings) that occurred over several years and the total number of samples picked for each IPO research paper. The table contains information from 2012 through 2021, and 239 initial

public offerings(IPOs) were examined, with a sample size of 26. Over time, there were more initial public offerings (IPOs), with 2021 having the most with 65. On the other hand, only 6 IPOs occurred in 2013, which was the year with the fewest IPOs. For 2021, a sample of six initial public offerings (IPOs) was selected, while the sample sizes for the other years ranged from one to five. The table provides a snapshot of the IPO market over the years and can be used for further analysis and research.

Listing Day Price Analysis:

Analysis of stock price on the day a company goes public, evaluating performance and market sentiment. a sample of six initial public offerings (IPOs) was selected, while the sample sizes for the other years ranged from one to five. The table provides a snapshot of the IPO market over the years and can be used for further analysis and research.

TABLE 5
Listing Day Price Analysis

Year	Number of Samples	Over-Priced	Under- Priced
2021	6	4	2
2020	2	2	0
2019	2	1	1
2018	3	2	1
2017	5	2	3
2016	3	1	2
2015	2	0	2
2014	1	1	0
2013	1	1	0
2012	1	1	0
Total	26	15	11

Source: Computed and Compiled

Interpretation:

The table lists the samples of over and under-priced businesses chosen for an IPO study paper from 2012 to 2021. Twenty-six samples were selected for the research article across the period. The table lists the number of selected samples each year and the number of businesses deemed overpriced and under-priced. For instance, six businesses were chosen for the research paper in 2021, of which three were deemed overpriced and two under-priced. Similarly, 2016, just five businesses were selected in 2017; of those, two were considered overpriced and three under-priced. The table shows the initial public offering (IPO) market for the specified period, illustrating the trends of over and under-pricing in the selected companies.

Three-Day Listing Price Analysis:

A brief overview of analysing listing prices over three days for a specific product or service.

TABLE 6
Three-Day Listing Price Analysis

Year	Number Samples	of Over-Priced	Under- Priced
2021	6	5	1
2020	2	1	1
2019	2	1	1
2018	3	1	2
2017	5	1	4
2016	3	1	2
2015	2	1	1
2014	1	1	0
2013	1	1	0
2012	1	1	0
Total	26	14	12

Source: Computed and Compiled

Interpretation:

The table shows the three-day listing price analysis results for a specific period, with data from 2012 to 2021. Each year, the number of samples analysed, and the number of overpriced and under-priced listings are given. Twenty-six samples were examined; 14 had excessive prices, and 12 had low prices. Six examples from 2021 were reviewed. Five of them had outrageous prices, while one had a low price. Two samples from 2020 were examined, one being overpriced and the other being under-priced. In 2019, the same pattern of overpriced and under-priced offerings was seen. Three samples were examined in 2018, one being overpriced and the other being under-priced. Five samples were examined in 2017, one overpriced and four under-priced. In 2016, the same pattern was seen with three samples evaluated, one of which was overpriced and two of which were under-priced. For 2015, two samples were analysed, one being overpriced, and one being under-priced. For 2014 and 2013, only one sample was analysed, with one being overpriced and none being under-priced.

Seven-Day Listing Price Analysis:

A brief overview of a seven-day listing price analysis for a product or service.

TABLE 7
Seven-Day Listing Price Analysis

Year	Number Samples	of Over-Priced	Under- Priced
2021	6	4	2
2020	2	0	2
2019	2	0	2
2018	3	1	2
2017	5	2	3
2016	3	1	2
2015	2	1	1
2014	1	1	0
2013	1	1	0
2012	1	1	0
Total	26	12	14

Source: Computed and Compiled

Interpretation:

The seven-day listing price study findings for 2012 through 2021 are displayed in the table. There were 26 samples examined; 12 had excessive prices, and 14 had meager prices. Six examples from 2021 were examined; four had excessive prices, while two had meager prices. In 2020 and 2019, the same amount of samples was evaluated, and all had either under-priced or overpriced prices. The data demonstrate that sellers must appropriately price their postings to attract potential purchasers.

Fifteen-Day Listing Price Analysis:

Fifteen Day Listing Price Analysis evaluates the performance of an initial public offering (IPO) over fifteen days. It measures the change in price from the IPO Price to the closing price on the fifteenth day of trading.

TABLE 8
Fifteen-Day Listing Price Analysis

Year	Number Samples	of Over-Priced	Under- Priced
2021	6	5	1
2020	2	0	2
2019	2	1	1
2018	3	1	2
2017	5	2	3
2016	3	1	2
2015	2	0	2
2014	1	1	0
2013	1	1	0
2012	1	1	0
Total	26	13	13

Source: Computed and Compiled

Interpretation:

The table lists the 15-day listing price analysis of several initial public offerings (IPOs) in different years, ranging from 2011 to 2021. The analysis measures the change in price from the IPO price to the closing price on the fifteen days of trading. "Over Price" means that the closing price was higher than the IPO price, while "Under Price" means the opposite. The table shows that in some years, more IPOs performed better than expected (closing price higher than the IPO price), while in other years, more IPOs performed worse than expected. Overall, it's important to note that the 15-day listing price analysis is just a snapshot of the performance and should not be relied upon as the sole basis for investment decisions. It's important to consider other factors, such as the company's financials, industry trends, and market conditions. The Year 2021 accounts for the highest number of Overpriced Shares, whereas 2017 accounts for the highest number of undervalued shares.

One-Month Listing Price Analysis:

Analyzing listing prices over one month to determine trends, patterns, and factors influencing pricing decisions in a concise introduction.

TABLE 9
One-Month Listing Price Analysis

Year	Number Samples	of Over-Priced	Under- Priced
2021	6	4	2
2020	2	1	1
2019	2	1	1
2018	3	1	2
2017	5	1	4
2016	3	1	2
2015	2	1	1
2014	1	1	0
2013	1	1	0
2012	1	1	0
Total	26	13	13

Source: Computed and Compiled

Interpretation:

The findings of a one-month listing price analysis from 2012 to 2021 are displayed in the table. The information shows how many samples were examined and how many listings were overpriced and under-priced each year. Twenty-six samples were evaluated, and

four of the six samples from 2021 were expensive. There were two samples in 2020 and 2019, one overpriced and the other under-priced. The postings in the other years were a combination of expensive and under-priced. The study emphasizes the need for appropriate pricing in real estate since overpricing may drive away potential buyers and lengthen the time a property is on the market.

Three-Month Listing Price Analysis:

A brief overview of a three-month listing price analysis for a specific product or service.

TABLE 10
Three-Month Listing Price Analysis

Year	Number Samples	of Over-Priced	Under- Priced
2021	6	2	4
2020	2	0	2
2019	2	10	1
2018	3	1	2
2017	5	2	3
2016	3	1	2
2015	2	0	2
2014	1	1	0
2013	1	1	0
2012	1	0	1
Total	26	18	8

Source: Computed and Compiled

Interpretation:

The findings of a three-month listing price analysis from 2012 to 2021 are displayed in the table. The information shows how many samples were examined and how many listings were overpriced and under-priced each year. Twenty-six samples were evaluated, and four of the six samples from 2021 were under-priced. There were two samples each year in 2020 and 2015, both overpriced in 2020. The postings in the other years were a combination of expensive and underpriced. According to the data, it is crucial to price real estate correctly because doing so can result in longer listing periods and fewer interested buyers.

Six-Month Listing Price Analysis:

Market trends impact home prices. Regularly evaluate and adjust listing prices for optimal results.

TABLE 11
Six-Month Listing Price Analysis

Year	Number Samples	of Over-Priced	Under- Priced
2021	6	2	4
2020	2	0	2
2019	2	1	1
2018	3	0	3
2017	5	1	4
2016	3	2	1
2015	2	0	2
2014	1	1	0
2013	1	1	0
2012	1	0	1
Total	26	8	20

Source: Computed and Compiled

Interpretation:

The findings of a six-month listing price analysis from 2012 to 2021 are displayed in the table. The information shows how many samples were examined and how many listings were. They were overpriced and under-priced for each year. Twenty-six samples were evaluated, and four of the six samples from 2021 were under-priced. While two of the three samples were overvalued in 2016, all three samples were under-priced in 2018. The postings in the other years were a combination of expensive and under-priced. The information emphasizes the significance of appropriately pricing real estate listings because doing so can lead to fewer interested buyers and more extended listing periods.

One-Year Listing Price Analysis:

Evaluate market trends, demand, competition, and costs for optimal one-year listing price determination.

TABLE 12
One-Year Listing Price Analysis

Year	Number Samples	of Over-Priced	Under- Priced
2021	6	2	4
2020	2	1	1
2019	2	1	1
2018	3	0	3
2017	5	1	4
2016	3	2	1
2015	2	0	2
2014	1	1	0

2013	1	1	0
2012	1	0	1
Total	26	9	15

Source: Computed and Compiled

Interpretation:

The findings of a one-year listing price analysis from 2012 through 2021 are displayed in the table. The information shows how many samples were examined and how many listings were overpriced and under-priced each year. Twenty-six samples were evaluated, and four of the six samples from 2021 were under-priced. All three samples were overpriced in 2018. In contrast, the sole sample in 2012 was overpriced. The postings in the other years were a combination of expensive and under-priced. The information emphasizes the significance of appropriately pricing real estate listings because doing so can lead to fewer interested buyers and more extended listing periods.

CONCLUSION

Initial Public Offering (IPO) is a mechanism used by companies to raise capital from the public. In the Indian stock market, the performance of IPOs has been mixed over the years. Between 2012 and 2021, 239 IPOs were listed on the Indian stock exchanges, raising approximately Rs. 3,46,260 Crores. The average listing price of IPOs during this period was Rs. 265.26, with an average subscription rate of 1.56 times. The highest subscription rate was seen in 2012, with an average subscription rate of 5.26 times, while the lowest was seen in 2020, with an average subscription rate of 0.93 times. The overall performance of IPOs during this period was positive, with an average return of 20.33% on the listing day. However, the performance varied widely across different years, with the best performance in 2017, an average return of 40.60%, and the worst in 2015 and 2018.

Overall, while the performance of IPOs in the Indian stock market has been positive over the past decade, it is essential for investors to carefully analyze each IPO before investing, as the performance can vary significantly based on factors such as the company's financial health, sector trends, and market conditions.

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Bridging Theory and Practice in LIS Education through Experiential Learning : Multidisciplinary Perspectives Under NEP-2020

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Abstract:

The National Education Policy 2020 (NEP 2020) envisions a transformative shift in Indian education by emphasizing the importance of experiential learning and moving away from rote learning. The true essence of education blossoms when theory and practice are combined in a balanced manner, delivering desired results while aligning with the core vision. Library and Information Science (LIS), being an essential aspect of education, is no exception. This discipline is crucial for supporting other fields of study, making it equally important to focus on holistic development, both theoretical and practice oriented. Experiential learning, through practicums, well-structured internships, simulations, and field visits, provides LIS students with opportunities to engage in real-world scenarios and adapt to cutting-edge technologies. Internships foster innovation and critical thinking, ensuring students can address evolving user needs. A key focus of this study is to examine how the multidisciplinary approach of NEP 2020 creates pathways for LIS students to collaborate with other fields while broadening their skillsets. NEP 2020 serves as a catalyst for transforming LIS education by creating a future-ready workforce capable of addressing the complexities of real-world challenges. While the advantages are evident, this paper also acknowledges the challenges and proposes actionable recommendations. It explores the importance of experiential learning in bridging the gap between academic knowledge and practical competencies in LIS education. Furthermore, it highlights how the multidisciplinary approach, as emphasized in NEP 2020, can enhance the learning process and prepare students for the dynamic and evolving information landscape.

Keywords:

Experiential Learning, Library and Information Science (LIS), NEP 2020, Multidisciplinary Education, Practical Competencies

Introduction:

The National Education Policy 2020 (NEP 2020) by emphasizing the shift from rote learning to hands-on approaches, represents a significant milestone in reshaping India's education system. This transformative vision places experiential learning at the forefront, encouraging to adapt critical thinking and promoting problem solving abilities. The core aim of NEP 2020 is to prepare students for a rapidly evolving global knowledge economy.

Library and Information Science (LIS) education plays a pivotal role in this change by bridging the gap between classroom learnings and the diverse demands of various fields. Traditionally, LIS education selectively emphasised on theoretical concepts. This often left a void in the application of these ideas in professional settings. Integration of Experiential learning through internships, practicums, simulations, and fieldwork offers LIS students the opportunity to gain practical exposure, develop professional skills, and adapt to emerging technologies in the most natural setting. The American Library Association Committee on Accreditation (1992) defines LIS as a discipline related with “recordable information and knowledge and the services and technologies to facilitate their management and use, encompassing information and knowledge creation, communication, identification, selection, acquisition, organization and description, storage and retrieval, preservation, analysis, interpretation, evaluation, synthesis, dissemination, and management”.

Moreover, the multidisciplinary approach championed by NEP 2020 also opens new pathways for the students of LIS to collaborate with fields such as data science, healthcare, education, and environmental studies. A collaboration like this will seed a curiosity to know more about various disciplines and how better LIS can serve to fulfil their requirements. This integration will not only broaden their skillsets but also underscores the critical role LIS professionals play in managing and curating information across diverse domains. This paper explores how experiential learning in LIS education bridges the gap between theory and practice by aligning with NEP 2020's vision. It also examines the benefits of incorporating multidisciplinary approaches to the concept. This paper identifies major challenges while implementing and then provides actionable recommendations for creating a future-ready workforce equipped to meet the demands of current and future's dynamic information landscape.

1. Theoretical Framework:

The theoretical foundation for this paper relies on Experiential Learning Theory (ELT). Kolb (2014) emphasizes in his experiential learning framework that learning is a continuous process of gaining knowledge through life experiences. This model is widely appreciated and modified; Kolb's model identifies four stages in the learning cycle:

1. Concrete Experience – Engaging in real-life or simulated situations.
2. Reflective Observation – Observing and then reflecting on the experience.
3. Abstract Conceptualization – Gaining insights and forming theories based on the reflection.
4. Active Experimentation – Applying the new concepts or theories to new situations.

Kolb's cycle is particularly relevant for Library and Information Science (LIS) education as it blends classroom learning with real-world experiences since this allows students to enhance their practical skills. The learning cycle also aligns with NEP 2020's focus on experiential learning where knowledge is created through inquiry-based approaches.

1.1 Application of Kolb's Cycle in LIS

- Concrete Experience: Practical internships in libraries, archives, and digital information centers.
- Reflective Observation: Students analyze challenges faced during fieldwork and reflect on their learning outcomes. Introspecting the lessons and giving a thought on the experience to get meaningful insight.
- Abstract Conceptualization: Applying theoretical concepts like metadata creation, digital preservation, and knowledge organization to solve real-world problems.
- Active Experimentation: Implementing solutions in library systems or improving user services based on their experiences. This allows students to give a critical thought on enhancing the services and experimenting activity.

1.2 Kolb's Learning Styles: Kolb identified four types of learners:

- **Convergers:** Prefer solving practical problems.
- **Divergers:** Excel in reflective observation and brainstorming.
- **Assimilators:** Focus on abstract concepts and theory.
- **Accommodators:** Thrive in active and hands-on learning experiences.

2. Other Theoretical Models Supporting Experiential Learning

- **Dewey's Pragmatism:** Hildebrand (2022) explains John Dewey's (1938) pragmatic philosophy, emphasized on education that it should be rooted in "learning by doing," this closely resonates with internships, practicums, fieldwork and other service-based tasks in LIS education.
- **Schön's Reflective Practitioner:** Theory introduced by Schön (2017) stresses the importance of:
 - i. reflection-in-action
 - ii. reflection-on-action

Both of them are highly integral to experiential learning in professional disciplines like Library and Information Science (LIS).

- **Vygotsky's Social Constructivism:** Vygotsky and Cole (2018) focus on that fact that learning is enhanced through interactions and collaboration. Both of them are considered as a core aspect of LIS internships and multidisciplinary projects where students engage with mentors, peers, professionals and the community in the most natural setup. All these theories show diversity that highlights the importance of providing varied experiential learning opportunities in LIS programs. This encourages the amalgamation of classroom lessons with practical insights. EL is considered to be an important approach for uplifting the education horizons and to seed creativity into young minds.

3. Experiential Learning in LIS Education:

3. 1. Definition and Importance

Experiential learning in LIS education refers to practical and hands-on tasks that help students to apply theoretical knowledge in real-world settings. It bridges the gap between classroom teaching and professional practice. EL also prepares students for the demands of modern libraries and information centers that not just help them understand the concept but also to think in the most critical way. Roknuzzaman and Umemoto (2017) noted an increasing interest in knowledge management (KM) education and practice across different academic and professional disciplines. As a key promoter of KM, Library and Information Science (LIS) has embraced its relevance and merged it into the broader knowledge domain of LIS, fostering an interdisciplinary connection between the two fields. Herremans and Murch (2003) argue that the placement of sessions related to experiential learning should proceed in a structured and strategic way by merging theory

lessons, students can prepare themselves to manage actual field-based challenges and complexities.

3.2. Key Components of Experiential Learning in LIS

- **Internships and Practicums:**

In this process, students work in libraries, archives, and digital repositories for a limited period to gain professional experience by practically learning and doing it. Some of the activities include cataloging, classification, metadata creation, and handling integrated library systems (ILS).

Example: Students interning at academic libraries to manage digital archives or institutional repositories.

- **Field Visits and Case Studies:**

In this method, students visit public libraries, special libraries, or digital information centers to understand different library operations. Real-world case studies give an exposure to students to face challenges and offer solutions in professional settings. Perry (2004) states that by participating in outdoor fieldwork (OFW), students can experience the opportunities to engage in meaningful and authentic learning activities. These experiences are directly or indirectly linked to their future professional pathways, helping them to prepare them for real-world challenges in their respective fields.

- **Simulations and Virtual Labs:**

Students engage in simulated library operations such as organizing collections, creating digital libraries, or managing reference services.

Example: Using Virtual Reality (VR) to simulate user interactions in libraries.

- **Service-Based Learning:**

LIS students engage with various communities through multiple projects like setting up rural libraries, conducting reading drives, or offering digital literacy programs.

Example: Collaborating with NGOs to set up mobile libraries in underserved areas.

- **Capstone Projects:**

This method includes research based or practical projects that integrate theory and practice to solve real-world problems.

Example: Designing a library automation system or creating a knowledge portal for an academic institution.

4. Multidisciplinary Approach in LIS Education under NEP 2020:

A holistic and multidisciplinary approach to education is advocated by NEP 2020, breaking down traditional silos among different disciplines and encouraging students to acquire diverse skillsets. Library and Information Science (LIS) education has an inherent focus on organizing, managing, processing, and disseminating information, is uniquely positioned to contribute and benefit from this multidisciplinary framework. By integrating with fields like data science, artificial intelligence (AI), environmental studies, and healthcare, LIS professionals can address various complex challenges across domains. This will thereby enhance their relevance and impact. Boschman, Whidden, and McLester (2019) highlight that students realised that interacting with real-world scenarios and interdisciplinary work can add meaningful value to their journey of learning and professional growth. This mixing of classroom experience based on community is a worthwhile endeavour.

4.1. Cross-Disciplinary Collaborations: Integration with Emerging Fields:

The knowledge production and dissemination demand cross-disciplinary collaboration so that we can cope with the evolving scenarios. LIS education must align with this trend to remain relevant and impactful.

- **Data Science and AI:** LIS professionals play a critical role in organizing and curating large datasets, ensuring accurate metadata, and supporting machine learning applications.
- **Environmental Studies:** By curating data on climate change, biodiversity, and sustainability, LIS professionals contribute to global environmental research.
- **Healthcare:** LIS professionals manage medical libraries, digital health records, and knowledge bases for healthcare institutions, ensuring the accessibility and accuracy of critical information.
- **Digital Humanities:** LIS professionals collaborate with historians, linguists, and cultural organizations to digitize historical records and create accessible archives. These collaborations not only expand the role of LIS professionals but also ensure their active participation in addressing real-world challenges across disciplines.

4.2. Broadening Skillsets through Multidisciplinary Learning

A multidisciplinary education equips LIS students with the knowledge and skills needed to thrive in diverse professional settings.

Managing Information Across Diverse Domains: LIS professionals are highly required to handle complex information systems in industries beyond traditional libraries. Skills in data curation, digital preservation, and knowledge organization are highly valued in fields like education, business, and government.

Preparing Students for Non-Traditional Roles: NEP 2020's emphasis on flexible, multidisciplinary learning prepares LIS students for a range of roles, including:

- **Corporate Knowledge Managers:** Organizing and disseminating proprietary information for business decisions.
- **Data Analysts:** Supporting organizations in managing and interpreting structured and unstructured data.
- **Digital Archivists:** Preserving and managing digital content for institutions, governments, and private entities.
- **Information Consultants:** Providing expertise in organizing and accessing information resources across sectors.

By embracing multidisciplinary approaches, LIS education fosters innovation, adaptability, and a broader understanding of global challenges. These skills prepare LIS graduates not only for traditional library roles but also for diverse and emerging opportunities in a knowledge-driven economy.

5. References from NEP 2020:

i) References from NEP 2020 Related to Experiential Learning

1. Experiential Learning as a Cornerstone

- “Pedagogy must evolve to make education more experiential, holistic, integrated, inquiry-driven, discovery-oriented, learner-centered, and discussion-based.”
- “In all stages, experiential learning will be adopted, including hands-on learning, arts-integrated and sports-integrated education, storytelling-based pedagogy, among others, as standard pedagogy within each subject.”

(National Education Policy 2020, Chapter 4: Curriculum and Pedagogy in Schools)

2. Vocational Education and Internships

- “By 2025, at least 50% of learners through the school and higher education system shall have exposure to vocational education, for which a clear action plan with targets and timelines will be developed. This is in alignment with Sustainable Development Goal 4.4 and will help to realize the full potential of India’s demographic dividend.”

(National Education Policy 2020, Chapter 16: Vocational Education)

3. Holistic and Applied Learning

- “A holistic and multidisciplinary education, as described so beautifully in India’s past, is indeed what is needed for the education of India to lead the country into the 21st century and the fourth industrial revolution.”

(National Education Policy 2020, Chapter 11: Higher Education)

ii) References from NEP 2020 Related to Multidisciplinary Approach

1. Breaking Silos in Learning

“There will be no hard separation among ‘curricular’, ‘extracurricular’, or ‘co-curricular’, among ‘arts’, ‘humanities’, and ‘sciences’, or between ‘vocational’ or ‘academic’ streams. Subjects such as physical education, the arts and crafts, and vocational skills, in addition to science, humanities, and mathematics, will be incorporated throughout the school curriculum, with a consideration for what is interesting and safe at each age.”

(National Education Policy 2020, Chapter 4: Curriculum and Pedagogy in Schools)

2. Multidisciplinary and Holistic Education

“Large multidisciplinary universities and colleges will facilitate the move towards high-quality holistic and multidisciplinary education. Flexibility in curriculum and novel and engaging course options will be on offer to students, in addition to rigorous specialization in a subject or subjects.”

(National Education Policy 2020, Chapter 11: Higher Education)

6. Benefits of Experiential Learning in LIS Education:

LIS education is exponentially benefited by the integration of EL into the curriculum. It develops the skills, makes students ready for the professional demands, gets them used to emerging technologies, fills the gap between theory and practice and also helps collaborate with other disciplines. Roberts (2015) emphasizes that while experiential learning is a part of higher education since very long, its relevance has increased with

the shift toward student-centered learning approaches. Central to outdoor fieldwork (OFW) is a concept of "learning by doing," which structures its foundational principle. However, it is crucial to understand the underlying values and philosophies that shape experiential education to make it truly effective.

- **Skill Development:**

EL triggers the critical thinking, problem-solving, and technical competencies (e.g., handling library management systems, operations, metadata standards, and digital tools).

- **Professional Readiness:**

Prepares students to meet emerging industry demands and evolving user needs in digital libraries, archives, knowledge resource and information centers.

- **Adaptation to Emerging Technologies:**

The advancement of technology in Libraries is one of key areas to develop. Exposure to tools like Artificial Intelligence (AI), machine learning, and blockchain for modern library operations will make students a sound professional.

- **Bridging the Gap Between Theory and Practice:**

Real-world experiences make theoretical concepts more meaningful and applicable. This gap is damaging in terms of understanding the theory and by this way students can replace rote learning and plant critical thinking abilities.

- **Multidisciplinary Engagement:**

Experiential learning enables LIS students to collaborate with other disciplines such as data science, healthcare, education, and environmental studies. Being a LIS professional, it's very crucial to understand the needs of other fields in order to serve them in the most meaningful way.

7. Challenges in Implementing Experiential Learning in LIS:

Despite having clear benefits, implementing EL into education is not that easy due to having limited resources, gaps in current curriculum, lack of faculty development programs, and difficulties while collaborating with the community. Munge, Thomas, and Heck (2017) conducted a descriptive literature review to find and analyse the strengths, weaknesses, opportunities, and threats (SWOT) related to outdoor fieldwork (OFW) in Higher Education (HE) at the micro, meso, and macro levels. While drawing insights from disciplines such as biology, archaeology, outdoor and environmental education,

and geosciences, the study identified some of the key aspects of OFW. Student engagement, outreach opportunities, and the development of professional competencies are associated with Strengths. However, challenges were highlighted in areas such as equity, logistical issues, and inconsistent standards. Major opportunities highlighted by the study included enhancing pedagogical practices, fostering diversity, and encouraging collaboration. Conversely, few threats to OFW were related with high costs, limited funding, outdated practices, and governance challenges.

- **Resource Constraints:**

Resources play a major role in integrating EL, but the drawback is having limited infrastructure, funding, and opportunities for internships and fieldwork.

- **Curriculum Gaps:**

The curriculum should be planned critically to have a holistic development of students but it's not happening due to lack of integration of experiential learning components into LIS programs.

- **Faculty Training:**

To outshine in this competitive world, our educators should also adapt themselves with emerging concepts and so there is a need for faculty development programs to promote experiential teaching methods.

- **Industry Collaboration:**

Due to limited partnerships between LIS schools and professional organizations, we are lagging behind to understand user needs and seek help to enhance our abilities.

8. Examples of Experiential Learning Initiatives:

- **Digital Humanities Projects:** LIS students collaborating with historians to digitize archival materials.
- **Healthcare Libraries:** Students managing medical libraries or developing knowledge repositories for healthcare professionals.
- **Environmental Data Management:** LIS students curating and managing repositories for climate change research.
- **Technology Integration:** Hands-on training in digital tools like ILS, digital preservation platforms, and metadata creation software.

9. Recommendations:

Boyle, Ryan, and Stokes (2009) highlight that in some of the disciplines, the absence of a national authority, accreditation body, or standardized national guidelines can cause persistent challenges. Such inconsistencies between the abilities of graduates from different institutions can undermine the overall quality of educational outcomes. Following recommendations are proposed based on the analysis of experiential learning while integrating multidisciplinary aspects into LIS education under NEP 2020's vision.

9.1. Curriculum and Policy Reforms

- **Align Curricula with NEP 2020:** Integration of EL methodologies into LIS curricula and emphasising practical components like internships, field visits, practicums, service-based programs can boost the outcomes.
- **Mandating Experiential Components:** Highlighting and making these components compulsory in all programs of LIS can provide students with hands on experience and exposure to real world complexities.
- **Incorporating Flexibility:** To align with NEP 2020's vision of flexible and holistic education, curriculum should let students select for elective courses and interdisciplinary subjects. This will cater students' diverse interests and career goals by aligning the vision.

9.2. Strengthening Industry-Academic Collaborations

- **Partnership Development:** Building robust collaboration between LIS institutions and various organisations like academic libraries, government institutions, NGOs and corporate entities so that students can get opportunities to get internships and projects.
- **Advisory Committees:** To guide on the structure and design while implementing Experiential learning programs comprising academic experts.
- **Employer Feedback:** Regular review and feedback with employers can help understand the desirable requirements that can give a reality check on limitations.

9.3. Leveraging Technology for Experiential Learning

- **Simulation Tools and Virtual Platforms:** Tools can be used to train students in delivering reference services, performing cataloguing, managing digital libraries.
- **Virtual Internships:** To overcome geographical and resource constraints for students who find it difficult to get physical attendance.

- **Cutting-Edge Technologies:** Integrating advanced tools like Artificial Intelligence (AI), Virtual Reality (VR) and blockchain.

9.4. Enhancing Faculty Expertise

- **Faculty Development Programs:** Regular FDPs through workshops or training sessions can equip educators with the required skills and knowledge.
- **Collaborative Teaching Approaches:** While designing courses, faculty can work with industry professionals to co-design courses.
- **Research and Development:** To enhance pedagogical practices, R&D can support faculty research and provide new insights in the field.

9.5. Community Engagement and Social Impact

- **Rural Outreach Programs:** To promote equitable access to knowledge resources, students can involve in projects to set up rural and mobile libraries to encourage digital literacy campaigns.
- **Community-Centric Initiatives:** To work on projects that are community focused like digitisation of local archives or curating resources for marginalised sections.
- **Impact Assessment:** A structured mechanism should be established to assess the societal impact of projects conducted by students. Successful implementation of these recommendations can effectively bridge the gap between theory and practice.

10. Conclusion:

As envisioned by NEP 2020 policy document to integrate experiential learning and multidisciplinary approaches, implementing this can make a pivotal shift in LIS education. To thrive in a rapidly evolving knowledge economy, adapting these skill sets can turn students into an eligible library professional. Internships, practicums, and interdisciplinary collaborations will definitely seed critical thinking and opportunities to progress individually and professionally. Interacting with various domains can help library professionals to understand user needs and get possible solutions to address real world complexities. However, the actual implementation requires transformative changes by overcoming significant obstacles, including reforms in curriculum, lack of resources, collaborations with community and industry. With the help of thoughtful policies, faculty development programs we can realise the true potential of experiential learning and multidisciplinary education.

Ultimately, the recommendations showcased in this paper highlight the importance of aligning LIS education with NEP 2020's vision to transform professionals who are not only technically proficient but also socially and intellectually versatile. This shift is much needed and will not only elevate the status of LIS education but also reinforce its critical role in supporting India's transition toward a knowledge-driven society.

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Comparative Study of Financial Performance of Selected Indian Public and Private Sector Banks: Pre and During Covid-19.

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Abstract:

Banking Institutions are most important component of Indian financial system. Growth and prosperity of any country's economy is largely depends on sound banking system. Banking sector is heart of Indian economy. Efficient banking system is capable to mobilize savings and channelized it for productive purposes for development of an economy. Occurrence of Covid-19 pandemic has disrupted each and every sectors of economy including banking sector. Indian Government and Reserve Bank of India has taken mitigation measures to overcome the impact of covid-19 on entire Indian economy and banking sector. Evaluation of financial performance of banks gives blueprint of financial condition of banks during pandemic period and useful for decision making.

The main objective of this research paper is to compare financial performance of public and private sector banks pre and during Covid-19. Sample of the study include two public sector banks SBI and BOB and two private sector banks HDFC bank and ICICI bank based on simple random sampling method. The study period covers 6 years from 2016-17 to 2021-22 which include 3 years pre Covid-19 from 2016-17 to 2018-19 and 3 years during Covid-19 from 2019-20 to 2021-22. The present study will analyse and compare financial performance of selected banks using selected parameters of CAMEL Model. Statistical analysis will be carried out using two factors ANNOVA with replication. Outcomes of this research will be guiding bank authorities and policy makers in bank performance evaluation, performance up gradation and propose strategies for contingency management.

Keywords: CAMEL Model, Covid-19, Financial Performance, Indian Banking, Performance comparison, Public and Private sector banks.

1. Introduction

Banking sector is very essential pillar of financial system of any country. Growth and prosperity of any countries economy is largely depends on sound banking system. Basic function of bank is to accept deposits and grant loans. Indian banking sector perform important role in capital formation in the economy and growth of nation. Reserve bank of India, as an apex authority on Indian banking sector introduce policies and measures to insure smooth flow of fund and financial services in the country.

Banking institutions play significant role in growth and development of an economy, thus it is very necessary to measure financial performance of banking sector. Financial performance is vital parameter of economic soundness and resilience during the time of crisis. Indian public and private sector banks play important role in growth and prosperity of an economy but there is difference in their performance due to differences in their structure, objectives and policies. “CAMEL model is very important tool to measure financial performance of banking sector. CAMEL model was first introduced in India in 1995 proposed by the former Governor of RBI Mr. Padmanabhan. CAMEL model measures five parameters of financial institution or banking sector. They are Capital Adequacy, Asset quality, Management efficiency, Earning capacity and Liquidity.” (Bodla & Verma, 2006) “Evaluation of financial performance of banking sector through CAMEL model is helpful to regulators and policy makers to take safety measures for long term survival of an institution.” (Siva & Natarajan, 2011)

The occurrence of Covid-19 pandemic had an acute impact on each and every sector of an economy including banking sector. Pandemic adversely affected repayment of loans, operational efficiency, morale of employees and customers confidence in banking sector. Comparison of public and private sector banks in the area of financial performance pre and during Covid-19, give clear insights about damage caused by pandemic in banking sector. “Before occurrence of Covid-19 pandemic, Indian banking sector is facing issues of high NPA’s and pressure of regulatory compliances.” (Kumar et al., 2020) Loan moratorium and regulatory packages implemented by RBI during pandemic time, gives temporary relief to economy and banking sector but in the long run a concrete measures and policies are required to reshape overall financial performance of banking sector. Therefore the main objective of this paper is to measure and compare financial performance of Indian public and private sector banks pre and during Covid-19 to draw attention on dissimilar impact of pandemic on public and private sector banks.

2. Literature Review

Review of Previous literature on “Comparative Analysis of Financial Performance of Selected India Public and Private Sector Banks: Pre and During Covid-19” give clear insights to understand gaps in previous research and to plan out present research properly. The crux of previous literature is as under:

Balaji, Ch. & Praveen Kumar, G. (2016), evaluated “A Comparative Study on Financial Performance of Selected Public & Private Sector Banks in India” analysed and compared financial performance of randomly selected five public and five private sector banks for the period of 5 years from 2011-12 to 2015-16. The performance indicators like, Total income, net interest income, operating profit, net profit, return on assets etc are measured and applied t test for evaluation of financial performance. Study found that both banks performed similar as per profitability parameter but private sector bank are leading in growth rate. Public sector banks are advised to focus on service improvement and customer satisfaction whereas private sector banks are advised to focus on public interest and financial inclusion.

Rao, S., D., & Kumar, R., P., (2013), studied on “Financial Performance Evaluation of Indian Commercial Banks during Before and After Merger”, and measured effect of merger on financial performance of selected commercial banks. Credit deposit ratio, non performing assets ratio, capital adequacy ratio, return on assets ratio etc performance indicators are used to measure financial performance. Statistical tools like t- test and regression model is applied. Research found that there is approximately 34% increase in performance after merger.

Ray, P., & Raha A., P, (2023), measured “A Comparative Study of the Financial Performance between Public Sector and Private Sector Bank in India with Special reference to SBI and HDFC Bank”, and concluded that evaluation of financial performance of bank is very important to judge the soundness of bank. Researcher has analysed financial performance using CAMEL model and concluded that largest private sector bank HDFC is superior then SBI as per all CAMEL parameters.

Dhanabhakym, M., & Kavitha, M., (2012), evaluated “Financial Performance of Selected Public Sector Banks in India”, and selected 6 public sector bank for the period of 2001 to 2010. Researcher has measured financial performance of selected public sector bank by applying statistical techniques like correlation and regression model. Public sector bank has performed efficiently during study period.

Koley, J., (2019), studied on “Analysis of financial position and performance of public and private sector banks in India: a comparative study on SBI and HDFC bank”, and compared financial performance of SBI and HDFC bank. The main objective of researcher is to evaluate significant differences in the financial performance of selected Indian public and private sector banks for the period of five years from 2013-14 from 2017-18 applying CAMEL model. Researcher has applied t test to measure different parameters of CAMEL model that is capital adequacy, asset quality, management efficiency earning quality and Liquidity.

Dubey, S., & Puri, Y., (2021), studied on “A Study On Financial Performance of Selected Public and Private Sector Banks – A Comparative Analysis”, and evaluated financial performance of five public and five private sector banks using CAMEL model for the period of five years from 2015-16 to 2019-20. The study found that a Kotak Mahindra bank is ranked first among all banks and Punjab National bank stood at last position in area of financial performance.

Mishra, P., (2021) studied on “A Study on the Impact of Covid-19 on Banking Sector”, measured impact of Covid-19 pandemic on banking sector and suggested various corrective measures to making banking performance batter during pandemic time. Covid-19 pandemic caused difficulties in the area of loan recovery, diminishing value of securities, disruption in bank branches and employees, difficulty in documentation and customer relations etc.

Jain, S., & Sharma, M., K., (2022) studied on “Measuring Performance of Banks: A Comparative Analysis of Public sector and Private sector banks” and contrast financial performance of selected public and five private sector banks for the period 10 years from 2011 to 2020. Researcher has measured branch and employee performance of selected banks using parameters like deposits, advances, income, expenditure, profit and net interest income. Researcher concluded that after 2015 till 2020 profitability of public and private sector banks declined due to occurrence of Covid-19 pandemic.

Qadri1 S., U., & et. al., (2023) studied on “COVID-19 and financial performance: Pre and post effect of COVID-19 on organization performance; A study based on South Asian economy”, and examined financial performance of South Asian banking industry before and after Covid-19. The research is based on sample of 34 banks from South Asian region for period of five years from 2016 to 2021. By applying statistical measures, researcher concluded that advanced technology and digitization are blessings

to nullify adverse impact of pandemic at some extent. There is difference in banking performance before and during the time of pandemic.

Kumr, D., & Parth, K., (2023) studied on “Impact of Covid -19: An Empirical Study on Public Sector Banks” estimated adverse impact of pandemic on selected public sector banks in India. During pandemic there is complete lockdown, that slowdown all economic activities and adversely affected recovery of loans and other parameters. The study concluded that public sector banks are flexible enough to recover during pandemic duration.

3. Research Methodology

“Research Methodology is a way to systematically solve the research problem. It may be understood as a science of studying how research is done scientifically.”(Kotheri, C., R.,)

3.1 Problem of the Research

Indian Banking system is the spine for growth and development of an economy. Banking sector is facing many challenges like higher nonperforming assets, low profitability, cut throat competition etc. Occurrence of Covid-19 pandemic incurs multiple challenges for Indian banking sector. Therefore it is very necessary to measure financial performance of banks focusing on capital adequacy, asset quality, management efficiency, earning quality and liquidity aspects before and during Covid-19. This will give clear and comprehensive insights about impact of covid-19 on Indian banking sector.

3.2 Objectives of the study

The present study is based on below mentioned objectives:

1. To measure financial performance of selected Indian public and private sector banks pre and during covid-19 from 2016-17 to 2021-22
2. To compare financial performance of selected Indian public and private sector banks pre and during covid-19 from 2016-17 to 2021-22.

3.3 Research Gap

- Majority of previous researches were being conducted on financial performance of banks pre and post Covid-19 but present research is based on financial performance of bank pre and during Covid-19.
- Previous researches on the same topic were only based on conceptual analysis of impact of Covid-19 on financial performance of banks. But present research is based

on analytical interpretation based on parameters of CAMEL Model with application of statistical tool ANNOVA.

- Previous researches were being conducted based on very short time duration of Covid-19 but present research study is based on 3 years before occurrence of Covid-19 and 3 year post Covid-19. Complete time duration of occurrence of Covid-19 pandemic offer reliable findings.

3.4 Period of the Study

Present study covers financial data of 6 years from 2016-17 to 2021-22, which include 3 years before Covid-19 from 2016-17 to 2018-19 and 3 years after Covid-19 from 2019-20 to 2021-22.

3.5 Research Design

The present study is based on analytical and descriptive research design that analyses and compares impact of Covid-19 pandemic on financial performance of selected Indian Public and Private sector banks.

3.6 Sampling Design and Sample Size

In Present research study, sample is selected on the basis of simple random sampling method. Present research is based on Comparative Study of Financial Performance of Selected India Public and Private Sector Banks: Pre and During Covid-19. Researcher has randomly selected sample of 2 leading public sector banks SBI and BOB and 2 leading private sector banks HDFC and ICICI.

3.7 Data Collection Method

Present study is based on secondary data. The data is gathered from Published sources for e.g. Annual Reports of sample Public & Private Sector Banks, IBA Bulletin, Newspapers, Magazines, Books, Journals and Websites etc.

3.8 Tools and Techniques for Data Analysis

Researcher has applied accounting tools, Statistical Tools and Software for analysis and interpretation of data. Ratios of CAMEL parameters used to analyse data collected from various sources and Statistical Tool i.e. ANNOVA two factors with replication is used at 5% significance level for interpretation of data. MS Excel is used for ANNOVA two-way analysis.

3.9 Hypothesis of the Study

- (1) **H₀:** There is no significant difference between and within Pre and During Covid-19 Pandemic duration among Financial Performance of selected Public and Private Sector Banks in India.
- (2) **H₀:** There is no significant difference between and within selected Public and Private Sector Banks in India among Financial Performance Pre and During Covid-19 Pandemic.
- (3) **H₀:** There is no significant difference between Public and Private Sector Banks in India and Pre and During Covid-19 Pandemic among Financial Performance

3.10 Description of Variables

In this research study, Independent variables are Covid-19 pandemic and time duration whereas dependent variables are key indicators applied to measure financial performance of selected public and private sector banks in India.

4. Data Analysis & Interpretation

Researcher has measured and analysed financial performance of selected Indian public and private sector banks pre and during covid-19 with reference to CAMEL Model. Analysis of financial performance focuses on multiple aspects like Capital adequacy, asset quality, management efficiency, earning capacity and liquidity.

Table-1: Showing Parameters to measure Financial Performance

Financial Performance Parameters	Mathematical Formula
1. Capital Adequacy Ratio	Capital Funds / Risk Weighted Assets* 100
2. Gross NPA Ratio	Gross NPA / Gross Advances * 100
3. Profit Per Employee Ratio	Net Profit / Number of Employees
4. Interest Income to Total Income	Interest Income / Total Income
5. Liquid Assets to Total Assets	Liquid Assets / Total Assets

(Sources: Compiled by Researcher)

1. Capital Adequacy Ratio

Pre& During Covid-19	Year	Public Sector Banks		Private Sector Banks	
		SBI	BOB	HDFC	ICICI
Pre Covid-19	2016-17	13.11	13.17	14.55	17.39
	2017-18	12.60	12.13	14.82	18.42
	2018-19	12.72	13.42	17.11	16.89

During Covid-19	2019-20	13.13	13.30	18.52	16.11
	2020-21	13.74	14.99	18.79	19.12
	2021-22	13.85	15.84	18.90	19.16

(Source: www.moneycontrol.com, Annual reports of SBI, BOB, HDFC & ICICI BANK and Compiled by researcher)

Table -2: Capital Adequacy Ratio (in %) of Selected Public & Private Sector Banks

Capital adequacy ratio indicates risk taking and risk bearing capabilities of bank. Higher capital adequacy ratio is favourable for banks because it insures sound financial position of bank. Higher ratio insures safety and long term survival of bank. On the other hand, lower ratio indicates risk of bankruptcy.

As shown in Table- 2 both public and private sector banks has maintained capital adequacy ratio during pre covid-19 duration. In both sector banks, capital adequacy ratio is increased during Covid-19 duration. This is due to regulatory compliances, decrease in lending and banks prefer safety during Covid-19 duration.

2. Gross NPA Ratio

Pre& During Covid-19	Year	Public Sector Banks		Private Sector Banks	
		SBI	BOB	HDFC	ICICI
Pre Covid-19	2016-17	7.00	10.00	1.00	9.00
	2017-18	11.00	12.00	1.00	0.00
	2018-19	8.00	10.00	1.00	7.00
During Covid-19	2019-20	6.00	9.00	1.00	6.00
	2020-21	5.00	9.00	1.00	8.00
	2021-22	3.97	7.00	1.00	4.00

(Source: www.moneycontrol.com, Annual reports of SBI, BOB, HDFC & ICICI BANK and Compiled by researcher)

Table -3: Gross NPA Ratio (in %) of Selected Public & Private Sector Banks

Gross NPA ratio depicts asset quality and risk management of bank. Higher ratio shows sound position of loan portfolio and lower amounts of nonperforming assets. Lower ratio depicts higher amount of nonperforming assets which spoil financial soundness of bank in the long run.

As shown in Table-3 gross NPA ratio is declining during covid-19 duration except HDFC bank maintained it at same level. The decline in gross NPA ratio is temporary due to government measures, regulatory package and loan moratorium declared by RBI

to boost economy during Covid-19. It does not mean that there is improvement in the quality of assets.

3. Profit Per Employee Ratio

Pre& During Covid-19	Year	Public Sector Banks		Private Sector Banks	
		SBI	BOB	HDFC	ICICI
Pre Covid-19	2016-17	0.05	0.03	0.17	0.12
	2017-18	-0.02	-0.04	0.20	0.08
	2018-19	0.00	0.01	0.21	0.04
During Covid-19	2019-20	0.06	0.01	0.22	0.08
	2020-21	0.08	0.01	0.26	0.16
	2021-22	0.13	0.09	0.26	0.22

(Source: www.moneycontrol.com, Annual reports of SBI, BOB, HDFC & ICICI BANK and Compiled by researcher)

Table -4: Profit per Employee Ratio (in %) of Selected Public & Private Sector Banks

Profit per employee ratio indicates efficient utilization of human resources and higher profitability. Higher Profit per employee ratio is preferable because it depicts high profitability and financial soundness whereas lower ratio indicates inefficiency of staff and ultimately impact on profitability of the bank.

As shown in Table-4, before covid-19 profit per employee ratio is fluctuating in both sector banks but during Covid-19, ratio increased due to many reasons. During pandemic many banks reduced their staff, adopt digitization and remote working. Due to this overall productivity is increases and that increase profitability also.

4. Interest Income to Total Income Ratio

Pre& During Covid-19	Year	Public Sector Banks		Private Sector Banks	
		SBI	BOB	HDFC	ICICI
Pre Covid-19	2016-17	0.83	0.86	0.85	0.74
	2017-18	0.83	0.87	0.84	0.76
	2018-19	0.87	0.89	0.85	0.81
During Covid-19	2019-20	0.85	0.88	0.83	0.82
	2020-21	0.86	0.84	0.83	0.81
	2021-22	0.87	0.86	0.81	0.82

(Source: www.moneycontrol.com, Annual reports of SBI, BOB, HDFC & ICICI BANK and Compiled by researcher)

Table -5: Interest Income to Total Income Ratio (in %) of Selected Public & Private Sector Banks

Interest income to total income ratio shows percentage of interest income in total income of bank. It shows sound position of bank to earn from its investments and lending.

Higher ratio shows higher operational efficiency and vice a versa.

As shown in Table-5 Interest Income to Total Income Ratio is fluctuating in both sector banks pre and during Covid-19 duration.

5. Liquid Assets to Total Assets Ratio

Pre& During Covid-19	Year	Public Sector Banks		Private Sector Banks	
		SBI	BOB	HDFC	ICICI
Pre Covid-19	2016-17	0.06	0.22	0.06	0.10
	2017-18	0.06	0.13	0.12	0.10
	2018-19	0.06	0.11	0.07	0.08
During Covid-19	2019-20	0.06	0.11	0.06	0.11
	2020-21	0.08	0.10	0.07	0.11
	2021-22	0.08	0.10	0.07	0.12

(Source: www.moneycontrol.com, Annual reports of SBI, BOB, HDFC & ICICI BANK and Compiled by researcher)

Table -6: Liquid Assets to Total Assets Ratio (in %) of Selected Public & Private Sector Banks

This ratio indicates percentage on liquid assets in total assets. Higher liquid assets are favourable because it shows capability of bank to fulfil all its obligations as and when it arises and vice a versa. As shown in Table-6 liquid assets to total assets ratio is slightly increasing except in BOB. Increasing ratio indicates that banks maintain more amount in liquid assets to fulfil its obligations on time during pandemic time.

5. Findings

No	Financial Performance Parameters	F Value	F crit	Result	Null Hypothesis H ₀ Accepted/Rejected
(1)	Capital Adequacy Ratio				
	• Pre & During Covid-19(Due to Raw)	15.14	4.49	F 15.14 > F crit 4.49	H ₀₁ is Rejected**
	• Public & Private Sector Banks(Due to Columns)	32.43	3.24	F 32.43 > F crit 3.24	H ₀₂ is Rejected**
	• Covid-19 & Sample Banks (Interaction)	2.24	3.24	F 2.24 < F crit 3.24	H ₀₃ is Accepted*
(2)	Gross NPA Ratio				
	• Pre & During Covid-19(Due to Raw)	2.49	4.49	F 2.49 < F crit 4.49	H ₀₁ is Accepted*
	• Public & Private Sector Banks(Due to Columns)	17.60	3.24	F 17.60 > F crit 3.24	H ₀₂ is Rejected**
	• Covid-19 & Sample Banks (Interaction)	1.43	3.24	F 1.43 < F crit 3.24	H ₀₃ is Accepted*
(3)	Profit Per Employee Ratio				
	• Pre & During Covid-19(Due to Raw)	13.13	4.49	F 13.13 > F crit 4.49	H ₀₁ is Rejected**
	• Public & Private Sector Banks(Due to Columns)	28.19	3.24	F 28.19 > F crit 3.24	H ₀₂ is Rejected**
	• Covid-19 & Sample Banks (Interaction)	0.34	3.24	F 0.34 < F Crit 3.24	H ₀₃ is Accepted*
(4)	Interest Income to Total Income Ratio				
	• Pre & During Covid-19(Due to Raw)	0.77	4.49	F 0.77 < F crit 4.49	H ₀₁ is Accepted*
	• Public & Private Sector Banks(Due to Columns)	17.38	3.24	F 17.38 > F crit 3.24	H ₀₂ is Rejected **
	• Covid-19 & Sample Banks (Interaction)	4.34	3.24	F 4.34 > F Crit 3.24	H ₀₃ is Rejected**

(5)	Liquid Assets to Total Assets Ratio				
	• Pre & During Covid-19(Due to Raw)				
	• Public & Private Sector Banks(Due to Columns)				
	• Covid-19 & Sample Banks (Interaction)	0.69	4.49	F 0.69 > F crit 4.49	H ₀₁ is Rejected **
		7.85	3.24	F 7.85 > F crit 3.24	H ₀₂ is Rejected **
		2.55	3.24	F 2.55 < F Crit 3.24	H ₀₃ is Accepted*

(Source: Researchers own compilation using M S Excel)

Table- 7 Showing Findings (Financial Performance Parameters) of ANNOVA two factor with Replication @ 5% Significance Level

*If Null Hypothesis H₀₁ is accepted than there is no significant difference between and within Pre and during Covid-19 Pandemic duration among Concerned Ratio of selected Public and Private Sector Banks in India.

*If Null Hypothesis H₀₂ is accepted than there is no significant difference between and within selected Public and private sector banks in India among Concerned Ratio pre and during Covid-19 Pandemic.

*If Null Hypothesis H₀₃ is accepted than there is no significant difference between selected Public and private sector banks in India and Pre and during Covid-19 Pandemic among Concerned Ratio.

**If Null Hypothesis H₀₁ is rejected than there is significant difference between and within Pre and during Covid-19 Pandemic duration among Concerned Ratio of selected Public and Private Sector Banks in India.

**If Null Hypothesis H₀₂ is rejected than there is significant difference between and within selected Public and private sector banks in India among Concerned Ratio pre and during Covid-19 Pandemic.

**If Null Hypothesis H₀₃ is rejected than there is significant difference between selected Public and private sector banks in India and Pre and during Covid-19 Pandemic among Concerned Ratio.

Table – 7 shows result of testing of hypothesis. Statistical tool ANNOVA two factors with replication is applied at 5% level of Significance to identify whether any significant difference happened in Financial performance of Public and Private Sector Banks and between Pre Covid-19 and During Covid-19 duration. It is concluded that there is no

significant difference between and within Pre and during Covid-19 Pandemic duration among gross NPA ratio and Interest income to total income ratio. There is significant difference between and within Pre and during Covid-19 Pandemic duration among capital adequacy ratio, profit per employee and liquid assets to total assets ratio.

There is significant difference between and within selected Public and private sector banks in India among capital adequacy ratio, profit per employee, gross NPA ratio, Interest income to total income ratio and liquid assets to total assets ratio. There is no significant difference between selected Public and private sector banks in India and Pre and during Covid-19 Pandemic among capital adequacy ratio, profit per employee, gross NPA ratio, and liquid assets to total assets ratio. There is significant difference between selected Public and private sector banks in India and Pre and during Covid-19 Pandemic among Interest income to total income ratio.

6. Conclusion

Research has been conducted to measure and compare Financial performance of two public sector banks and two private sector banks applying CAMEL model from 2016-17 to 2021-22 including 3 years before covid-19 and 3 years during covid-19. It is found that Covid-19 pandemic adversely affected financial performance of Indian Public and Private sector banks. It is clear that there is significant difference in performance of Indian Public and Private sector banks pre and during Covid-19.

Regulatory packages and loan moratorium declared by RBI was helpful to banks at certain extent. Ministry of finance, government and authorities of banks need to design concrete policy and model for Indian banks to survive in unforeseen situations in future. Both sector banks need to improve their financial performance to increase earning capability and operational efficiency. Due to ownership, operational and Regulatory differences, the impact of Covid-19 pandemic was major or moderate on public and private sector banks. Researcher concluded that both public and private sector banks have to improve their particular performance parameters like capital adequacy, asset quality, efficiency and liquidity for long term growth and survival.

Result and conclusion of present research will be helpful to stakeholders including government, RBI and concerned bank authorities for shaping important banking policies and models in future.

7. Limitations and Future Research

Present research has been conducted under certain limitations. It is based on secondary data and limited time duration that is 6 years. Therefore accuracy is depending on accuracy of secondary data used. Present study is based on public and private sector banks. There is Scope for future research to focus on other banks like co-operative banks, RRB and foreign banks for authentic and fruitful conclusion about whole banking sector. Researcher can focus on long time duration and can use primary data and other advance statistical tools for batter conclusion.

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CUSTOMER SATISFACTION IN BANKING SECTOR - A CASE STUDY ON AXIS BANK

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ABSTRACT:

The banking system forms the important role in the financial sector of an economy. Now a days, banking has changed because banking services are no more based on brick and mortar structure. Due to the continuous growth of technology there is increasing customer base and the evolution of alternate banking channels has changed the way of banking services, so the customer satisfaction. Banking is a customer-oriented service industry and customer satisfaction has become the most important aspect of any banking business due to immense competition. The concepts and determinants of customer satisfaction has changed significantly as transition has taken place from traditional to modern banking. Banking industry is the service industry and provides various financial services to its customers. Indian banking industry is rendering their services according to the directions of reserve bank of india As banking industry is service providing industry thus customers' satisfaction is vital in its business. This study tries to get various problems or satisfaction of axis bank customers in regarding physical resources, courteous services, committed services and assurance etc. from the present study, it is expected dimensions will have significant relationship with customer satisfaction and mostly customers will be satisfied with the banking services since axis bank provides best quality services and identifies and fulfil the need of its customers.

Key Words: Customer satisfaction, banking sector , AXIS bank

INTRODUCTION :

In the age of globalization, accomplishing the higher level of customer satisfaction is the challenging task especially in the service sector. In order to face this challenging task, many organizations have started to improve their service quality. Service quality is one of the serious components in any service sector because service quality helps to maintain competitive advantages in the market place. Therefore, service quality is the strategic tool to reinforce competitive advantages and increase profitability in business. So many

service sectors are using this strategic component to attract and retain customers. Hence, service quality is determined through customer satisfaction and customer satisfaction is determined through customer loyalty. Similarly, in order to provide superior services to the clients, at first service providers must understand how clients perceived and evaluated their services. After that, service providers can assume clients are facilitated by various services provided by service sectors. Affinity between both service quality and customer satisfaction is highlighted in empirical research. Therefore, relationship between customer satisfaction and service quality is very critical in service sector like banking. In case of banking sector, clients are attracted by high quality services. Moreover, advancement in technology helps banking sector to upgrade their service quality. The point is that clients are loyal to those products which have a greater value as compared to those of competitors'. Thus, banks can earn higher profit if they are one step ahead of their competitors in terms of services provided by them. For this reason, every banking institution should focus on service quality so as to satisfy customer and retain customer loyalty.

CUSTOMER SATISFACTION-

Customer satisfaction is defined as a measurement that determines how happy customers are with a company's products, services, and capabilities. Customer satisfaction information, including surveys and ratings, can help a company determine how to best improve or change its products and services. Customer satisfaction is defined as "the individual's perception of the performance of the products or services in relation to his or her expectations" (Schliemann & Kanuk). Customer satisfaction helps in measuring whether the products and services supplied by company meet or further exceed the expectations of customers. Customer satisfaction is an indicator which shows whether the customers will make repurchase decision or not along with their loyalty (Boonlertvanich, 2011). It also describes that the feeling of happiness which is gained by achieving his or her goals can be considered as satisfaction.

Customer satisfaction (often abbreviated as csat) is a term frequently used in marketing. It is a measure of how products and services supplied by a company meet or surpass customer expectation. Customer satisfaction is defined as "The number of customers, or percentage of total customers, whose reported experience with a firm, its products, or its services (ratings) exceeds specified satisfaction goals." Customers play an important role and are essential in keeping a product or service relevant; it is, therefore,

in the best interest of the business to ensure customer satisfaction and build customer loyalty.

AXIS BANK :

Axis bank limited, formerly known as uti bank (1993–2007), is an indian banking and financial services company headquartered in mumbai, maharashtra.it sells financial services to large and mid-size companies, smes and retail businesses.as of 30 june 2016, 30.81% shares are owned by the promoters and the promoter group (united india insurance company limited, oriental insurance company limited, national insurance company limited, new india assurance company ltd, gic, lic and uti).the remaining 69.19% shares are owned by mutual funds, fiis, banks, insurance companies, corporate bodies and individual investors.

The bank was founded on 3 december 1993 as uti bank, opening its registered office in ahmadabad and a corporate office in mumbai. The bank was promoted jointly by the administrator of the unit trust of india (uti),[11] life insurance corporation of india (lic), general insurance corporation, national insurance company, the new india assurance company, the oriental insurance corporation and united india insurance company. The first branch was inaugurated on 2 april 1994 in ahmadabad by manmohan singh, then finance minister of india.

In 2001 uti bank agreed to merge with global trust bank, but the reserve bank of india (rbi) withheld approval and the merger did not take place. In 2004, the rbi put global trust under moratorium and supervised its merger with oriental bank of commerce. The following year, uti bank was listed on the london stock exchange. In the year 2006, uti bank opened its first overseas branch in singapore. The same year it opened an office in shanghai, china. In 2007, it opened a branch in the dubai international financial centre and branches in hong kong. On 30 july 2007, uti bank changed its name to axis bank. In 2009, sheikh sharma was appointed as the md and ceo of axis bank. In 2013, axis bank's subsidiary, axis bank uk commenced banking operations. On 1 january 2019, amitabh chaudhry took over as md and ceo.in year 2021,the bank had reduced its stake in yes bank from 2.39 per cent to 1.96 percent.

REVIEW OF LITERATURE

1. **D. Srinivas, Prof. N. Hanumantha Rao (2018)**-In their research paper titled 'Service Quality In Commercial Banks:A Study Of Public Sector Banks In Warangal

District' the objectives of the study were to determine the perceptions of customers regarding the quality of service delivered by public and private bank, to determine the relevant dimensions of service quality for the banking sector and to identify the dimensions of SERVQUAL that ensure maximum satisfaction for customers in the banking sector. The study explores the service quality of the public sector banks in Warangal district of Telangana.. As a pilot study data collected from 100 respondents from Warangal District , which is based on convenience sampling basis. For measuring service quality, Likert type five point scale was used. Suitable score values was assigned to the responses obtained for each point. The dissatisfied customers find responsiveness and empathy dimension as the twin concept that is lacked by the bank. So far as the satisfied customers are concerned, there exist a long gap between the expected service quality (what type of services the customers expect exactly from the bank) and actual service quality (what type of services the are getting from bank in real sense).

2. **Ashraf and Dr. K. Venugopalan (2018)**- In their research paper 'Service Quality And Customer Satisfaction: A Comparison Between Public And Private Sector Banks In Kerala' the objectives were two fold- to compare the level of service quality dimensions of commercial public sector banks and private sector banks in Kerala and to examine the satisfaction level of customers of commercial public sector banks and private sector banks in Kerala. This study was an analytical nature based on primary. The primary data for the analysis were collected, by the researcher, from the customers of commercial public sector banks and private sector banks in Kerala. It was collected with the help of structured questionnaires. Questionnaire measures service quality by implementing the five dimensions of the “SERVQUAL” instrument. The study result indicates the high level of service quality in all dimensions (more than 5). It also reveals that, there is no significant difference in level of service quality and customer satisfaction between public sector and private sector banks in Kerala.
3. **H.M.G.Y.J. Hennayake (2017)**- In his research paper 'Impact of Service Quality on Customer Satisfaction of Public Sector Commercial Banks: A Study on Rural Economic Context' the objectives were to evaluate the relationship between service quality and perceived customer satisfaction, to identify the impact of Human-Related service quality factors towards the perceived customer satisfaction in

commercial banking sector, to identify the impact of Non-Human Related service quality factors towards the perceived customer satisfaction in commercial banking sector to propose recommendations to enhance perceived customer satisfaction in banking industry. Primary data was collected by distributing a detailed questionnaire for 210 respondents who are the customers of state commercial banks in Puttalam district. Findings revealed that the Human Related Factors of perceived service quality have a greater impact on customer satisfaction whereas Reliability and Responsiveness are the most influential factors on customer satisfaction. Managerial implications and the research propositions were suggested for the service marketing sphere at the conclusion.

4. **Dr. Biju John M(2017)-** In his research paper titled 'Dynamics Of Service Quality In The Indian Banking Sector' the objectives were to evaluate the perceived service quality in commercial banks, to ascertain the dimensions of service quality in banks and to offer suggestions to improve the service quality in banks. The paper is based on a descriptive and exploratory study based on primary data. Primary information is collected using survey method. The customers of commercial banks in Thrissur District of Kerala State forms the population of the study. The study used convenient sampling technique and selected 200 customers of commercial banks from different areas of Thrissur district of the state of Kerala. . It is suggested to the banking sector that apart from ensuring the trust of customers, it should improve their operations in providing the customers highly advanced technological services for easy access and instant delivery of services.
5. **SukanyaKundu, Saroj Kumar Datta(2015)-** In their research paper titled 'Impact of trust on the relationship of e-service quality and customer satisfaction' the purpose of this paper is to find the role of trust as a mediating variable between e-service quality and customer satisfaction in internet banking. The paper opted for an exploratory study using closed ended questionnaire. The empirical data are drawn from 367 customers of internet banking. The results confirm trust as a mediating variable between e-service quality while analyzing the same model with gap value and perception value.

OBJECTIVES OF THE STUDY

The general objective of this proposed research is to study the customer satisfaction, quality services and customer loyalty in Axis Bank in India in valsad district. Moreover, the specific objectives are:

1. To understand the demographic profile of the respondent with Axis bank in Valsad city.
2. To know the satisfaction level of customers from Axis banks in valsad city.

RESEARCH METHODOLOGY

Data Collection and Empirical Context- The descriptive research was carried out to assess the age, gender, occupation, income, education. customer loyalty in the Axis Bank of Valsad district in Gujarat. Therefore, researchers started by searching former knowledge of the area. These past knowledges are used to recognize different dependent and independent variables.

Study Area - Axis Bank, Valsad, Gujarat, India.

Population- Population refers to specific group of the units such as individuals, households, organization and similar that are targeted for definite study. For this thesis, 300 customers of Axis Bank of Valsad, India were identified.

Sampling Frame -After defining the population, the next step is to identify the sample frame. Sampling frame is the process of listing the elements so as to draw actual sample. For this research paper. list of all branches of Axis banks in valsad district was obtained.

Sampling Procedure- Non- Probability sampling methods was used for data collection. Under this sampling procedure, convenience sampling procedure is appropriate for this research. Sampling Size-Several factors such as money, time, statistical methods, population size and so on depends upon the question of sample size. For this research paper, as per the research convenience, 300 sample were taken.

Nature of Instruments- Structural questionnaires were developed. The questionnaire consists of two parts. First part consists of demographic factor and situational factor, Second part consists of service quality customer satisfaction dimensions,

Measurement of Variables -After completing the data collection, questionnaires were checked for completeness. By using SPSS software, at first variables were developed and data were entered accordingly. For this research multivariate statistical analysis was used graphical analysis, charts, percentage, etc...

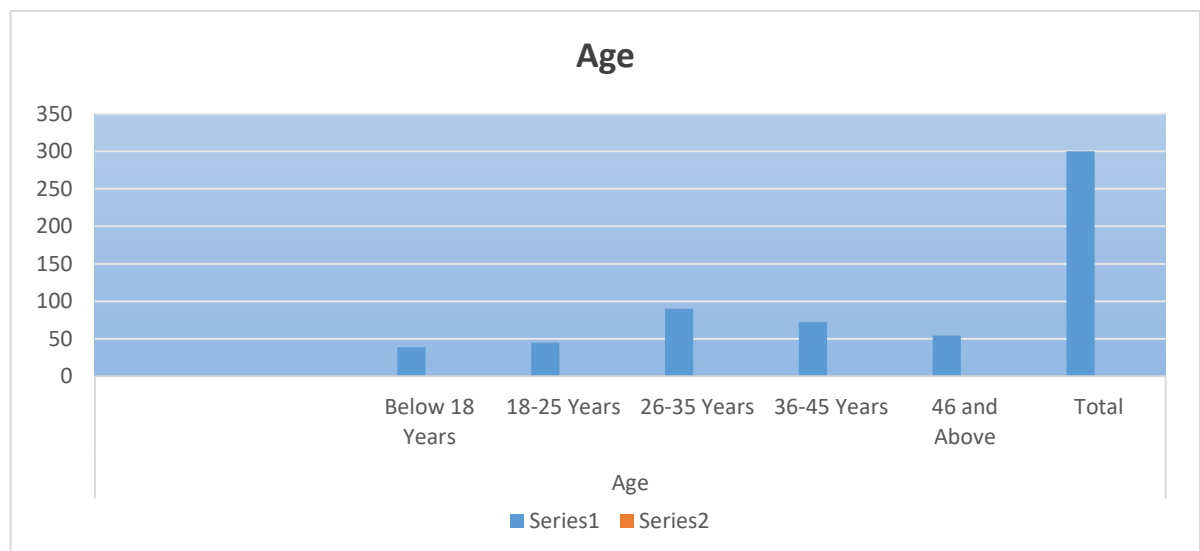
Statistical Methods- In this research researcher used in percentage, Normality Test, graphical analysis, Kolmogorov-Smirnov, Shapiro-Wilk

DATA ANALYSIS AND FINDINGS:

1. To understand the demographic profile of the respondent with Axis bank in Valsad city

Age			
		Frequency	Percent
Valid	Below 18 Years	39	13
	18-25 Years	45	15
	26-35 Years	90	30
	36-45 Years	72	24
	46 and Above	54	18
	Total	300	100.0

Table no.1

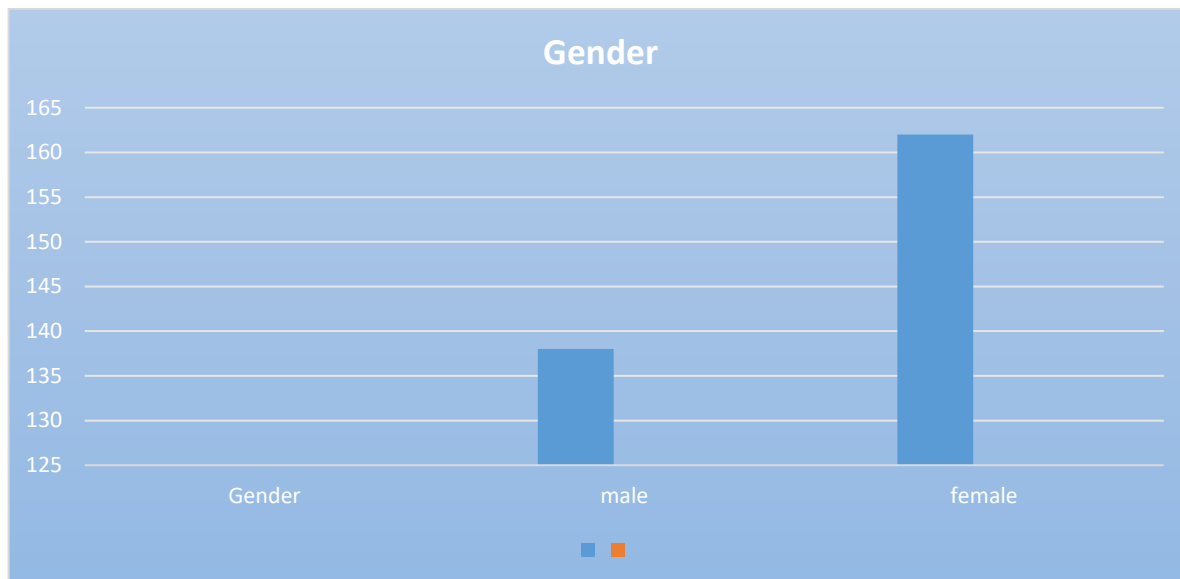


The above table and chart represents the age categories of the banking customers where majority of the respondents are falling between age categories of 26 to 35 years followed by 46 years and above. Very less number of people found youngsters.

Gender			
		Frequency	Percent
Valid	Male	138	46

	Female	162	54
	Total	300	100.0

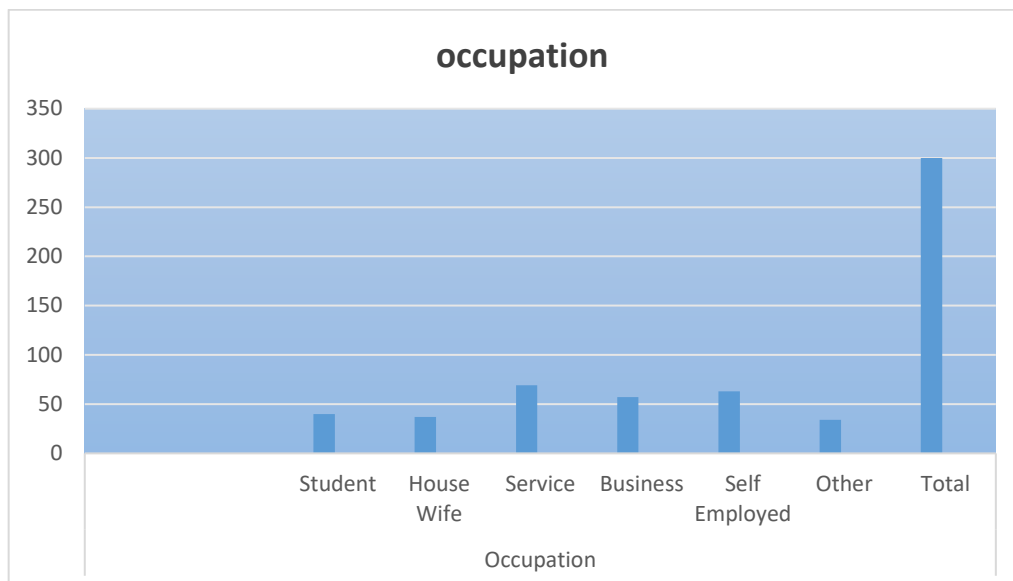
Table no.2



The above table and chart indicates the gender categories studied as male and female in this study for banking customers. Out of 300 sample size, respondents are 138 male while remaining 162 are female which means study is going to infer on this gender bifurcation from male responses are more compared to female.

Occupation			
		Frequency	Percent
Valid	Student	40	13.33
	House Wife	37	12.33
	Service	69	23
	Business	57	19
	Self Employed	63	21
	Other	34	11.34
	Total	300	100.0

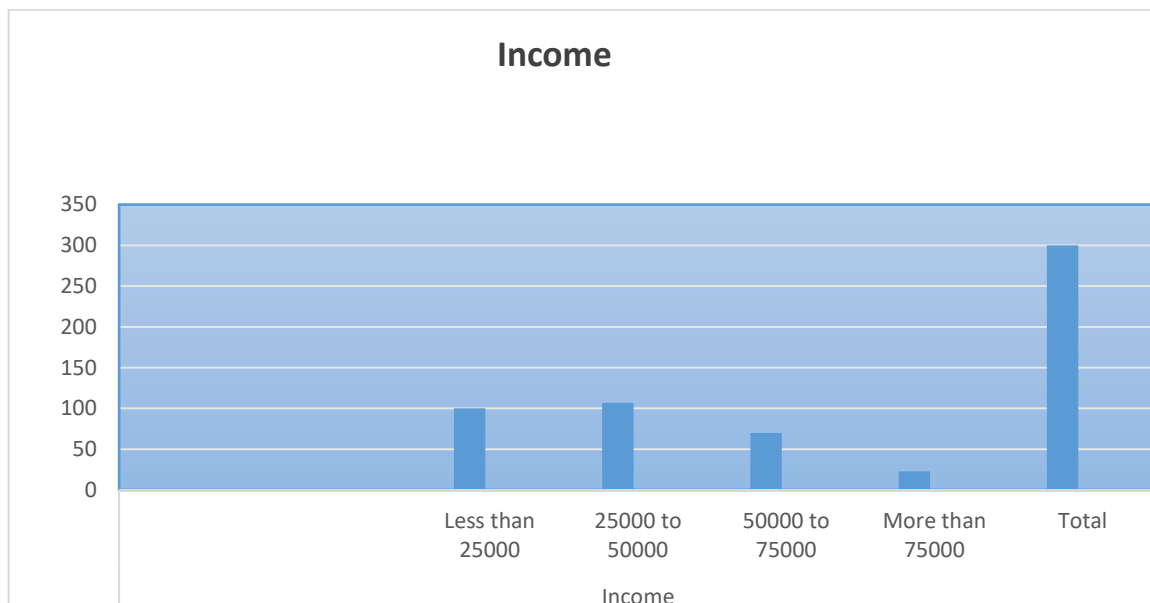
Table no.3



The above chart and table shows the occupation categories considered in the study for banking customers. Maximum number of service and businessman are there in this study followed by students while very less number of customers found housewife.

Income			
		Frequency	Percent
Valid	Less than 25000	100	33.33
	25000 to 50000	107	35.67
	50000 to 75000	70	23.33
	More than 75000	23	7.67
	Total	300	100.0

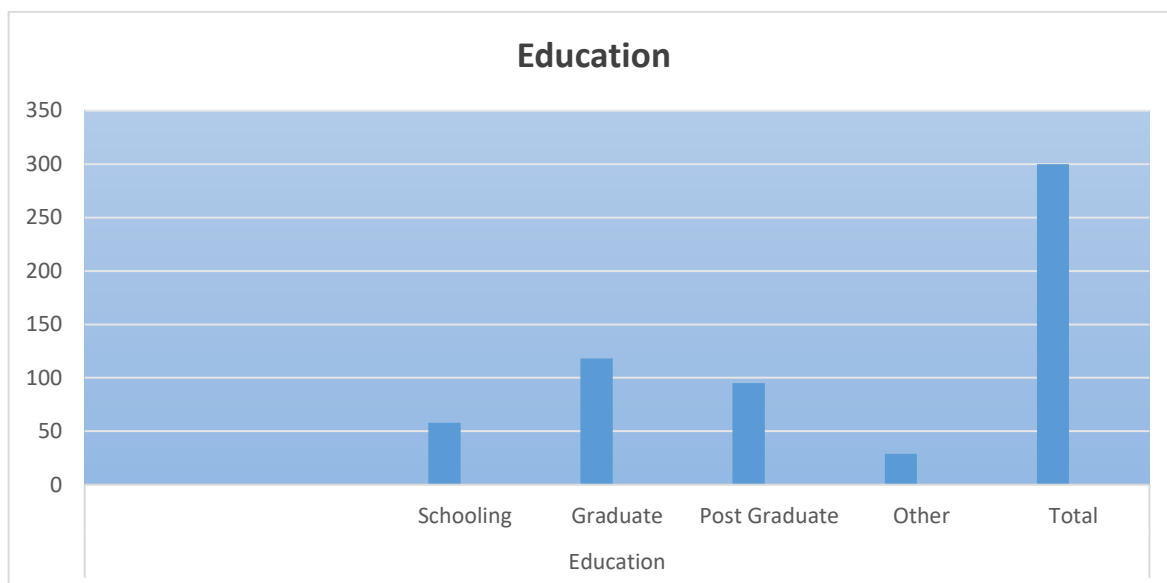
Table no.4



The above chart and table represents the income categories of the respondents i.e. banking customers where respondents are having income more than 75000 per month followed by less than 25000 to 50000. This means that there are extreme income holder group where majority are having higher income and very next to that lowest income.

Education			
		Frequency	Percent
Valid	Schooling	58	19.33
	Graduate	118	39.33
	Post Graduate	95	31.67
	Other	29	9.67
	Total	300	100.0

Table no.5



The above chart and table indicates education categories of the respondents where schooling, graduate, post graduate and other categories are considered in this study. Looking to the chart and table, maximum number of respondents is post graduate followed by graduate banking customers. This indicates that the sample consists of literate customers and which is the most important characteristics needed to judge the service satisfaction of banking services.

2. To know the satisfaction level of customers from Axis banks in valsad city.

Normality Test:

Tests of Normality						
	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
AVG_SS	.172	300	.000	.924	300	.000
AVG_HQPS	.103	300	.000	.936	300	.000
AVG_CSR	.104	300	.000	.942	300	.000
AVG_SM	.107	300	.000	.948	300	.000
AVG_BF	.102	300	.000	.957	300	.000
AVG_SD	.149	300	.000	.939	300	.000
AVG_TE	.118	300	.000	.939	300	.000

INTERPRETATION- The table indicates the output for two different normality test i.e. Kolmogorov-Smirnov and Shapiro Wilk test. First is appropriate when sample size is larger and if it is small sample size than second one is appropriate. Here sample size is large but looking to the statistics for both the test, probability values are less than 0.05 so the researcher reject the null hypothesis and interpret that data are NOT normally distributed. Thus, application of any parametric test is not possible and inappropriate. Thus, the researcher has applied non-parametric tests wherever applicable in further data analysis.

CONCLUSION :-

1. the age categories of the banking customers where majority of the respondents are falling between age categories of 26 to 35 years followed by 46 years and above. Very less number of people found youngsters.
2. the age categories of the banking customers where majority of the respondents are falling between age categories of 26 to 35 years followed by 46 years and above. Very less number of people found youngsters.
3. the occupation categories considered in the study for banking customers. Maximum number of service and businessman are there in this study followed by students while very less number of customers found housewife.
4. the income categories of the respondents i.e. banking customers where respondents are having income more than 75000 per month followed by less than 25000 to 50000. This means that there are extreme income holder group where majority are having higher income and very next to that lowest income.
5. education categories of the respondents where schooling, graduate, post graduate and other categories are considered in this study. Looking to the chart and table, maximum number of respondents is post graduate followed by graduate banking customers. This indicates that the sample consists of literate customers and which is the most important characteristics needed to judge the service satisfaction of banking services .

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Eco-Friendly Entrepreneurship: Evaluating the Socioeconomic Impact of Cow Dung Paint Production on Rural Women's Livelihoods and Empowerment

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Abstract

This study explored the socioeconomic impact of eco-friendly entrepreneurship, specifically focusing on cow dung paint production, on rural women's livelihoods and empowerment in Gujarat, India. With a sample of 100 entrepreneurs, selected using a stratified random sampling technique, primary data was gathered through a structured questionnaire. The research aimed to assess how this sustainable business model affects economic empowerment, skill development, social status, and environmental awareness among rural women. To analyze the data, frequency distribution was employed to determine the socio-demographic profile of the entrepreneurs, providing insight into their gender, age, educational qualifications, income levels, and sectors of work. Factor analysis was then applied to identify key factors that drive the benefits and development of women entrepreneurs involved in cow dung paint production. The Kruskal-Wallis test was used to evaluate differences in perceptions based on socio-demographic variables, examining how these characteristics influence views on empowerment and welfare outcomes from this venture. The findings revealed significant variations in how different demographic groups perceive the benefits of cow dung paint production. Gender, education, income, and sector emerged as influential factors impacting perceptions of economic, social, and environmental outcomes. The study concludes that eco-friendly entrepreneurship through cow dung paint production offers substantial benefits for rural women's empowerment but highlights the importance of tailoring strategies to the unique profiles of entrepreneurs to maximize socioeconomic impact.

Key Words: Rural, Women livelihood, Empowerment, Cow Dung Paint, Entrepreneur

Introduction

Eco-friendly entrepreneurship has emerged as a promising approach for sustainable development, particularly within rural economies where resource scarcity and limited

livelihood opportunities often constrain economic growth. Among these initiatives, cow dung paint production has become a notable example of sustainable enterprise that promotes environmental conservation while empowering marginalized communities. Cow dung, an abundant and renewable resource in rural areas, traditionally used as manure or fuel, is now finding new utility in eco-friendly paint production. This innovation is not only contributing to the circular economy but also opening avenues for employment and empowerment, especially for rural women.

The production of cow dung-based paint aligns with environmentally sustainable goals by reducing the need for chemical-based paints, which often contain volatile organic compounds (VOCs) harmful to human health and the environment. The process of converting cow dung into paint is energy-efficient, generates minimal waste, and the end product is biodegradable and non-toxic. This creates a healthier and safer working environment for rural women, who are key participants in this entrepreneurial venture. By involving women in every stage of the production process—from collection to marketing—this initiative fosters skill development, economic independence, and financial stability among rural women.

The socioeconomic impact of cow dung paint production extends beyond individual income generation. It strengthens the local economy by creating demand for locally sourced raw materials, which stimulates a multiplier effect within the community. Moreover, this eco-friendly entrepreneurship fosters a sense of pride and ownership among rural women, contributing to their social empowerment and enhancing their decision-making power within households and communities. This empowerment often translates into better health, education, and welfare outcomes for their families.

In assessing the socioeconomic impact of cow dung paint production, this study explores its potential to uplift rural women's livelihoods, promote environmental sustainability, and challenge traditional gender roles. By evaluating the direct and indirect effects of this eco-friendly enterprise, this research seeks to highlight how such initiatives can serve as a model for sustainable rural development, driving both economic growth and social transformation through women's empowerment.

1. Literature Review

Ramachandra, T. V., & Chandran, M. S. (2020) defined that In India, the idea of trade guilds and economic agglomeration dates back to prehistoric times. Historically, the cocoon and silk processing industries have been concentrated in areas like Banaras,

Kancheepuram, Kashmir, etc. Researchers and experts in economic development are increasingly interested in cluster-based economic growth. The strategy is regarded as a crucial component of a larger shift in economic policy and research toward establishing the groundwork for a microeconomic strategy for development and prosperity. Macroeconomics and the establishment of market institutions in emerging nations have dominated recent decades. Although there is already a good deal of agreement on the kinds of legal and macroeconomic frameworks required to accomplish economic advancement, it is also becoming increasingly evident that these frameworks are not enough. Cluster-based initiatives have drawn a lot of interest as a novel strategy to assist economies in realizing the full benefits of an enhanced macroeconomic and legal environment. Based on the availability of natural resources, clusters are groups of businesses and organizations that are situated together in a certain geographic area and are connected by interdependencies to provide a related set of goods and/or services. Cluster members gain economically from a variety of favorable location-specific externalities due to their close proximity to one another, both geographically and in terms of activity. By strengthening the basis for sustainable growth, this communication offers integrated village clustering for inclusive growth, supporting eco-friendly, locally available resources, and thematic developmental programs based on local expertise and personnel. The financial and livelihood stability of rural households may be significantly increased through microfinance, the resuscitation of village-centered businesses, and the grouping of villages for theme development programs. These initiatives may also offer the biggest platforms for women's empowerment.

Dwivedy, Nidhi (2014) discussed that "The role of female labor in the farming sector: a study of the state of Sikkim" is the topic of the researcher's investigation. The perception of farming women to choose any other activity to supplement their income in addition to farming is one of the many factors that have been examined under this area. Even though the majority of people in the area depend on the agricultural sector, it is still changing and presents a number of difficulties. Despite a number of incentives offered by the state government, social science research in Sikkim remains insufficient. Women make a huge, unseen, and underappreciated contribution to this honorable industry. Given that women make up the majority of those working in the farming industry, they are difficult to reach, and since the government currently spends a significant amount of money on programs to empower women, it is imperative that we address this issue in order to

enable them to reach their full potential in this industry. In light of this, the current study examined the opinions of female farmers regarding choosing any entrepreneurial endeavor other than farming as a means of boosting their income in the area. To do this, data was gathered from 230 female farmers via interviews conducted according to a pre-planned schedule in 24 circles across all four districts of Sikkim State. The Statistical Package for the Social Sciences has been used to measure and analyze the opinions of female farmers based on their subjective assessments. The data is interpreted using a few descriptive statistics, including percentages, and one sample t-test of inferential statistics. The study's conclusions showed that, on average, a larger percentage of the sample's female farmers are interested in and have the opinion that anything other than farming is possible, and they wish to pursue any kind of entrepreneurship. This book has examined the results related to these findings.

Dwivedy, N. (2012) examined the role of female labor in farming sector: a study of state of Sikkim" is the topic of the research, which is being conducted by a research scholar. Even though the majority of people in the area depend on the agricultural sector, it is still changing and presents a number of difficulties. Even while women make a huge, unseen contribution to this admirable field, it is rarely acknowledged. Despite a number of incentives offered by the state government, social science research in Sikkim remains insufficient. Given the significant public spending on programs for women's empowerment these days, it is impossible to overlook this problem, which makes it necessary to empower them as well with the goal of using their full potential in this area. In light of this, the current study examined the opinions of female farmers regarding choosing any entrepreneurial endeavor other than farming as a means of boosting their income in the area. To do this, data was gathered from 230 female farmers via interviews conducted according to a pre-planned schedule in 24 circles across all four districts of Sikkim State. The Statistical Package for the Social Sciences (SPSS) has been used to measure and evaluate the opinions of female farmers based on their subjective assessments. The data is interpreted using a few descriptive statistics, including percentages, and one sample t-test of inferential statistics. The study's conclusions showed that, on average, a larger percentage of the sample's female farmers are interested in and have the opinion that anything other than farming is possible, and that they would like to pursue any kind of entrepreneurship. It has also been noted that female farmers are in poor socioeconomic standing. In order to enhance the

socioeconomic status of the stakeholders, the researcher has examined a few areas of gainful work in this study. Additionally, by 2015, the state hopes to have it completely organic. Therefore, by providing a flow diagram of Integrated Dry land Commercial Farming by Rainwater Harvesting, which can be advantageous to the farmers, this article aims to address the issues faced by female farmers in order to improve their socioeconomic status and increase food security.

2. Research Methodology

3.1. Research Problem

The rise of eco-friendly entrepreneurship presents a unique opportunity to empower rural women, yet the socioeconomic impacts of such initiatives are not fully understood. While cow dung paint production is gaining attention as a sustainable business model in Gujarat, India, there is a need to assess its effectiveness in enhancing rural women's livelihoods and empowerment. Specifically, understanding the socioeconomic profiles of entrepreneurs engaged in this venture is crucial to evaluating their unique challenges and opportunities.

Key factors contributing to rural women's livelihoods—such as income generation, skill acquisition, and social status—must be identified to gauge the impact of cow dung paint production on empowerment outcomes. Additionally, the diversity in socioeconomic backgrounds among these entrepreneurs may influence their experiences and perspectives on empowerment, creating a need to examine whether these differences affect their engagement with and benefits from eco-friendly entrepreneurship.

This study aimed to fill these gaps by exploring how cow dung paint production affects livelihoods and empowerment, with special emphasis on understanding any significant variances in perceptions based on socioeconomic profiles. By addressing these research gaps, this study seeks to provide insights into how eco-friendly enterprises can be tailored to better support rural women, thus serving as a model for sustainable, inclusive development in rural areas.

3.2. Objectives of the Study

Based on the above-mentioned problem identification for the research, the objectives of this research have been mentioned below:

- To discuss the Socioeconomic profile of the entrepreneurs from the Gujarat State in India.

- To find out the factors which are important for the Rural Women's Livelihoods and Empowerment with the consideration of the effect of the Cow Dung Paint Production process.
- To define the significant difference of opinion among the Socioeconomic profile for the entrepreneurs from the Gujarat State for the factors which are important for the Rural Women's Livelihoods and Empowerment with the consideration of the effect of the Cow Dung Paint Production process.

3.3. Hypothesis of the Study

With the considerations of the objectives for the study i.e. findings the factors which are important for the Rural Women's Livelihoods and Empowerment with the consideration of the effect of the Cow Dung Paint Production process, the Hypothesis for the study have been mentioned below:

H0₁: There is no significant difference of opinion among the gender profile of the entrepreneurs and the factors which are responsible for the Rural Women's Livelihoods and Empowerment with the consideration of the effect of the Cow Dung Paint Production process.

H0₂: There is no significant difference of opinion among the age profile of the entrepreneurs and the factors which are responsible for the Rural Women's Livelihoods and Empowerment with the consideration of the effect of the Cow Dung Paint Production process.

H0₃: There is no significant difference of opinion among the education qualification profile of the entrepreneurs and the factors which are responsible for the Rural Women's Livelihoods and Empowerment with the consideration of the effect of the Cow Dung Paint Production process.

H0₄: There is no significant difference of opinion among the annual income profile of the entrepreneurs and the factors which are responsible for the Rural Women's Livelihoods and Empowerment with the consideration of the effect of the Cow Dung Paint Production process.

H0₅: There is no significant difference of opinion among the sectoral profile of the entrepreneurs and the factors which are responsible for the Rural Women's Livelihoods and Empowerment with the consideration of the effect of the Cow Dung Paint Production process.

3.4. Sample Size of the Study

A sample of approximately 100 respondents has been drawn from the entrepreneurs from the different areas of the Gujarat State. The selection of this sample size is designed to capture variations in income levels, educational backgrounds, age groups, and household sizes, ensuring that the study addresses differences across socioeconomic profiles. Using both purposive and random sampling methods, the study will identify participants who are actively involved in cow dung paint production. This sample will allow for a comprehensive examination of key factors impacting empowerment and livelihoods, providing valuable insights into the effects of eco-friendly entrepreneurship on rural women in Gujarat.

3.5. Sampling Techniques of the Study

For selecting a sample of 100 rural women entrepreneurs involved in cow dung paint production across various regions in Gujarat, a combination of purposive and stratified random sampling techniques will be used. **Purposive sampling** enables the study to specifically target participants who are actively engaged in cow dung paint production, ensuring the relevance of the sample to the study's objectives.

3.6. Societal Importance of the Study

This study on the socioeconomic impact of cow dung paint production on rural women's livelihoods and empowerment has significant societal implications. By focusing on eco-friendly entrepreneurship, it highlights an innovative way to enhance income, skills, and agency for rural women, often among the most marginalized in society. The findings will provide valuable insights into how sustainable practices can be leveraged to create economic opportunities, thereby reducing poverty and promoting gender equality in rural regions.

Understanding the socioeconomic profiles of these entrepreneurs across Gujarat will shed light on the specific needs, challenges, and strengths within different communities, allowing policymakers and organizations to better tailor interventions. This knowledge can help address economic disparities, support skill-building initiatives, and improve access to resources, contributing to the social and economic upliftment of rural women.

Additionally, the study underscores the importance of eco-friendly enterprises in combating environmental degradation by reducing reliance on chemical-based paints. As cow dung paint production gains traction, it offers a model for other sustainable business ventures that benefit both the economy and the environment, thus fostering a holistic

approach to rural development that prioritizes social equity, economic resilience, and environmental health.

4. Data Analysis and Interpretation

Socio-Demographic Profile	Parameters	Frequency
Gender	Male	76 (76.00%)
	Female	24 (24.00%)
Age	Less than 25 Years	22 (22.00%)
	25 – 40 Years	33 (38.00%)
	41 – 60 Years	30 (30.00%)
	More than 60 Years	15 (15.00%)
Educational Qualification	Up to Schooling	10 (10.00%)
	Graduation	24 (24.00%)
	Post – Graduation	32 (32.00%)
	Doctorate	14 (14.00%)
	Others	08 (08.00%)
Annual Income	Less than Rs. 25,000	09 (09.00%)
	Rs. 25,000 – Rs. 50,000	28 (28.00%)
	Rs. 50,001 – Rs. 75,000	41 (41.00%)
	More than Rs. 75,000	22 (22.00%)
Sector	Textile	24 (24.00%)
	Jewellery	28 (28.00%)
	IT Sector	22 (22.00%)
	E-Commerce and Retail	08 (08.00%)
	Healthcare	14 (14.00%)
	Others	04 (04.00%)

Table 1

Sociodemographic Profiles of the Entrepreneurs of the Gujarat State

(Source: Research Data Results)

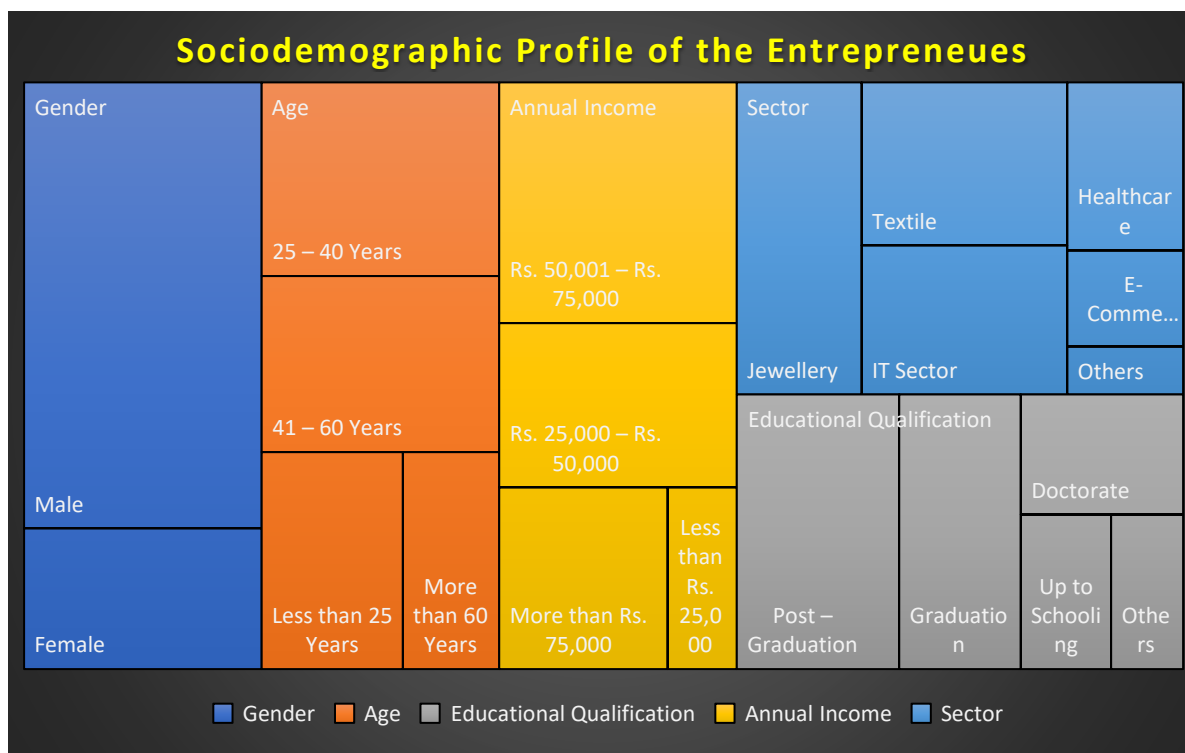


Figure1

Sociodemographic Profiles of the Entrepreneurs of the Gujarat State

(Source: Research Data Results)

The socio-demographic profile data of Gujarat State entrepreneurs highlights their varied characteristics, which can influence their perspectives and potential impact on initiatives like cow dung paint production, particularly concerning rural women's livelihoods and empowerment. Here's a breakdown and interpretation of each parameter:

Males (76%) significantly outnumber **females (24%)** among the surveyed entrepreneurs, suggesting a male-dominated entrepreneurial landscape. This may reflect broader societal patterns in entrepreneurship, especially in sectors that require significant capital or networking, but it also highlights the opportunity for targeted programs to encourage female entrepreneurship, particularly in eco-friendly and rural-focused ventures like cow dung paint production.

Age group 25-40 years (38%) forms the largest segment, followed by 41-60 years (30%) and those under 25 years (22%). The younger entrepreneurial demographic indicates a potential openness to innovative and sustainable business models. However, the presence of older entrepreneurs suggests a mix of traditional experience with younger, more adaptive approaches to modern entrepreneurship. Entrepreneurs aged more than 60 years

(15%) might have limited adaptability to new ventures but could still provide guidance and stability within the community for eco-friendly projects.

A large proportion of entrepreneurs have post-graduation (32%) and graduation (24%) qualifications, suggesting a well-educated cohort capable of understanding and supporting complex business models, such as eco-friendly production. This educational background can be beneficial for creating awareness around the environmental benefits of cow dung paint production. Those with schooling (10%) or other qualifications (8%) may face challenges in adapting to or promoting new sustainable initiatives, suggesting the need for targeted training in eco-entrepreneurship.

Income brackets of Rs. 50,001–75,000 (41%) and Rs. 25,000–50,000 (28%) dominate, indicating mid-level earning entrepreneurs. Their income level aligns well with small- to medium-scale entrepreneurial initiatives, such as cow dung paint production, where initial investment requirements are low to moderate. The presence of low-income entrepreneurs (9%) and high-income entrepreneurs (22%) could create a diverse investment environment, potentially attracting both risk-takers and cautious investors into eco-friendly ventures.

Factors	Statements	Communalities
Economic Empowerment	Cow dung paint production has improved my monthly income.	0.682
	This work provides me with better financial stability.	0.667
	I feel more financially independent since starting this venture.	0.712
	My household's economic situation has improved because of cow dung paint production.	0.785
	This business has allowed me to contribute more to my family's expenses.	0.743
Skill Development and Knowledge Enhancement	I have learned new skills through training related to cow dung paint production.	0.621
	This work has increased my knowledge of sustainable and eco-friendly practices.	0.674

	I feel more competent and skilled due to my involvement in this business.	0.764
	I have gained valuable business knowledge by participating in cow dung paint production.	0.734
	This venture has provided me with opportunities to develop leadership skills.	0.789
Social Status and Community Recognition	I feel that my status in the community has improved through this work.	0.689
	People in my community respect me more since I started cow dung paint production.	0.634
	My participation in this business has made me feel more valued by others.	0.748
	This venture has helped me build better social connections within my community.	0.547
	Cow dung paint production has increased my confidence and social presence.	0.756
Environmental and Health Awareness	I am more aware of environmental issues because of this work.	0.746
	Cow dung paint production has helped me understand the importance of eco-friendly products.	0.642
	I am committed to reducing waste and using sustainable resources due to this venture.	0.567
	This business has positively impacted the health and well-being of my family and community.	0.751
	I feel proud to be part of an environmentally friendly business.	0.873

Table 2

Factors for eco-friendly entrepreneurship for evaluating the socioeconomic impact of cow dung paint production on rural women's livelihoods and empowerment

(Source: Research Data Results)

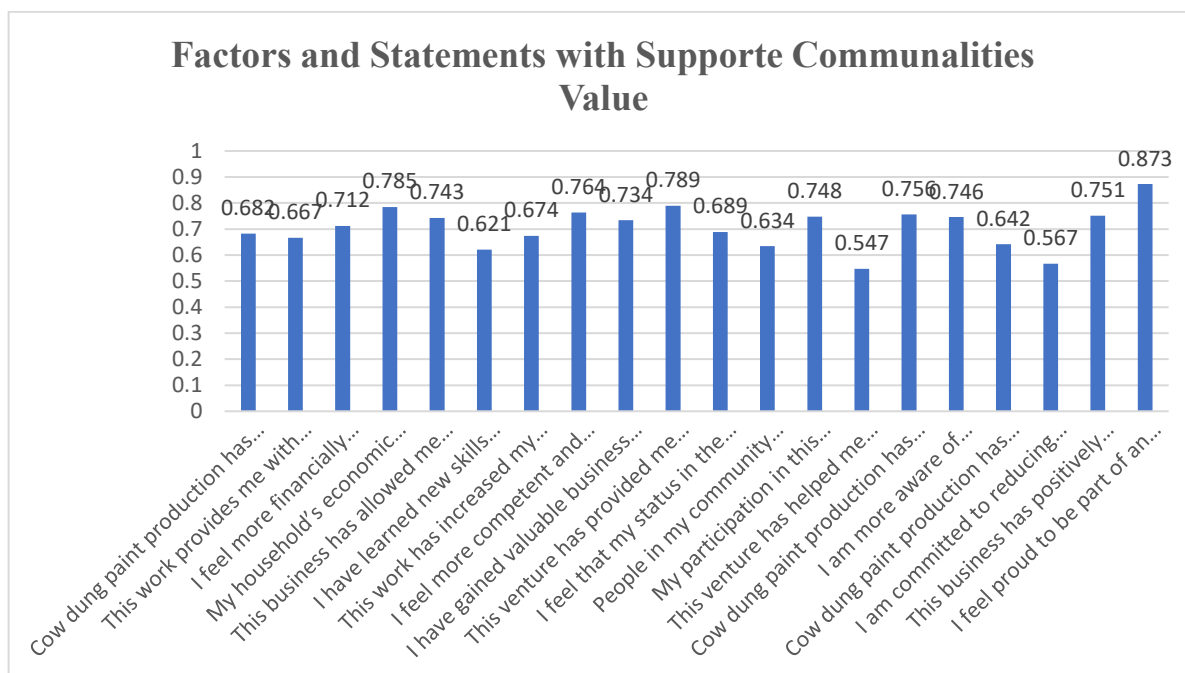


Figure 2

Factors for eco-friendly entrepreneurship for evaluating the socioeconomic impact of cow dung paint production on rural women's livelihoods and empowerment

(Source: Research Data Results)

For the factor of Economic Empowerment, Statements like “My household’s economic situation has improved” (0.785) and “This business has allowed me to contribute more to my family’s expenses” (0.743) highlight that women feel a direct, positive economic impact from their involvement. The relatively high communalities (all above 0.66) suggest that economic empowerment is a significant outcome of cow dung paint production, reinforcing their financial contribution to the household and personal income.

For the factor of Skill Development and Knowledge Enhancement, Statements such as “This venture has provided me with opportunities to develop leadership skills” (0.789) and “I feel more competent and skilled” (0.764) have high communalities, indicating that skill development and knowledge enhancement are core benefits of this work.

For the factor of Social Status and Community Recognition, Statements like “My participation in this business has made me feel more valued by others” (0.748) and “Cow dung paint production has increased my confidence and social presence” (0.756) show high communalities, suggesting that involvement in this work significantly boosts social respect and self-worth.

For the factor of Environmental and Health Awareness, Statements such as “I feel proud to be part of an environmentally friendly business” (0.873) and “This business has positively impacted the health and well-being of my family and community” (0.751) demonstrate very high communalities, highlighting that the environmental and health benefits are strongly felt by the participants.

Factors for eco-friendly entrepreneurship	Gender	Age	Edu. Qual.	Annual Income	Sectors
Economic Empowerment	0.000*	0.200	0.010*	0.007*	0.000*
<i>Significant Difference</i>	<i>Yes</i>	<i>—</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Skill Development and Knowledge Enhancement	0.000*	0.000*	0.025*	0.000*	0.020*
<i>Significant Difference</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Social Status and Community Recognition	0.100*	0.000*	0.010*	0.002*	0.014*
<i>Significant Difference</i>	<i>—</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Environmental and Health Awareness	0.000	0.000	0.001	0.014	0.000
<i>Significant Difference</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>

Table 3

Significant difference of opinion for evaluation the impact of eco-friendly entrepreneurship for evaluating the socioeconomic impact of cow dung paint production on rural women’s livelihoods and empowerment

(Source: Research Data Results)

The statistical results highlighted that gender, age, educational qualification, annual income, and sector all significantly influence the perceptions of entrepreneurs regarding the socioeconomic impacts of cow dung paint production on rural women’s livelihoods and empowerment. These factors contribute to differences in how economic empowerment, skill development, social status, and environmental awareness are perceived, pointing to the importance of considering these socio-demographic factors when evaluating the effectiveness of eco-friendly entrepreneurial ventures.

5. Findings, Conclusions and Suggestions of the Study

The statistical results highlighted that gender, age, educational qualification, annual income, and sector all significantly influenced the perceptions of entrepreneurs regarding the socioeconomic impacts of cow dung paint production on rural women's livelihoods and empowerment. These factors contributed to differences in how economic empowerment, skill development, social status, and environmental awareness are perceived, pointing to the importance of considering these socio-demographic factors when evaluating the effectiveness of eco-friendly entrepreneurial ventures.

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Elements of Travel Vlogs that Impact Student's Travel Destinations Choice

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Abstract

Tourism on a global scale has seen dramatic changes because of the fourth industrial revolution and digital advancements. These new advances have altered numerous elements, including the operating platform and the way tourists are seen. Tourists' consumption decisions are influenced by their information finding through travel-related information channels prior to a trip. Travel vlogs have become a popular tool among Inter-net users, particularly young people as a means of providing them with travel information.

The primary purpose of this research is to determine whether the characteristics of travel vlogs influence the destination choices of students. The research contains both theoretical and empirical components. To advance this research, the theoretical section comprises selected aspects from the literature review.

The findings of this study indicate that content elements such as novelty, authenticity, comprehensibility, and influencer/vlogger factors influence the satisfaction of watching travel vlogs, consequently influencing students' travel decisions. The most influential of these elements on students is the Content. The technical aspects of travel vlogs have minor impact on the student's enjoyment of viewing, and so do not influence their destination selection.

Keywords

Travel vlogs, destination choice, Tourism

Introduction

The international tourism sector has recently seen tremendous growth in line with the rebound of global economies as they recover from the pandemic. After declining significantly in 2020 because of the coronavirus (COVID-19) pandemic, the size of the worldwide tourist industry grew by 20% in 2021 compared to the previous year. Tourism has seen significant sales especially due to the growth of the internet users.

Objective of study

- 1 Due to the growing of Internet, it is evident that travel vlogs have a substantial effect on the traveler's selection of destination and activities. The travel vlog includes recommendations for a new travel destination, sights to see, local cuisine

- to sample, and tourist-friendly activities.
- 2 The fundamental goal of this research is to explore the impact of travel vlogs on individuals, and the students are the research object in this research. Moreover, this study will also uncover the characteristics that students value most highly while selection.
 - 3 Prior knowledge and observations
 - 4 Globalization, digitalization, sustainability, and the coronavirus pandemic have all had a significant impact on the travel and tourism sector in recent years.
 - 5 Travel vlogs, therefore, serve as representations of travel experiences that both public and commercial tourism organizations can utilize for marketing and promotional purposes (Peralta, 2019, 9).
 - 6 Delimitations of study
 - 7 Tourism vlogs influence the travel business in innumerable ways that most people cannot imagine. Vlogs are studied and considered in numerous areas of social life. Therefore, this study requires a specific scope. The study is a cross-sectional descriptive study implying that the study cannot measure causality between the variables in the study
 - 8 Research questions
 - 9 In what ways do travel vlogs on social media influence the travel decisions of customers, especially students?
 - 10 What are the criteria for determining if a travel vlog's material is appropriate and appealing to viewers?
 - 11 To draw in new audiences, especially youngsters, what are the best practices for a travel content creator?

Literaturereview

Depending on how each person and organization approaches it, the concept of tourism can be understood in a variety of ways. Many concepts have been proposed in this regard.

Before the 19th century and at the start of the 20th century, tourism was seen as a social phenomenon. People's emotional values and perceptions are enriched by tourism-related activities. People travel abroad for a variety of reasons, except for looking for work, and they must pay for their travel expenses. This phenomenon is known as tourism. "

‘The United Nations World Tourism Organization (UNWTO) introduced the concept of tourism in 2008 as “ a social, cultural, and economic phenomenon which entails the movement of people to countries or places outside their usual environments for personal or business/professional purpose. These people are called visitors (which may be either tourists or excursionists; residents or non-residents) and tourism has to do with their activities, some of which involved tourism expenditure.” Tourism is defined by the UNWTO as the activities that tourists engage in (traveling, sightseeing, exploring, experiencing, resting, entertaining, relaxing,). These activities are regulated and must occur continually for a predetermined amount of time, in a specific location that is not where they live, and without any intention of making money (make money).

1. Tourism destination

As stated in the definition of tourism, tourism refers to activities that require people to travel from their customary domicile to another location to fulfil personal requirements for a variety of reasons.

According to Vu Duc Minh's (2008) curricular review of tourism, the majority of tourist destinations are made up of the following constituent parts:

- A tourist attraction
- Transportation (access to destination)
- Accommodation
- Conveniences and assistance services
- Activities

2. Travel vlog

A vlog is a mix of the terms blog and video. Whereas vlogs are a kind of online publishing that enables anybody with a web connection and minimal video production equipment — such as a computer, camera, or mobile phone with video capability – to create and distribute content (Molyneaux et al.,2008).

3. The youth

A community of young people is called youth. The definition of adolescent takes the place of most notions of youth. The diversity of this age group around the world is one issue with the notion of youth, though. The World Health Organization (WHO) specifies youth as those who are between the ages of 19 and 24.

4. Destination marketing

Destination Marketing is the combination of Product Marketing and Service marketing, in which Service marketing account for a higher proportion.

5. Internet and travel experience

Travelers can access a wealth of first-hand knowledge and travel information that they can use to plan future journeys for holidays and vacations. Clawson & Knetsch (1966) has defined travel experience as a multiphase experience with five major phrases:

- Anticipation: when people start thinking about the travel idea, looking for the information and start to plan their trip.
- Travel-to: when tourist going to the destination by transport.
- Onsite: when tourist looking for restaurants, accommodation, tourist activities, and attractions ...
- Travel-back: when the tourist leaves the destination and goes back to their place.
- Recollection: when the tourist thinks back about their travel experience.

2. Research Methodology

The in-depth analysis of the aspects of travel vlogs that influence students' choice of vacation destinations; hence, it is grounded in qualitative and quantitative research. The survey was created using Google form.

Students at Pacific University, Udaipur are the primary focus of this study's research. The research survey began at the middle of October 2023 and ended at the end of December,2023.

As stated in the summary of article, the researcher concentrated on researching the subject using the following elements:

- Content:

+ The Novelty

+ Comprehensive

+ Authenticity

Technical factors:

+ Video recording techniques

+ Video editing techniques

Vlogger/Influencer

3.Information gathering and processing

A survey consisting of 23 questions was administered as part of the thesis. This survey aims to evaluate which aspects of travel vlogs influence students' destination selection. The survey started on the 10th of October and ended on the 30th of October. After 20 days (about 2 weeks), we received 70 responses.

4.Research results and analysis

Our survey asking about "Travel vlog elements that influence students' choice of travel places" received 70 responses in 17 days (about 2 and a half weeks). The outcomes of these questionnaires, analyses, and the effects of the elements of travel vlogs on consumer destination choice may be seen through the information acquired in the part that follows.

1.Respondents background

The response percentage for our survey of students from multiple faculties in the university was 70% after we received 70 responses. There were 70 responses in total, with 27 male responses (38.6%) and 43 female responses (61.4%).

The majority of students are between the ages of 18 and 24, making up 71.4% (50) of the total responses. Students between the ages of 25 and 30 make up 21.4% (15), and students beyond 30 make up 7.1% (5).

The majority of students travel once or twice each year. 42/70, or 60%, of the study respondents say they travel once or twice a year. There are 21/70 of the students travel from 3–4 times per year (30 percent).

50 percent of students have made a decision to travel immediately after watching a travel vlog, whereas 35.7 percent of students say they will think about their choice and 14.3 percent disagree. In which, the percentage of respondents who have watched travel vlogs for their own trip accounts for 88.6 percent, only 7.1 percent had never seen a travel vlog before their trip and 4.3 percent said they would think about it.

Respondents were asked how long they think the vlog should be. According to survey findings, participants believe that a travel vlog lasting between 5 and 10 minutes and between 10 and less than 20 minutes falls into the same percentage range, or 35.7%. These two alternatives are ordinary when compared to the other times in the opinions. The average duration gives the viewer enough time to visualize and take in all the relevant information. Viewers of too-brief videos will experience emotional overload, and the amount of information they absorb is also somewhat constrained.

The results of the study indicate that 58/70 (82%) respondents believe that viewing travel vlogs is useful to them, whereas 11 respondents believe that watching travel vlogs

is not particularly beneficial, and only one respondent disagrees.

2.Elements of travel vlogs that affect students' destination choice survey results

This question is a quantitative question measured by the scale from 1 to 5, 1 as “Strongly disagree” and 5 as “Strongly agree”. The respondents were asked if they believe travel vlogs influence their choice of destination. 57.1 percent of respondents agree that travel vlogs influence their location decision, while 20% of respondents strongly agree, whereas 18.6% of respondents are neutral and 4.3% are against. The majority of respondents' (57.1% Agree and 20% Strongly agree) destination preferences are influenced by travel vlogs. (Figure 2)

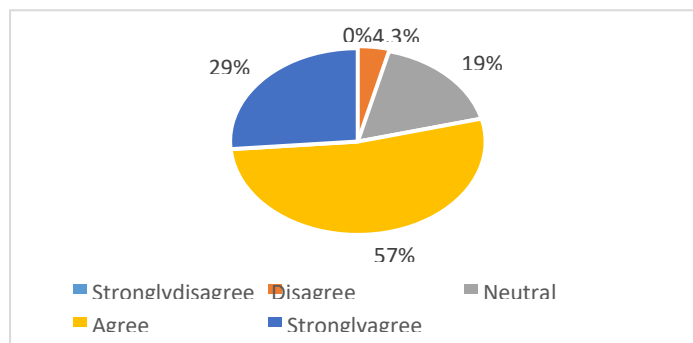


Figure 2. Do you think that travel vlogs affect your destination choice?

The respondents were asked what the most significant aspect of travel vlog content is. Here, we have presented the responders with a selection of predetermined replies and asked whether they had a different response. As shown in Figure 3, the leading response is the Comprehensibility of the content with 36 responses, followed by the authenticity with two distinct answers: the reliability of the information (Authenticity 1) and the quality of being genuine truthfulness of origins (Authenticity 2) which have the same responses with 35 choices, and novelty with 32 responses. There are also uncommon responses which will be called as “Other”.

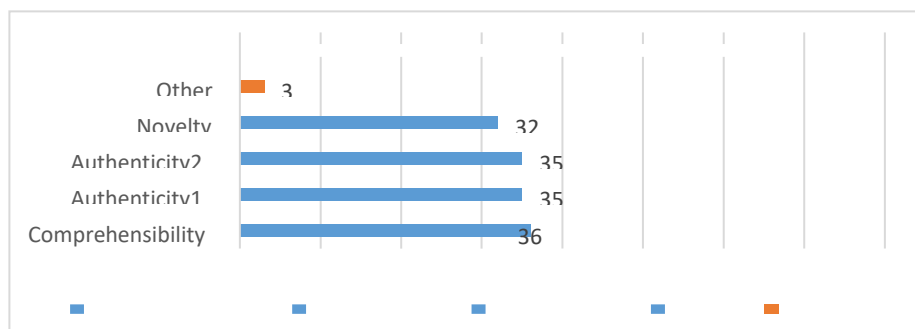


Figure3. What are the most important things in the content of the travel vlogs?

The following question delves more into the novelty of the travel vlog's content. The majority of respondents (54/70, or 77.1%) believe that the content provides them with

newknowledge regarding a destination. Seventy percent of respondents indicated that travelvlogs helped them discover new destinations, while 54.3 percent (38/70) indicated thattravel vlogs had satisfied their interest in a destination. Only 18.6% (13/70) of respondentsindicated that they already knew about the destination, therefore the travel vlog does notprovidethemwithmuch information.(Figure 4.)

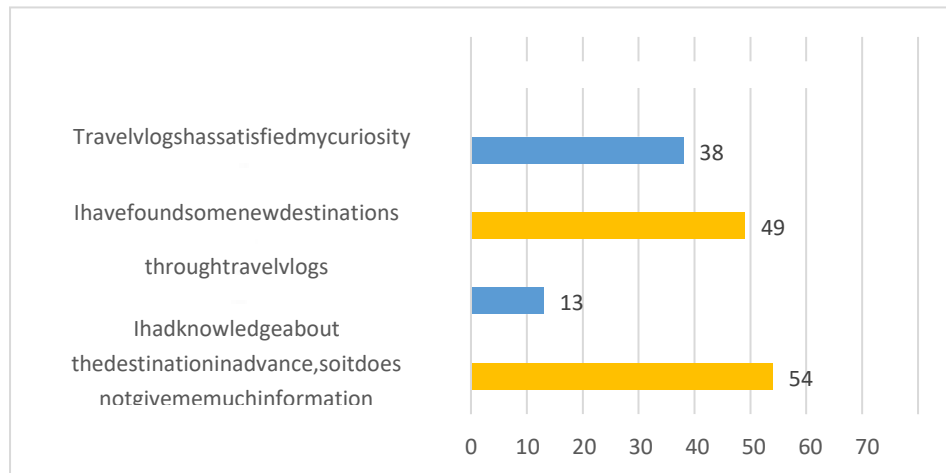


Figure 4. What do you think about the Novelty in the travel vlog?

The following inquiry concerns the authenticity of the given content. With 57 of 70 respondents (or 81.4%), the leading response to this question is "The information of travel vlogs is congruent with reality." 35/70 (50 percent) of respondents believe that the content of the travel vlog is believable, while 29/70 (41,4 percent) of respondents believe that the con- tent of travel vlog is correct. Only one respondent believes that the content of travel vlogs is somewhat believable. (Figure 5.)

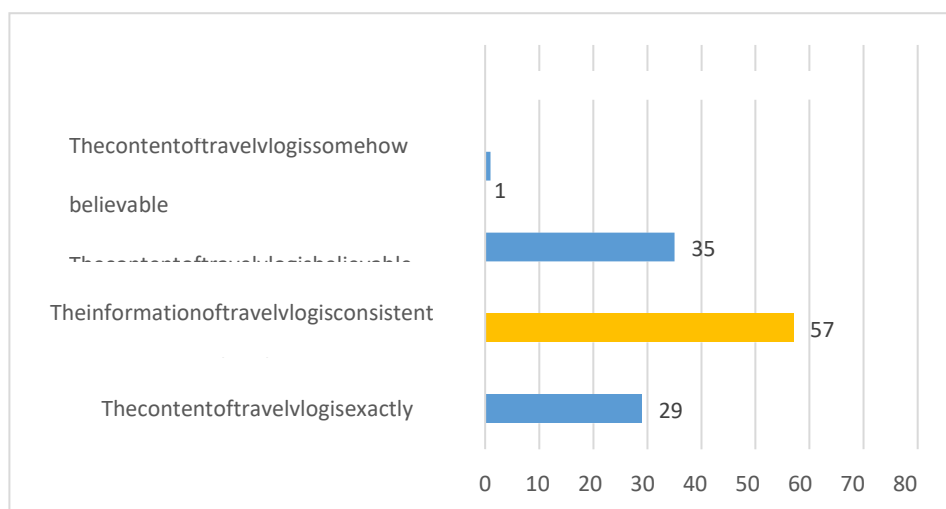


Figure 5. What do you think about the Authenticity of the travel vlog?

Next question addressed respondents about the comprehensive nature of the travel vlog.

Seventy percent of respondents, or 49 out of 70, believe that the content in travel vlogs is straightforward to interpret. At 48/70, they also share the same perspective that they can easily follow the information in travel vlogs (68.8 percent). Only 27 respondents believe that other viewers will find vacation vlogs as simple to comprehend as they do. (Figure 6.)

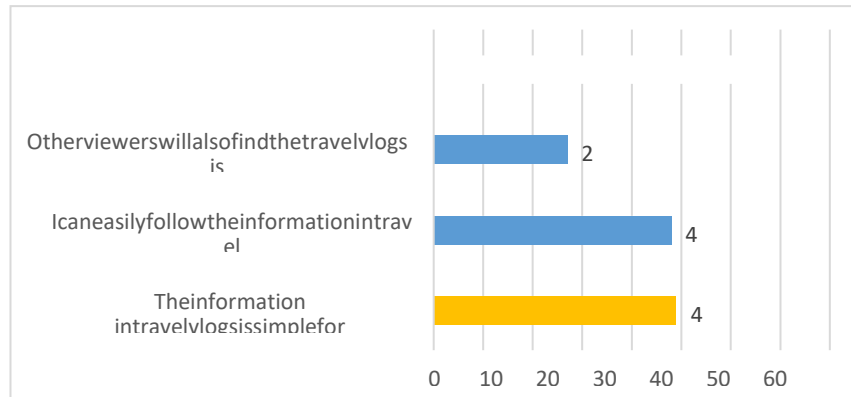


Figure 6. What do you think about the Comprehensibility of the travel vlog?

The following question asks how vloggers/influencers could affect respondents' interest in watching travel vlogs, following a discussion of the key characteristics of travel vlog content. Eighty percent (56/70) of respondents believe that a vlogger/Influencer can influence their desire to watch travel vlogs since the vlogger provides an honest review. Seventy percent (49/70) of respondents believe that the vlogger is credible and provides accurate information. The following leading opinion is that the blogger comprehends the destinations. Two other perspectives with fewer votes are vlogger is well-known and vlogger provides an objective evaluation, with 19/70 (27.1 percent) and 23/70, respectively (32.9 percent). (Figure 7.)

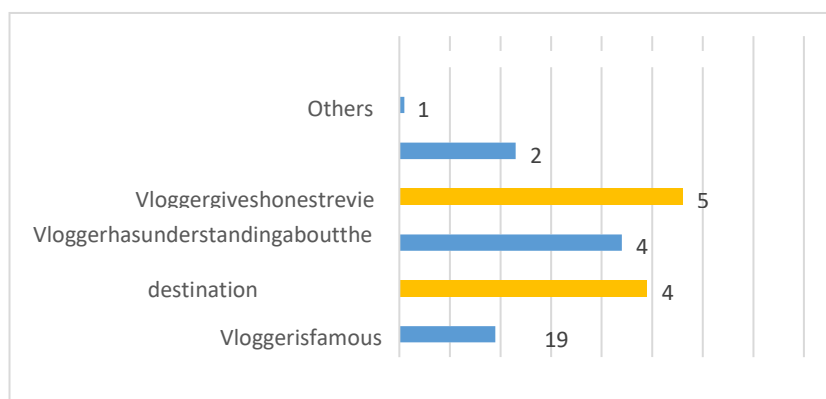


Figure 7. How could vlogger/influencers affect your interest of watching travel vlogs?

The following poll asks respondents how they feel when they watch a travel vlog. Travel vlogs provide more information on the location, according to 72.9 percent of

respondents (51/70). 48/70 respondents (68.6%) believe that the travel vlog motivated them to travel to the destination, and 62.96% (44/70) believe that watching travel vlogs is interesting and valuable to them.

Other popular opinions include that travel vlogs depict, promote, and increase the attractiveness of the location and that viewing travel vlog is entertaining, with a reply rate of 40/70 (57.1%) and 32/70 (45.7 percent). The opinion with the fewest votes, 12/70 or 17.1 percent, is that travel vlogs made me happy. (Figure 8.)

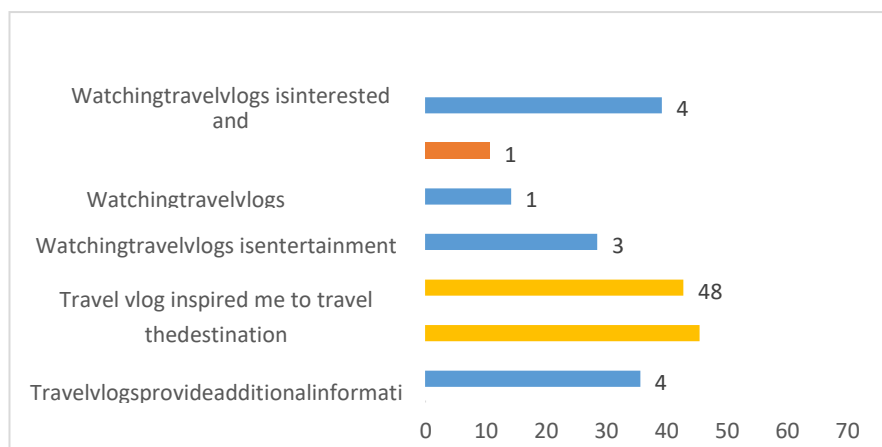


Figure 8. How do you feel when you watch a travel vlog?

This is a quantitative question measured on a scale of 1 to 5, with 1 indicating "Strongly disagree" and 5 indicating "Strongly agree." The respondents were asked if they believe that the images of a destination provided by vloggers in travel vlogs are meaningful and influence their travel decisions. 41/70 (58.8 percent) of respondents agreed with the supplied statement, while 19/70 (27.1 percent) strongly agreed. 9 respondents were neutral and only 1 was opposed to this statement. (Figure 9.)

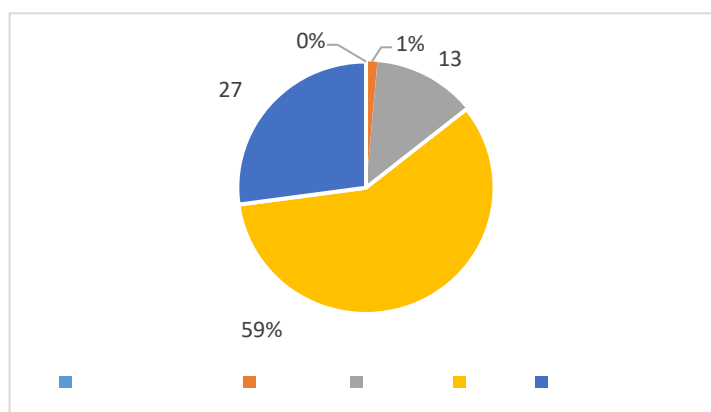


Figure 9. Do you think the images of a destination that the vloggers provide in a travel vlog are relevant and it impacts your travel decision?

Respondents were asked what aspect of the destination images in travel vlogs was most likely to influence their travel decision, and 49 out of 70 responded. As

demonstrated in Figure 10, the top two replies are magnificent landscapes with 12/49 (24.5%) responses, and culinary with 11/49 responses (22.4 percent). There are also uncommon responses which will be called as “Other”.

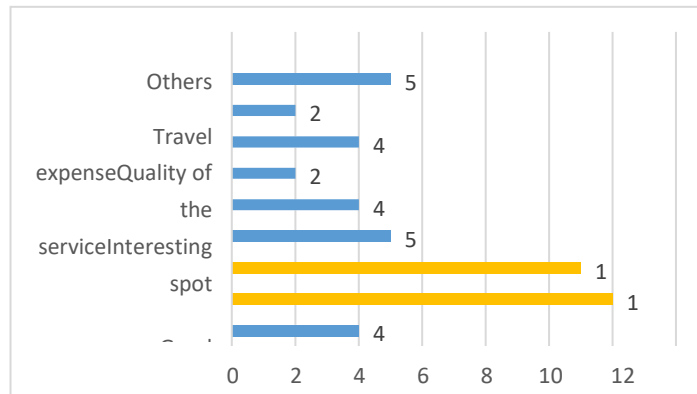


Figure 10. What was something on the destination images through travel vlogs that especially could affect your travel decision?

The following question is converted to a “Yes”, “No” and “Maybe” scale. In addition to the images and content of a travel vlog, 68.6% or 48/70 respondents agree (Yes) that they also pay attention to the filming/recording and video editing techniques of vloggers, while 21.4% of the respondents are unsure (Maybe) if they pay attention to the filming/recording and video aspect of travel vlogs and 10% do not pay attention (No) to this factor.

After viewing a travel vlog, respondents were asked to select the most significant part of video techniques that could affect their travel destination. 67.1% or 47/70 respondents believe that clear images and sound are the most significant factor, while 15% or 15/70 respondents believe that smooth video is the most important factor. We also received a variety of other responses. There are also uncommon responses which will be called as “Other”.

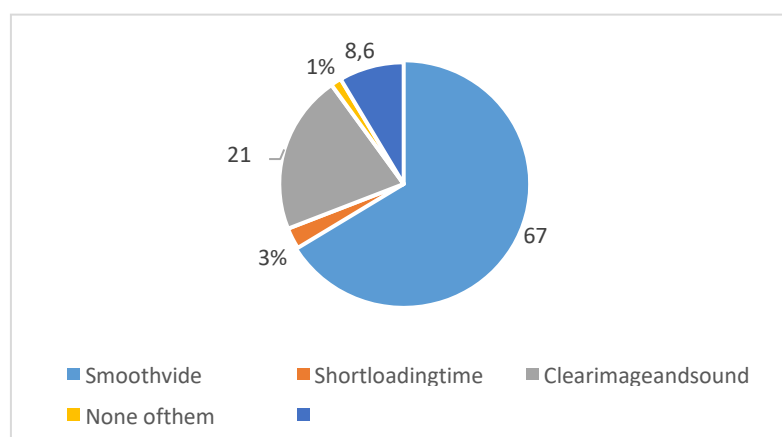


Figure 11. In your opinion, which of the following three factors determines the most important element of video techniques that might affect your travel decision after watching a travel vlog?

In addition to the criteria, we provided such as contents, technical elements, and vlogger/in- fluence, we also surveyed respondents to see what additional elements of travel vlogs could affect their destination. The majority of respondents selected "No" indicating that they con- cur with our provided aspects. There are also uncommon responses which will be called as "Other". (Figure 12)

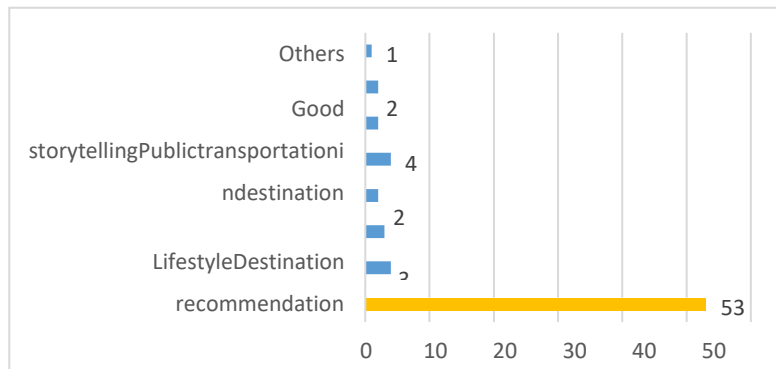
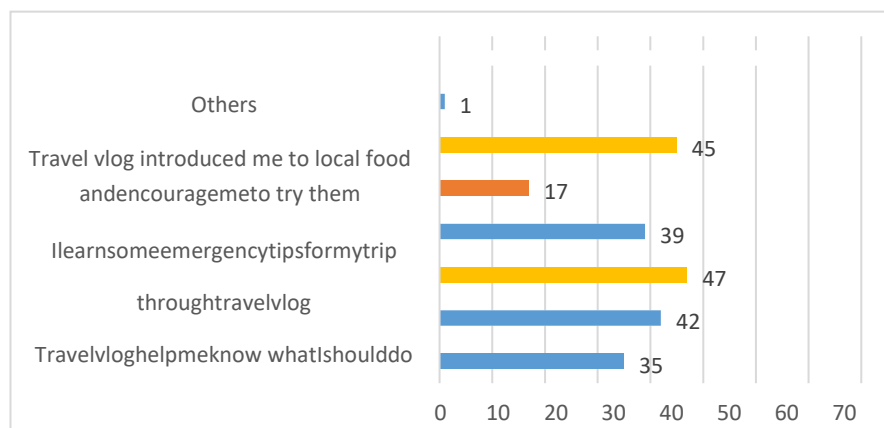


Figure 12. Do you think are there any other elements of travel vlog that affect your travel decisions?

Figure 13. What would you like to talk about the experiences, contents, and importance of travel vlogs on your traveling intentions?



In the final question, respondents were asked to discuss the impact of travel vlogs on their trip intentions in terms of their experiences. Most respondents (67.1%) think that travel vlogs assist them in locating certain scenery at their destination. Travel vlogs introduced them to local cuisine and encouraged them to try it, according to 45/70 (64.4 percent) of the respondents. The opinion with the fewest votes is that they learned some emergency travel tips from travel vlogs. (Figure 13.)

6. Summary and discussion

1. Effects of vlogging on the travel preparation process

The interviewees testified that knowledge was the first resource that has grown substantially. Blogs facilitate great information and simple preparation thanks to their communities' combined intelligence in the form of comments, feedback, and connections. Nearly all respondents, meanwhile, highlighted the reliability and objectivity of blog posts as reasons to favor them. From the survey interviews results, 97% of respondents, regardless of gender, education level, age, place of residence, or how often they travel, had visited a social networking web- site during the past 12 months. Therefore, tourist now have more leeway and choice in planning their trips, but they also bear greater responsibility in determining which advice to follow (Fotis et al., 2011, 4). With the help of blogs, travelers have more ways to get ready for their trips, which can change how they experience their destinations.

2. Responsible travel

Following a basic question, this subject was broken down into smaller, more focused sections. While certain ideas and thoughts had already been raised in the preceding section, the theme of responsible travel also inspired some new views. The most often given responses were to avoid littering, learn about local cultures and customs, and abide by local regulations.

3. Destination

Students' motivations and reasons for selecting the location were highly individualistic. Seven of the pupils brought up the topic of how much the vacation would cost. This may indicate the state of students' budgets in higher education. After financial considerations, a person's curiosity about and desire to see a particular place were cited as the most important factors in travel (Ofitserova, 2021). Before traveling, the students checked on the destination's popularity, accessibility, and the opportunity to experience something new, which were also frequently cited as reasons for a person's choice of vacation spot. Another factor to consider before traveling is the political climate of the destination, according to some students. The security of the passengers depends on this. Traveling there can also demonstrate support for a nation's political system and legal framework. Many tourism and hospitality organizations have found that engaging with their target audience and building brand recognition through travel influencers is an effective use of the Internet.

4. Influence of vlogs on travel

People's daily lives have been profoundly altered by technological progress. People today are much more likely to rely on readily available information like that found online than in the past. Since this helps shape their destinations' visual expectations, they should experience it vicariously through photos and videos (Belanio et al., 2022, 74). Videos are popular because they allow viewers to gain insight into the lives of those they follow. It is widely believed to be the primary reason for the recent surge in

viewership of travel television networks. One of the most subscribed playlists on YouTube is dedicated to travel videos.

5. Travelling

As needed, all respondents had some experience traveling. They had all experienced domestic and international travel to varying degrees. There were also references to discovering new things, meeting new people, and having new experiences. This might be viewed as the driving force for the trip.

Moreover, over half of those who participated in the survey said they had visited a location just because they saw it featured on Instagram or YouTube.

Summary and recommendation

The more appealing the YouTuber, the more potential visitors would have on the relevance of the vlogger, and the stronger their aim to travel after viewing travel vlog video. To the impression of the social media platform, vloggers had a bigger influence on potential tourists. A good image for the vlogger and personal appeal are more likely to have viewers' impressions. A travel Vlog's ability to entertain its viewers will increase the likelihood that a potential tourist will visit one of the vlogger's recommended destinations.

Potential tourists are likelier to take vloggers up on their recommendations when they believe the video is helpful. A video's perceived utility is how much its viewers believe it will enhance their vacation. A system's perceived usefulness measures how much its users think it will boost their productivity. Visitors' intent to purchase was significantly impacted by how practical attractions seemed to them.

7. Conclusion and Future Research

The purpose of the study was to determine the impact of travel vlogs on students' decision to choose a location. The findings of this study indicate that factors such as novelty, authenticity, comprehensibility, and influencer/vlogger factors influence the satisfaction of watching travel vlogs, consequently influencing students' travel decisions. The most influential of these elements on students is the Content in general.

The technical aspect of travel vlogs have minor impact on the student's enjoyment of viewing, and so do not influence their destination selection.

For the sake of future research, there is several aspects that could be considered to improve this study. The first is to increase the number of survey samples and broaden the research scope and area. Second, the length of this study is insufficient to capture the long-term effects of the link between the travel vlogs and customer, and because the research objective is quite specific, it may not cover all characteristics of travel vlogs; therefore, this study needs to be reviewed and enhanced to understand more about other aspects of travel vlogs.

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Evaluating the Financial Soundness of Care Health Insurance Limited

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Abstract:

The insurance sector is financially vulnerable due to various risks, including underwriting, investment, and non-technical risks, which can threaten the stability of the financial system. To maintain sector stability, it is essential to regularly assess insurers' financial performance within a competitive context. To aid this, the International Monetary Fund (IMF) introduced Macro Prudential Indicators (MPI) under the Financial Stability Assessment Programme (FSAP), which became known as Financial Soundness Indicators (FSIs) in September 1999. A notable framework for evaluating insurer financial health is CAMEL, developed by Das et al., which assesses six key areas: (C)apital adequacy, (A)sset quality, (R)isk management and insurance practices, (A)ctuarial considerations, (M)anagement efficiency, (E)arnings and profitability, and (L)iquidity. This framework evaluates financial stability of Care Health Insurance Ltd. using data from 2019-20 to 2023-24 gathered from insurer websites, annual reports, the Handbook of Insurance Statistics, and IRDA Annual Reports. Analyses of financial ratios reveal growth within India's insurance industry overall. Further, statistical T-test has been used for study.

Key Words:

CAMEL, Financial Soundness, t-test.

INTRODUCTION:

The liberalization of India's insurance business has facilitated substantial expansion and diversity, allowing private entities to enter the market and compete with established public-sector leaders. Care Health Insurance Ltd, previously referred to as Religare Health Insurance, has become a significant entity in the health insurance sector among private enterprises. Founded to offer specialized health insurance solutions, Care Health Insurance has significantly enhanced healthcare accessibility and affordability for Indian consumers. The organization provides a variety of unique policies designed to meet the needs of individuals, families, and corporations, prioritizing customer-centric solutions and offering financial protection against escalating medical expenses. The Indian insurance sector, originally nationalized to promote inclusion and resource mobilization, has progressively shifted to a privatized model, attracting international investors and encouraging competition. This transition has facilitated enhancements in product offerings and service delivery, allowing organizations such as Care Health Insurance Ltd to position themselves as significant players in the industry. Health insurance is regarded not merely as a financial protection against medical crises but also

as a crucial investment in individual well-being. With the increasing need for health insurance, Care Health Insurance is reinforcing its market position by providing value-oriented solutions, bolstering customer trust, and advancing the overarching objective of ensuring health security for all.

Care Health Insurance has concentrated on providing innovative, customer-oriented health insurance solutions that address the varied healthcare requirements of individuals, families, and corporations. The company has continually strengthened its market presence with a comprehensive portfolio of products, including critical illness plans, family floater policies, and disease-specific coverage. Care Health Insurance is renowned for its robust focus on digital innovation and efficient claim settlement procedures, allowing them to provide an exceptional customer experience. The company has constantly extended its customer base and established a reputation for trust and quality service in the health insurance sector, demonstrating its growth and trustworthiness. Care Health Insurance is addressing the increasing need for healthcare coverage in India, thereby fulfilling the financial protection requirements of its clients and considerably advancing the development of the Indian health insurance business.

The CAMELS framework offers a comprehensive method for evaluating the financial performance and operational effectiveness of insurance companies. Utilizing this rigorous process, stakeholders such as regulators, investors, and policymakers may discern the strengths and weaknesses of specific organizations, facilitating informed decision-making and strategic planning.

Review of Literature:

[1] CAMELS Parameter

Das, Davies, and Podpiera (2003) suggest the CAMELS framework (Capital Adequacy, Asset Quality, Reinsurance and Actuarial Issues, Management Soundness, Earnings and Profitability, Liquidity, and Sensitivity to Market Risk) to evaluate financial health and soundness. The fiscal performance of insurance firms. The CAMELS framework is extensively utilized in the banking industry. Reinsurance and Actuarial problems (RA) have been incorporated into the CAMELS framework; nonetheless, there are intrinsic distinctions between banking and insurance, resulting in differing meanings and interpretations of the indicators utilized for banks compared to those for insurance. The objectives and significance of the CAMELS characteristics and financial indicators utilized for analysis are addressed in the fourth section.

[2] Review of Literature

Dr. L. Krishna Veni, Karteeek Chedadeepu(2018):The study compared the financial performance of LIC and four private insurance companies using the CAMEL model from 2007-08 to 2016-17. Results showed ICICI Prudential showed a growing trend in Capital Adequacy, while HDFC Standard Life showed an increasing trend. Management soundness fluctuated, and LIC's Return on Equity showed a significant upward trend.

Tia Anna Widati and Eka Pria Anas(2020):The study evaluated the financial health of five Indonesian life insurance companies using Risk-based capital,

CAMELS, and Financial Strength Rating models in 2017. All companies showed healthy financial positions, with PT Prudential Life Assurance showing the highest RBC level. FSR and CAMELS provided a more systematic assessment.

Kumar, P. and Ghimire, R. (2013): The study analysed Nepalese Life Insurance Companies using the CAMELS Model over a five-year period. Eight companies showed increasing trends in Capital Adequacy and Asset Quality, while risk retention ratios increased due to reinsurance and accrual issues. Management soundness showed upward trends in Gross Premium to Number of Employees and Assets per Employee.

V.N. Parthiban(2014) study evaluated the financial performance of life insurers like LIC, SBI, and ICICI Prudential Life using the CAMEL model, finding significant differences in parameters among selected Indian insurers.

Stephen Rossiter (2016) highlights the importance of on-site and off-site inspections by insurance supervisors to assess risks and financial position of insurance companies. He highlights various risks such as product design, operational, liquidity, reinsurance, interest rate, credit, underwriting, and foreign exchange.

The study by **Singh and Fatima (2017)** The study by Singh and Fatima (2017) evaluates the growth and performance of ICICI Prudential Life Insurance Company Limited, a prominent private sector life insurance firm, using indicators like net profit, net premium, and branch number. They also use the CAMEL Model and one-sample t-test to analyze ratios like capital to total assets and net premium to gross premium ratios, examining five chosen life insurance firms over the past decade

Objective of the Study:

To analyse the financial performance and soundness of Care Health Insurance Ltd in India using CAMEL Framework.

Research Methodology:

Purpose of The Study

Health insurers are progressively vulnerable to diverse hazards, regarded as potential contributors to instability within the financial structure of the insurance sector. Consequently, financial soundness has become a crucial concern for guaranteeing long-term sustainability and stability. This study is to assess the financial stability of Care Health Insurance Ltd. through ratio analysis utilizing the CAMEL framework.

The Null Hypothesis

TheCare Health Insurance company, There is no significant difference with respect to Capital Adequacy Ratios, Asset quality Ratio, Reinsurance and Actuarial Issues Ratios, Management Soundness ratios, Earning and Profitability Ratios and liquidity ratios.

Research Design

This paper aims to analyze the financial soundness indicators of Care Health Insurance Ltd. utilizing the CAMEL Framework based on Das et al.'s methodology from an IMF working paper. The research adopts a descriptive research design to assess the financial stability of Care Health Insurance Ltd. using Secondary data sources, including IRDA annual reports, insurance statistics handbook, and public disclosures from these insurers, were employed to gather financial performance data spanning five years, covering the period from 2019-20 to 2023-2024. In this paper researcher used one sample t-test for selected ratio.

CAMELS Framework:

In 2003, Das et al. introduced the CAMEL framework, expanding upon the established CAMEL Framework [(C)apital adequacy; (A)ssets Quality; (R)isk Management; (A)ctuarial aspects; (M)anagement Efficiency; (E)arnings and Profitability; (L)iquidity]. This extension incorporated two vital analytical dimensions: the assessment of management soundness and actuarial Issues, aimed at appraising insurers' financial health. The authors proposed two sets of Insurance Financial Soundness Indicators (FSI): The Core Set and the Encouraged Set. For this study, select indicators from the Core Set were chosen for both life and non-life insurers. The following table presents these indicators.

Table-1 Insurance Financial Soundness Indicators: CAMEL Framework

Category	Core set Indicators
Capital Adequacy	Net Premium / Capital
Asset Quality	Equities/ Total Assets
Reinsurance and Actuarial Issues	Risk Retention Ratio (Net premium/Gross premium)
Management Soundness	Gross Premiums/ Number of Employees
Earnings and Profitability	Expenses ratio (Expenses/Net premiums)
Liquidity	Liquid Assets /Current Liabilities

Analysis of Each Financial Indicator:

This study reveals analysis based on the CAMEL framework suggested by Das Et al. Various results that indicating a financial soundness of the respective insurers has been found as follows.

Table-2: Year wise Financial Performance of Care Health Insurance Ltd Using CAMEL Framework

CARAMEL	C	A	RA	M	E	L
Category	Capital adequacy	Asset quality	Reinsurance and actuarial issues	Management soundness	Earnings and profitability	Liquidity
Ratio Financial Years	Net Premium To Capital (In %)	Equity To Total Assets (In %)	Net Premium To Gross Premium (In %)	Total Assets To Number of Employees	Combined Ratio (In %)	Liquid Assets To Current Liabilities
2019-20	207.5502	36.390	67.497	23.534118	115.00	1.2951802
2020-21	174.9558	28.830	77.384	29.455372	109.00	0.5607949
2021-22	239.5604	23.313	79.580	27.232828	93.00	0.6621071
2022-23	262.4605	17.081	89.228	36.496196	92.00	0.4290139
2023-24	278.6715	13.745	88.087	44.479150	95.00	0.3983801

(Source: Computed)

This section evaluates the performance of Care Health Insurance Company Ltd. using the CAMEL Model. Here six ratios have been calculated from 2019 to 2024 under each category. The table above shows the calculated ratios in percentages

Capital Adequacy (C): Net Premium to Capital:

This ratio is fundamental to a company, providing a security cover for policyholders and indicating the firm's solvency status. An elevated capital adequacy ratio signifies improved efficiency and a greater capacity to withstand risks. The data indicates that the ratio was 207.55% in 2019-20, subsequently decreasing to 170.49% in 2020-21. The ratio exhibited a steady increase over the following years, attaining 239.56% in 2021-22, 262.46% in 2022-23, and 278.67% in 2023-24. The observed trend indicates a significant enhancement in the company's capital adequacy throughout the period, reflecting a more robust financial standing and an augmented ability to manage risks effectively. The company has demonstrated strong performance in capital adequacy, reflecting its financial resilience and solvency.

Asset quality (A): Equity to Total Assets:

This ratio serves as a significant indicator of a sound financial position over the long term, as it reflects that a substantial proportion of total assets is finance by equity, thereby reducing the firm's reliance on external sources of finance. A lower ratio serves as a warning for long-term lenders, suggesting a diminished margin of safety at their disposal. A lower ratio indicates that long-term loans are less secure, increasing the risk of financial loss. The data presented indicates a notable decline in the ratio, decreasing from 36.39% in 2019-20 to 13.74% in 2023-24. The decreasing ratio indicates a decline in asset quality over time. This trend raises concerns as it suggests a diminished dependence on equity and possible asset vulnerabilities.

Reinsurance and actuarial issues (RA): Net Premium to Gross Premium:

This ratio indicates the company's risk retention position, reflecting the extent to which it retains its gross premium to manage payment risks. A higher ratio indicates that the company retains a greater portion of the premium amount and depends less on the Reinsurance Company. A lower ratio indicates that the company is increasingly dependent on the reinsurance provider to manage its risk associated with customer payments. It is essential to ascertain the financial position of the reinsurance company in this instance. The net premium to gross premium ratio was 67.49% in 2019-20 and increased to 88.08% in 2023-24. The observed ratio range indicates that the company is improving its risk retention ratio and is less dependent on reinsurance. This suggests confidence in its financial position and an ability to meet customer obligations. A higher ratio signifies that the company retains a larger share of its premium, thereby decreasing reliance on reinsurance. The 2023-24 ratio of 88% indicates improved risk retention relative to previous years.

Management soundness (M): Total Assets to Number of Employees:

Management soundness indicates the efficiency and effectiveness of a company's leadership in employing its workforce to generate and administer assets. The ratio of total assets to the number of employees serves as a significant measure of productivity and operational efficiency. An elevated ratio signifies effective management in the utilization of human resources to enhance the value of controlled assets. The data indicate a consistent and notable improvement in the ratio over the years. The ratio was 23.53 in 2019-20 and rose to 29.45 in 2020-21. The ratio decreased to 27.23 in 2021-22 but subsequently rebounded, achieving 36.49 in

2022-23 and increasing further to 44.48 in 2023-24. The upward trend indicates a consistent improvement in the company's management effectiveness, as a reduced number of employees is required to manage larger asset volumes, reflecting enhanced operational efficiency. This ratio's steady rise demonstrates the business's capacity to maximize employee productivity, allocate resources more effectively, and boost productivity over time. This indicates strong managerial capabilities within the organization, demonstrating an effective approach to maintaining and expanding the asset base.

Earnings and profitability (E): Combined Ratio: Loss Ratio and Expense ratio:

Earnings and profitability are essential metrics of a company's financial well-being and operational efficacy. The Combined Ratio, an essential indicator, is the aggregate of the loss ratio and expenditure ratio, indicating the company's underwriting profitability. A ratio under 100% signifies that the company is generating underwriting profits, whilst a ratio beyond 100% indicates underwriting losses. The Company's Combined Ratio has exhibited variability over the years. In 2019-20, the ratio was 115.0%, signifying underwriting losses. Nevertheless, the ratio markedly improved in 2020-21, decreasing to 109.0% and further reducing to 93.0% in 2021-22, indicating a transition towards profitability. Despite a modest rise in 2022-23 and 2023-24, with ratios of 92.0% and 95.0% respectively, the figures remained beneath the 100% benchmark, indicating continued profitability. The decline in the Combined Ratio indicates the company's enhanced efficiency in claims management and operational expenditure reduction. The transition from underwriting losses to profitability underscores the firm's capacity to improve its earnings and operational viability during the observed timeframe. The company's earnings and profitability, as evidenced by the Combined Ratio, demonstrate a favorable financial trajectory and effective operational management.

Liquidity (L): Liquid Assets to Current Liabilities:

Liquidity is an essential indicator of a company's capacity to fulfill its short-term liabilities with its liquid assets. The Liquid Assets to Current Liabilities ratio reflects the company's financial flexibility and short-term solvency. An elevated ratio indicates the company's capacity to meet its current liabilities, whilst a decreasing ratio may suggest impending liquidity issues. The liquidity ratio exhibits a steady decline over the investigated period. In 2019-20, the ratio was 1.295, indicating a

robust liquidity situation. The ratio decreased to 0.561 in 2020-21, further fell to 0.662 in 2021-22, and continued to plummet to 0.429 in 2022-23. In the 2023-24 period, the ratio attained its nadir at 0.398. This downward trend signifies that the company's liquid assets are inadequate to meet its short-term liabilities, thus jeopardizing its financial flexibility. The ongoing decline in the liquidity ratio prompts apprehensions regarding the company's capacity to adequately handle short-term financial commitments. This tendency underscores the necessity for enhanced cash flow management and the fortification of liquid asset reserves to guarantee the company's financial stability moving forward. Mitigating these liquidity concerns is crucial for bolstering the firm's resilience to financial shocks and ensuring operational continuity.

Testing of Hypotheses and Interpretation:

The hypotheses have been tested using the one sample t-test. The above-calculated ratios have been tested to know the significant difference in the performance of Care Health General Insurance Company Ltd. Over the study period with respect to CARMEL parameters. The table below shows the results:

Table-3 Result of t-test for CARMEL

Tests of Normality						
	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Capital Adequacy	.166	5	.200	.963	5	.830
Asset Quality	.173	5	.200	.969	5	.867
Reinsurance and Actuarial Issues	.209	5	.200	.925	5	.565
Management Soundness	.231	5	.200	.944	5	.694
Earnings and Profitability	.310	5	.132	.832	5	.144
Liquidity	.308	5	.137	.796	5	.075

Note: Results computed using SPSS software

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Capital Adequacy	5	2.326396	.4187188	.1872567
Asset Quality	5	2.238718	.0908664	.0406367
Reinsurance and Actuarial Issues	5	.803552	.0884971	.0395771

Management Soundness	5	32.239533	8.3146001	3.7184022
Earnings and Profitability	5	1.800100	.1049762	.0469468
Liquidity	5	.669095	.3656111	.1635063

Note: Results computed using SPSS software

	One-Sample Statistics						
	t	d f	Significance		Mean Difference	95% Confidence Interval of the Difference	
			One- sided p	Two- sided p		Lower	Upper
Capital Adequacy	12.424	4	<.001	<.001	2.3263960	1.806488	2.846304
Asset Quality	5.874	4	.002	.004	.2387180	.125892	.351544
Reinsurance and Actuarial Issues	20.303	4	<.001	<.001	.8035520	.693668	.913436
Management Soundness	8.670	4	<.001	<.001	32.239533	21.915593	42.563472
Earnings and Profitability	21.411	4	<.001	<.001	1.800100	.877655	1.138345
Liquidity	4.092	4	.007	.015	.669095	.215129	1.1230601

Note: Results computed using SPSS software

The analysis assesses the company's financial stability utilizing the CAMEL framework, which includes six essential dimensions: Capital Adequacy (C), Asset Quality (A), Reinsurance and Actuarial Issues (RA), Management Soundness (M), Earnings and Profitability (E), and Liquidity (L). The hypothesis tested was that there is no significant difference among these ratios. A normality test was conducted using the Kolmogorov-Smirnov and Shapiro-Wilk tests, both of which indicated that the data met the assumption of normality for all ratios ($p > 0.05$). We then applied a one-sample t-test, which revealed significant differences in most ratios, indicating variability in the company's performance across these dimensions.

The results underscore the company's significant strengths. Capital adequacy has shown to be a considerable strength, evidenced by a substantial t-value (12.424, $p < 0.001$) and a consistent upward trend, culminating at 278.67% in 2023-24, reflecting the company's strong capacity to absorb risks and sustain solvency. The robustness of management was evidenced by a substantial t-value (8.670, $p < 0.001$), indicating effective resource allocation and operational expansion. Moreover, earnings and profitability demonstrated outstanding results, as indicated by a highly significant t-value (21.411, $p < 0.001$), highlighting the company's capacity to produce consistent profits and maintains operational efficiency.

Notwithstanding these qualities, the organization encounters specific weaknesses. The asset quality demonstrated a reduced t-value (5.874, $p = 0.004$), signifying deficiencies in asset management that may risk long-term financial a t-value of 4.092 ($p = 0.007$) and a decreasing ratio of liquid assets to current liabilities, indicating possible difficulties in fulfilling short-term obligations. Reinsurance and actuarial concerns, although statistically significant ($t = 20.303$, $p < 0.001$), exhibited deficiencies in the effective management of reinsurance risks, necessitating improved risk-sharing systems. The null hypothesis of no significant difference among the CAMEL ratios was rejected for the majority of dimensions, signifying variability in the company's performance. The company exhibits robust financial stability in capital sufficiency, managerial efficiency, and profitability; yet, its deficiencies in liquidity and asset quality underscore areas need prompt intervention. Mitigating these vulnerabilities is crucial for improving the company's long-term sustainability and financial robustness. These findings emphasize the necessity of attaining balanced performance across all CAMEL components to sustain overall financial stability.

Conclusion:

The company's financial stability was assessed with the CAMEL model, emphasizing Capital Adequacy, Asset Quality, Reinsurance and Actuarial Issues, Management Soundness, Earnings and Profitability and Liquidity. The normality tests (Kolmogorov-Smirnov and Shapiro-Wilk) demonstrated that the data for the majority of variables followed a normal distribution ($p > 0.05$). One-sample t-tests indicated significant differences in all ratios relative to their expected averages ($p < 0.05$). The Capital Adequacy Ratio had an upward trajectory, indicating strong solvency and capacity for risk absorption. Management Soundness shown consistent enhancement, reflecting improved operational efficiency. Earnings and profitability exhibited stability, indicating constant operational performance. Nevertheless, the Liquidity ratio has diminished throughout the years, indicating possible difficulties in fulfilling short-term obligations. The decline in Asset Quality may suggest apprehensions over asset management. Reinsurance and actuarial issues saw a marginal enhancement, indicating improved risk-sharing systems.

The Care Health General Insurance Company Ltd. demonstrates strengths in Capital Adequacy, Management Soundness, and Earnings and Profitability, while encountering disadvantages in Liquidity and Asset Quality. The findings underscore the company's strong long-term solvency while indicating areas that necessitate improvement to bolster short-term financial resilience.

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Exploring Consumer Preferences for Indian-Made Products: A Study on Economic Nationalist and Protectionist Attitudes in Surat

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Abstract:

Consumer preferences for domestic products over imports have garnered increasing attention amidst the rise of economic nationalism and global market dynamics. This study investigates the attitudes of Indian consumers toward Indian-made products and their perspectives on foreign goods, focusing on demographic influences such as education, gender, profession, and income. A structured questionnaire was developed and distributed online, collecting 295 valid responses for analysis. The findings reveal a strong overall preference for Indian-made products, underscoring the role of cultural and economic factors in shaping consumer behavior. Education emerged as a significant factor, influencing nuanced perspectives on protectionist policies like import taxation and restrictions on foreign goods. Respondents with higher education levels demonstrated stronger support for such measures, reflecting a deeper understanding of their economic implications. On the other hand, certain beliefs, such as the preference for Indian products to support local industries and promote self-reliance, were consistent across all demographic groups, suggesting shared cultural narratives. This research highlights the potential for targeted educational campaigns to further enhance support for domestic products and foster economic self-reliance. The study contributes to the broader discourse on consumer behavior and economic nationalism, offering valuable insights for policymakers and marketers seeking to align strategies with consumer preferences in a globalized economy.

Keywords: Consumer Behavior, Economic Nationalism, Domestic Products, Indian Consumers, Consumer Preferences

Introduction:

Consumer behavior is a complex and multifaceted domain that plays a pivotal role in shaping market dynamics and economic trends. In recent years, there has been a growing emphasis on understanding consumer preferences for domestic products over imports, particularly in the context of economic nationalism. This phenomenon is driven by a combination of factors, including national pride, the desire to support local industries, and the belief that buying locally contributes to economic self-reliance and job creation.

India, with its rich history of movements advocating for self-reliance, such as the Swadeshi movement, presents a unique case for studying consumer preferences. The

contemporary emphasis on "Vocal for Local" and campaigns promoting Indian-made products further underscores the relevance of examining how these preferences manifest in consumer behavior. As globalization continues to introduce diverse choices in the market, understanding the factors that influence consumer decisions becomes crucial for policymakers, businesses, and marketers aiming to promote domestic industries.

This study aims to explore the attitudes and preferences of Indian consumers toward Indian-made products and their perspectives on imported goods. By analyzing these preferences across various demographic groups, the research seeks to uncover the underlying motivations and barriers that drive consumer choices. The study employs a structured questionnaire distributed online to collect responses, allowing for a comprehensive understanding of these attitudes.

Through this research, we aim to contribute to the existing body of literature on economic nationalism and consumer behavior, offering insights into how national identity, economic considerations, and cultural factors intersect in shaping purchasing decisions. The findings are expected to inform strategies for promoting domestic products and fostering sustainable economic growth.

Review of Literature:

The preference for domestic products over imports among Indian consumers has been a subject of extensive research, particularly in the context of economic nationalism and consumer behavior. Recent studies have provided valuable insights into this phenomenon, highlighting the interplay between consumer ethnocentrism, national identity, and purchasing decisions.

Consumer ethnocentrism refers to the belief that purchasing domestic products is morally appropriate, while buying foreign-made goods is considered inappropriate. Shimp and Sharma (1987) introduced the concept, emphasizing that highly ethnocentric consumers are inclined to prefer domestic products and may even disapprove of others purchasing foreign goods. This concept has been instrumental in understanding consumer behavior in various cultural contexts.

In the Indian context, research by Bandyopadhyay and Muhammad (1999) examined the impact of consumer ethnocentrism on preferences for domestic versus foreign products. Their study revealed that Indian consumers with high ethnocentric tendencies exhibited a strong preference for domestic products, driven by a sense of national pride and the perception that supporting local industries contributes to the country's economic development.

Economic nationalism emphasizes the importance of domestic control over the economy, advocating for the prioritization of local goods and services. In India, this ideology has deep historical roots, notably in the Swadeshi movement, which encouraged the boycott of foreign goods in favor of Indian-made products. This movement has significantly influenced contemporary consumer behavior, fostering a preference for domestic products as an expression of national identity and economic patriotism.

Recent studies have explored the resurgence of economic nationalism in India, particularly in response to globalization and economic liberalization. Nayar (2001)

analyzed the limits of economic nationalism in India during the late 1990s, highlighting the challenges and contradictions faced by the government in balancing nationalist economic policies with the pressures of globalization. This analysis provides a historical perspective on the evolution of economic nationalism in India and its impact on consumer behavior.

Globalization has introduced a plethora of foreign products into the Indian market, challenging traditional consumer preferences. However, studies indicate that Indian consumers continue to exhibit a strong preference for domestic products. A report by the Boston Consulting Group (2019) found that 50% of Indian consumers prefer Indian brands over international ones in at least one category, with the trend being most pronounced in food products. This preference is attributed to factors such as cultural affinity, perceived quality, and the desire to support the local economy.

The COVID-19 pandemic has further influenced consumer behavior in India, reinforcing the preference for locally made products. Dasgupta (2023) observed that the pandemic heightened health and hygiene concerns, leading consumers to favor products that promote personal safety and well-being. Additionally, there has been a shift towards supporting local businesses and products, driven by a renewed sense of community and economic self-reliance.

Despite the preference for domestic products, consumers often face challenges in distinguishing between Indian and imported goods. A study by Mintel (2022) reported that nearly one-third of Indian consumers find it difficult to differentiate between domestic and foreign products, as many global brands manufacture locally, and domestic brands compete in premium segments. This blurring of lines necessitates clear labeling and marketing strategies to help consumers make informed choices aligned with their preferences.

Consumer Preferences and Economic Nationalism Studies have shown that consumer preferences are often swayed by economic nationalism, where local products are favored due to perceived economic and social benefits. This trend is strengthened by sentiments of national pride and the belief in supporting local economies, which can influence purchasing behaviors significantly (Nielsen, 2023).

Global Trends in Consumer Behavior Globally, there is a growing preference for domestic products across various industries. This trend is partly driven by the perceived quality and sustainability of local products compared to imports. For instance, in the food industry, consumers show a pronounced preference for local brands, which they associate with freshness and lower environmental impact (Ingredion, 2024).

Impact of Globalization and Consumer ethnocentrism While globalization has increased the availability of imported goods, there is a noticeable trend of consumer ethnocentrism where local products are favored even when foreign alternatives might offer superior quality. This paradoxical behavior underscores the complex interplay between consumer identity and global market dynamics (Forest Products Journal, 2023).

Socio-Demographic Factors Influencing Preferences Research indicates that socio-demographic factors such as age, family size, and occupation play crucial roles in

shaping preferences for domestic versus imported products. Older consumers and those with larger family sizes tend to prefer domestic products, reflecting broader life-stage and economic considerations (Forest Products Journal, 2023).

The Role of Marketing and Advertising Marketing strategies significantly affect consumer preferences. Effective advertising can shift consumer attitudes towards both domestic and imported goods. Campaigns that highlight the quality, tradition, or innovation associated with local products can enhance consumer preference for these items (Nielsen, 2023).

Research Methodology:

The present study aimed to investigate the attitudes of individuals toward supporting Indian-made products and restricting foreign goods. The research was conducted using a quantitative survey method, wherein a structured questionnaire was developed and distributed to collect responses. The questionnaire was meticulously designed to capture various dimensions of economic patriotism, protectionism, and cultural beliefs related to consumer behavior. It included statements reflecting attitudes toward Indian-made products, the impact of foreign goods, and preferences for protectionist measures such as import limitations and taxation. The responses were measured on a five-point Likert scale ranging from "Strongly Agree" to "Strongly Disagree." The questionnaire was created using Google Forms for ease of distribution and accessibility.

The survey was conducted among individuals known to the researchers and through various online modes, including email, social media platforms, and messaging applications. This ensured a diverse pool of respondents across different demographic backgrounds, such as education, profession, and income levels. The use of online distribution methods facilitated the efficient collection of responses while maintaining a geographically dispersed sample. A total of 295 responses were collected for the study. These responses were screened and verified for completeness and consistency, ensuring the quality of the data. The sample included participants from varied educational, professional, and income backgrounds, providing a broad spectrum of perspectives on the research topic.

The collected data was analyzed using statistical tools to identify patterns and significant differences in attitudes across demographic groups. Descriptive statistics were employed to summarize the responses, while one-way ANOVA was used to examine the influence of education on various statements. The significance levels were evaluated to determine whether the differences in responses were statistically meaningful. The methodology adopted in this study provides a robust framework for understanding consumer attitudes toward economic nationalism. By leveraging a well-structured questionnaire and online data collection methods, the research ensures both the reliability and validity of the findings, offering valuable insights into the behavioral patterns of Indian consumers.

Result:

The results of this study provide a detailed analysis of the attitudes of respondents toward supporting Indian-made products and restricting foreign goods, focusing on the influence of demographic factors such as education, gender, profession, and income. A

variety of statements reflecting economic patriotism, protectionism, and cultural beliefs were analyzed to identify patterns and differences among groups. Using statistical tools such as ANOVA, the study highlights significant variations in attitudes based on respondents' educational backgrounds, while also revealing consistent trends across other demographic variables.

Demographic Details	Indian people should always buy Indian made products instead of imports.						Sig .
	Variable	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	
Gender	Male	69	17	7	0	99	0.28
	Female	32	15	4	0	52	
Education	SSC	2	2	0	0	4	0.18
	HSC	17	4	1	2	24	
	Graduation	50	15	8	1	74	
	Post Graduation	32	9	2	4	47	
	Other	0	2	0	0	2	
Profession	Students	25	9	3	3	40	0.78
	Business	23	4	1	0	28	
	Homemaker	4	3	0	0	7	
	Private Job	33	10	5	2	50	
	Government Job	16	6	2	2	26	
Monthly Income	Below 30000	40	13	8	0	4	0.68
	30000 - 40000	17	4	0	0	0	
	40000 - 50000	24	7	1	0	2	
	50000 - 60000	9	4	0	0	0	
	Above 60000	11	4	2	0	1	

Table 1 Descriptive Statistics

Table 1 shows the responses to the statement, "Indian people should always buy Indian-made products instead of imports," across various demographic variables, including gender, education, profession, and monthly income. The findings revealed some interesting patterns in attitudes toward prioritizing Indian-made products.

In terms of gender, males demonstrated a mixed response, with a notable proportion (69 respondents) strongly agreeing, while an equally significant number (99 respondents) strongly disagreed. Females showed a similar trend, with 32 strongly agreeing and 52 strongly disagreeing. However, the p-value (0.283) suggests no statistically significant difference between males and females in their support for Indian-made products.

When examining education levels, respondents with Graduation and Post-Graduation qualifications expressed stronger support, with 50 and 32 individuals, respectively, strongly agreeing with the statement. Lower education levels, such as SSC and HSC, displayed more mixed responses, with some agreement and a small amount of disagreement. Despite this variation, the p-value (0.183) indicates that education does not significantly influence the preference for Indian-made products.

Professionally, private jobholders (33 strongly agree) and students (25 strongly agree) showed higher levels of support for Indian-made products. Respondents from government jobs and homemakers demonstrated moderate agreement, with fewer respondents strongly disagreeing across these groups. However, the p-value (0.781) confirms no significant differences in attitudes based on profession.

Income-wise, individuals earning below ₹30,000 showed the highest level of strong agreement (40 respondents), suggesting that lower-income groups may prioritize Indian-made products due to economic or patriotic reasons. Higher-income groups, such as those earning above ₹50,000, also showed support, but the overall trend was less pronounced. The p-value (0.683) indicates that monthly income does not significantly impact opinions regarding the preference for Indian-made products.

The analysis highlights a general inclination toward supporting Indian-made products across demographic groups. However, the lack of statistically significant differences across gender, education, profession, and income suggests that the preference for Indian-made goods is a broadly shared sentiment, not confined to any subgroup. These findings underscore the potential for nationwide campaigns promoting Indian-made products, leveraging this shared nationalistic perspective.

Table 2 ANOVA (Education of the Respondents as the Factor)

		ANOVA (Education of the Respondents as the Factor)				
		Sum of Squares	df	Mean Square	F	Sig.
Indian people should always buy Indian made products instead of imports.	Between Groups	1.085	4	.271	.278	.892
	Within Groups	142.386	146	.975		
	Total	143.470	150			
Only those products that are unavailable in India should be Imported.	Between Groups	3.012	4	.753	.820	.514
	Within Groups	133.982	146	.918		
	Total	136.993	150			
Buy Indian-made products, Keep India working.	Between Groups	9.474	4	2.369	3.538	.009
	Within Groups	97.744	146	.669		
	Total	107.219	150			
Indian products first, last and foremost.	Between Groups	2.959	4	.740	.596	.666
	Within Groups	181.239	146	1.241		
	Total	184.199	150			
Purchasing foreign made products is un - Indian.	Between Groups	9.128	4	2.282	1.239	.297
	Within Groups	268.819	146	1.841		
	Total	277.947	150			
It is not right to purchase foreign products because	Between Groups	.875	4	.219	.141	.967
	Within Groups	226.304	146	1.550		

it puts Indians out of jobs.	Total	227.179	150			
A real Indian should always buy Indian-made products.	Between Groups	4.329	4	1.082	.804	.524
	Within Groups	196.505	146	1.346		
	Total	200.834	150			
We should purchase products manufactured in	Between Groups	12.309	4	3.077	2.814	.028
	Within Groups	159.664	146	1.094		
	Total	171.974	150			
India instead of letting other countries get rich off us.	Between Groups	11.467	4	2.867	2.838	.026
	Within Groups	147.474	146	1.010		
	Total	158.940	150			
There should be very little trading or purchasing of goods from other countries unless out of necessity.	Between Groups	1.060	4	.265	.236	.918
	Within Groups	163.987	146	1.123		
	Total	165.046	150			
It is always best to purchase Indian products.	Between Groups	3.206	4	.801	.589	.671
	Within Groups	198.582	146	1.360		
	Total	201.788	150			
Indians should not buy foreign products because it hurts Indian business and causes unemployment.	Between Groups	1.637	4	.409	.351	.843
	Within Groups	170.098	146	1.165		
	Total	171.735	150			
Limitations should put on all imports.	Between Groups	6.586	4	1.646	1.143	.339
	Within Groups	210.248	146	1.440		
	Total	216.834	150			
It may cost me in the long run but I prefer to support Indian products.	Between Groups	8.030	4	2.008	1.003	.408
	Within Groups	292.129	146	2.001		
	Total	300.159	150			
Foreigners should not be allowed to put their products on our markets.	Between Groups	7.323	4	1.831	1.143	.339
	Within Groups	233.777	146	1.601		
	Total	241.099	150			
Foreign products should be taxed heavily to reduce their entry into India.	Between Groups	9.227	4	2.307	2.708	.033
	Within Groups	124.349	146	.852		
	Total	133.576	150			
We should obtain from	Between Groups	7.242	4	1.810	.979	.421

foreign countries only	Within Groups	269.858	146	1.848		
Those products That we cannot obtain within our own country.	Total	277.099	150			

The one-way ANOVA was conducted to examine the influence of respondents' education levels on their attitudes toward supporting Indian-made products and restricting foreign goods shown in the **Table 2**. The analysis revealed significant differences between certain statements. For the statement "Buy Indian-made products, Keep India working," the results ($F = 3.538$, $p = 0.009$) indicated a significant variation across education levels, suggesting that higher education levels may lead to stronger agreement on the importance of supporting Indian-made products for economic sustainability. Similarly, the statement "We should purchase products manufactured in India instead of letting other countries get rich off us" also showed significant differences ($F = 2.814$, $p = 0.028$), implying that education influences the preference for prioritizing domestic goods over imports. Another notable finding was the significance for the statement "India instead of letting other countries get rich off us" ($F = 2.838$, $p = 0.026$), indicating a stronger inclination among certain education groups to support domestic products as a means of retaining economic benefits within the country. The statement "Foreign products should be taxed heavily to reduce their entry into India" also revealed significant differences ($F = 2.708$, $p = 0.033$), highlighting that education shapes opinions on implementing protectionist measures like taxation to reduce reliance on foreign products.

However, for many other statements, such as "Indian people should always buy Indian-made products instead of imports" ($p = 0.892$) and "It is not right to purchase foreign products because it puts Indians out of jobs" ($p = 0.967$), no significant differences were observed. This consistency suggests that certain beliefs regarding the support of Indian-made goods transcend education levels and are widely shared among the population.

The findings suggest that education plays a crucial role in shaping nuanced attitudes toward economic protectionism and the prioritization of Indian products. While some opinions are consistent across all education levels, specific views on taxation and economic retention strategies are influenced by the respondents' educational background. These insights highlight the potential for targeted educational campaigns to further strengthen support for Indian-made products and promote economic self-reliance.

Discussion:

The findings of the study provide valuable insights into the attitudes of individuals toward prioritizing Indian-made products over foreign goods and the influence of demographic factors, particularly education, on these attitudes. The analysis revealed that while certain beliefs are widely shared across all education levels, other opinions show significant variation based on the educational background of respondents.

The significant results for statements such as "Buy Indian-made products, Keep India working" and "We should purchase products manufactured in India instead of letting other countries get rich off us" suggest that education plays a crucial role in shaping individuals' understanding of the economic implications of supporting domestic products. Higher levels of education may enhance awareness of the benefits of supporting local industries and the impact of economic protectionism on national development. This aligns with existing literature that emphasizes the role of education in fostering economic patriotism and a sense of responsibility toward domestic industries.

Interestingly, the statement "Foreign products should be taxed heavily to reduce their entry into India" also showed significant differences across education levels. This indicates that while protectionist policies such as import taxation are broadly supported, the intensity of this support may vary depending on the educational background of respondents. Higher-educated individuals may better understand the economic rationale behind such policies, which could explain the observed variation.

On the other hand, several statements, such as "Indian people should always buy Indian-made products instead of imports" and "It is not right to purchase foreign products because it puts Indians out of jobs," did not show significant differences across education levels. This suggests that these beliefs are deeply ingrained in the collective mindset, cutting across demographic divides. Such consistency reflects the cultural and nationalistic undertones associated with supporting Indian-made products, which may stem from long-standing societal narratives promoting economic self-reliance.

The findings also highlight opportunities for policy interventions and educational campaigns. While there is already strong support for Indian-made products, targeted efforts to educate the population about the broader economic and social implications of their purchasing decisions could further enhance this behavior. For example, campaigns emphasizing the long-term benefits of supporting domestic industries and the drawbacks of excessive reliance on imports could be designed to resonate with specific educational groups.

Additionally, the observed support for taxing foreign products underscores the potential for policy measures that encourage the consumption of domestic goods. However, such policies must be implemented carefully to avoid adverse effects on consumer choice and market dynamics. Balancing protectionism with global competitiveness will be key to ensuring sustainable economic growth.

The study underscores the importance of education in shaping nuanced attitudes toward economic patriotism and protectionism while also revealing the widespread support for Indian-made products across all demographic groups. These insights contribute to the broader discourse on fostering national economic resilience through consumer behavior and highlight the need for targeted interventions to maximize the potential of such attitudes. Further research could explore additional factors influencing these attitudes, such as cultural and regional differences, to provide a more comprehensive understanding of consumer behavior in the context of economic nationalism.

Conclusion:

This study examined the attitudes of individuals toward supporting Indian-made products over foreign goods, with a particular focus on the influence of demographic factors such as education, gender, profession, and income. The findings revealed that while certain beliefs, such as the general preference for Indian products, are widely shared across all demographic groups, education emerged as a significant factor shaping nuanced attitudes toward economic protectionism and domestic product prioritization. Significant variations were observed in responses to statements such as "Buy Indian-made products, Keep India working" and "We should purchase products manufactured in India instead of letting other countries get rich off us," highlighting the role of education in enhancing awareness of the economic and social benefits of supporting domestic industries. Furthermore, education influenced opinions on protectionist policies, such as taxing foreign products, suggesting that higher educational levels are associated with a deeper understanding of such economic measures.

Conversely, attitudes toward statements with strong cultural or nationalistic undertones, such as "Indian people should always buy Indian-made products instead of imports," were consistent across all demographic groups, indicating a deeply rooted cultural narrative that transcends differences in education, income, or profession. This reflects the shared belief in economic self-reliance and national pride, which forms the foundation of consumer behavior in India.

The study underscores the potential for leveraging education and awareness campaigns to further enhance support for Indian-made products and foster economic patriotism. Policymakers and businesses can capitalize on these insights to design initiatives that not only promote domestic goods but also encourage informed consumer behavior that aligns with the broader goal of economic self-reliance and sustainable growth.

Overall, this research contributes to the understanding of consumer behavior in the context of economic nationalism, emphasizing the importance of education as a critical factor. Future studies could explore additional dimensions, such as regional and cultural influences, to build a more comprehensive framework for understanding the drivers of consumer preferences in emerging economies like India.

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Fables from Panchatantra: A Management Perspective.

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Abstract:

Fables of Panchatantra is a very well-known collection of stories with moral lessons. It has attracted readers despite of their age and religious background, not only in India but whole world wide. One of the reasons for its popularity is attributed to the fact that the story personifies birds and animals having human vices and virtues and thus, gives lessons on righteousness and conduct in life. It is "certainly the most frequently translated literary product of India" and these stories are among the most widely known in the world for its preachings and wisdom.

This paper attempts to reiterate five famous fables from the collection of 87 stories in context of the process (functions) of management and also extract important management fundas from it. It is an attempt to establish a bridge between the ancient Indian wisdom and the modern management concepts. It also highlights the obvious moral and ethical lesson from these stories. These lessons are stepping stone for a strong character building of modern managers since, ultimately, it is the moral character of the management personnels that is reflected in a transparent undertakings of an ethical business entity.

As laid down in the National Education Policy – 2020, it is utmost important to explore the indigenous knowledge of ancient India and establish its relevance in present time so that our offsprings and generation to come takes pride in our cultural heritage and tradition. It also shall be helpful in developing innovative teaching pedagogy, specially to management students.

Key Words:

Panchatantra, Management Process, Management Lessons, IKS, Panchatantra Tales, Moral Education

Introduction to Panchatantra:

According to Wikipedia, The Panchatantra is an ancient Indian collection of interrelated animal fables in Sanskrit verse and prose, arranged within a frame story. The surviving work is dated to about 200 BCE, but the fables are likely to be much more ancient. The original author of this text is still unknown, but it has been attributed to Vishnu Sharma in some recensions and Vasubhaga in others. The word Panchatantra literally means five (panch) systems (tantra) of Nitishashtra (Science of Wise Conduct). It attempts to teach us, how to understand people, how to choose reliable and trustworthy friends, how to meet difficulties and how to problems through tact and wisdom, and how to live in peace and harmony amidst deceit, hypocrisy and other pitfalls in life. In fact, it is a novel way to impart worldly wisdom using the art of story-telling.

According to one of the recensions, The Panchatantra is woven round the frame of a tale of a king who entrusts his three 'dud' sons to a learned man, a Brahmin, called Pandit Vishnu Sharma, to enlighten their minds within six months. The tale is narrated in prose while the exposition of a philosophical and moral theme is put in verse; maxims or wise sayings are also expressed in verse, which either sums up the narration or introduces the next tale. As one fable follows another, people and animals are constantly changing places, and they share the same characteristics of love and hatred, compassion and wit, selfless courage and base cowardice, generosity and meanness. Each story has a moral and philosophical theme which has stood the test of time and so is true even in modern times

Modern Academia ardently supports this way of teaching. If the modern management lessons are taught through such ancient treatise, it will not only lead to innovative teaching pedagogy but also integrate ancient knowledge in today's education system. The New Education Policy 2020 warrants for the same as well. It is believed that Panchatantra supposedly was narrated by the composer, to three princes of a king; to impart them with the wisdom to perform their duties in a morally and politically accurate manner.

The stories in Panchatantra are divided into five different heads. Each category consists of certain number of tales and fables through which morals are taught. Panchatantra stories are categorized as under:

1. **Mitra Bhedha – Loss of Friends:** Under this head, through different stories and situations, the narrator teaches to avoid unwarranted fights and differences for living a peaceful life. In modern context, it teaches the managers to avoid rift with colleagues, associates, clients and other professional contacts as this can lead to unpleasant consequences like loss of business.
2. **Mitra Samprapti – Gain of Friends:** Here, the narrator has included the tales that teaches about developing kinship or friendships for mutual benefits and lay emphasis on developing and maintaining relationships. In today's parlance it can be equated with making strategic alliances, team-building, professional associations and trade bodies.
3. **Kakolukiyam – Crows and Owls (in context of War and Peace):** This head comprises tales on the theme of War and Peace where stories are centred round the theme of being observant, recognizing friends, identifying rivals and being ready to face deceit at the hands of friends and also not under estimating the rivals. Stories under this head teaches corporate lessons of Critical Thinking, Strategic Planning, Behavioural Studies, Crisis Management, Conflict Management and Leadership to modern managers.
4. **Labdha Prasanam – Forfeit of Gains (in context of losing what is achieved):** The lores included in this section are towards moral education. They emphasis on righteousness and ethical conduct in life. It is relevant to manages for learning lessons of Types of Leadership, Business Ethics and Decision Making.
5. **Aparikshit Karakam – Inconsiderate Action (in context of good governance):** This is the last head under which stories elucidate characteristics of a good human

being and expected framework within which one should live one's life. Modern managers can learn about the leadership development, characteristics of a good leader, professional behaviour and strategic leadership from these bunch of stories.

Introduction to Management and Functions / Process of Management:

Management is the process of planning and organising the resources, operations and workflow of a business to achieve specific goals in the most effective and efficient manner possible. Efficiency in management refers to the completion of tasks correctly and at minimal costs. Effectiveness in management relates to the completion of tasks within specific timelines to yield tangible results.

Management Process refers to series of activities and functions that are performed effectively to achieve the desired goal efficiently. It includes number of interrelated functions like planning, organizing, directing (leading) and controlling.

Management process can be defined as a systematic approach that may be undertaken by the managers to Plan, Organize, Lead and Control business activities resulting into achievement of the object of profit maximization or wealth maximization. It is multi-faceted in nature. Each of the function described above involves a lot of thought before it is implemented.

Planning: Planning involves preparing an action plan to be executed to achieve a goal or complete the work. It serves as a road map to be followed to complete the desired work within a desired time frame. It is one of the most crucial functions of management and it is aptly said the failing to plan is planning to fail. The process of planning tends to answer questions like – what is to be done; where it is to be done, when it is to be done, who has to do it and how it is to be done. Planning aspect of management mostly deals with determination of Vision & Mission Statements, Strategy Building and Establishing Goals and Objectives. Usually, the planning process includes following activities undertaken by managers:

1. Setting Objectives
2. Developing Planning premises
3. Identifying Alternative courses of Actions
4. Evaluating all the identified courses of actions
5. Selecting the best Alternative
6. Implementing the Plan
7. Taking regular follow ups to see if the desired result is obtained.

Organising: The concept of organizing, which refers to the process of arranging resources, tasks, and people in a way that enables an organization to function efficiently and effectively. This includes setting clear goals, structuring roles, delegating tasks, and ensuring cooperation. It is one of the toughest functions of management. Organizing function of management deals with developing Organization Design, Culture and Social Networks. Following steps become necessary for undertaking the function of Organizing by managers:

1. Identifying the work
2. Grouping the work / workers
3. Establishing hierarchy

4. Delegation of Authority

5. Coordination

Directing (Leading): Directing indicates giving guidance or mentorship which is significant to ensure the best use of the available human resources. It necessarily involves managers assuming leadership roles and use various theories of motivation to get the work done. It is a managerial function, around which all other functions revolve. It entails monitoring, motivation, leadership, and communication to ensure that everyone is working efficiently towards the achievement of shared objectives. Four pillars of efficient directing are as under:

1. Leadership

2. Motivation

3. Supervision

4. Communication

Controlling: Controlling refers to taking corrective actions for the implemented course of action through regular follow-up and feedback. It involves preparation of a good control system and having critical thinking to aptly and timely take charge of the situation that is getting beyond the expectation or deviating from the desired action. Controlling as a management function ensues that right things happen, in the right ways and at the right time. Without effective control, direction is lost. It keeps the management process dynamic and grounded. It includes – management by exception, change management, risk management, conflict management, etc. The broad framework of controlling entails following:

1. Development of Systems and Processes

2. Strategic Human Resources Management

Gist of the selected tales of Panchatantra and corresponding Management Lesson:

The Lion and the Rabbit

In this tale, a mighty lion has been terrorizing all the animals in the forest. To protect themselves, the animals come up with a plan to offer one animal each day as its prey. When it is the turn of a clever rabbit, it comes up with a plan to outwit the lion. The rabbit goes to the lion, claiming that it was delayed because another lion claimed to be the king of the jungle. The lion, enraged, demands to see this other lion. The rabbit leads the lion to a well, where the lion sees his own reflection and, thinking it is another lion, jumps into the well and drowns.

Moral Lesson: "Intelligence and Wisdom are far more effective than brawn and brute force."

Management Lessons:

1. **Planning:** A strategy that managers may apply for assessing the opportunities, risks, weaknesses, and strengths of a challenge or an opponent is strategic planning. This aids in figuring out the most appropriate course of action. Even managers can use strategic planning and decision-making to pave the way to success, much like the Rabbit in the fable devise a plan to trick formidable foe – the lion. It's crucial for the

managers to acknowledge the opponent's strengths and weigh the risks involved, but it's even more crucial to spot their weaknesses and exploit them to our advantage.

2. **Organizing:** Managers must arrange their resources and use them wisely to reduce their loss, just as every animal in the wild chose to willingly send one victim to a lion every day. It is crucial to comprehend that where risks cannot be eliminated, the efforts must be towards abating the same. Exactly the way all the animals coordinated within themselves; Cooperation, team-work and collaboration must be used by managers for efficient organizing of business activities. This ensures optimality in all business processes.
3. **Directing / Leading:** Rabbit assumed the leadership role and saved life of all the animals with his wisdom. Similarly, managers must develop peripheral vision for problem solving with their intellect and creative thinking. Communication is one of the important aspects of leading. Rabbit used his communication / persuasion skill to outwit the mighty lion. Effective leaders and managers must develop good communication skill should be able to influence others to achieve desired outcomes. Maintaining composure in adversity, overcoming fear with confidence and intellect, stress management, risk management, innovative thinking are some of the desired qualities of a good leader which are impersonated in rabbit.
4. **Controlling:** Just like rabbit taking control of the situation decided to deal it with the available limited resources – time and wit, managers also must know the knack of using the available resources judiciously. They should ensure that their planned actions are implemented through appropriate control management systems without any deviations.
5. **Leadership Traits:** In this story, the lion's personality represents some of the qualities that leaders and managers should absolutely avoid. As the fierce king of the jungle, the lion chose to depend on the food supplied by other animals, which made him sluggish and also diverted him from his primary skill of hunting. In addition to losing his ability to detect danger, he also underestimated other animals, took pride in vanity, and became over confident which cost him his life. Leaders must always try to sharpen their skills, develop core competence and bring innovative changes to ensure that the business as well they both progress simultaneously.

The Three Fishes

In this tale, three fishes live in a pond. One of the fishes is wise, the second one is average, and the third one is careless. When they overhear a fisherman talking about coming to catch fish, the wise fish immediately plans to swim to a different pond and also requests the other two to take immediate action. The second fish thinks of staying hidden as it is too confident on its ability to swim deep and decides not to act upon the threat and the third fish, not taking the threat seriously, stays in the pond. The wise fish survives since it successfully shifts, while the other two are caught by the fisherman and dies.

Moral Lesson: “One who acts promptly upon smelling a danger persists.”

Management Lessons:

1. **Planning:** This tale effectively illustrates the value of planning. In an emergency, a well-thought-out plan may prove to be the key to success. A well-considered or planned move can prove to be economically beneficial to the manager, just as the ingenious fish in this fable swam its way back to another pond before the fisherman strikes proved to be a lifesaver for it and its family. In order to keep ahead of his rivals or competitors, a manager must plan his future course of action well in advance. In addition to this, it is crucial to consider all the probable alternatives before making a decision. The scientific planning technique can be used to accomplish this.
2. **Controlling:** The clever fish was able to save its life only because it got successful in controlling the situation. It accurately identified the threat and made the quick decision to move to a safer area. To efficiently handle a crisis with minimal harm, managers should develop their critical thinking and decision-making skills, just like this wise fish. Making an intelligent choice and taking charge of the management problem are vitally important. As was the case with the second and third fishes, it is often gets too late to come out of the problem if we wait until it strikes. Therefore, it's critical to be proactive and react quickly to change.

The Elephant and the Sparrow

This story is about a sparrow who seeks revenge on an elephant that destroyed her nest and killed her eggs: Two sparrows lived in a nest in a banyan tree. One day, an elephant came to the tree to find shade from the sun. The elephant tore off a branch of the tree, which caused the sparrow's eggs to fall and break. The mother sparrow and her friends, including a woodpecker, fly, and frog, planned to get revenge on the elephant. The fly lured elephant into his comfort zone, woodpecker taking advantage of the same, injured his eyes, frog led the thirsty elephant to a marshy area to find water, where the elephant fell into a ditch and died.

Moral Lesson: "A friend in need is a friend indeed."

Management Lessons:

1. **Planning:** In this tale, we learnt how a sparrow, woodpecker, a fly and a frog made a plan to avenge the loss of sparrow and kill the elephant. In similar lines, managers must plan their actions to out-wit their competitors. A well devised and executed plan helps in achieving desired goals within the limited time span. A good plan serves as a roadmap to success for any business entity.
2. **Organizing:** Sparrow, fly, woodpecker and frog came together formed a team, each of them was assigned a specific role, the entire plan was coordinated and implemented by them cohesively and this led to the fall of elephant into the ditch. Managers have to be competent at organizing the resources, identifying the potential of each team member and accordingly divides the work amongst them. Organizing function of management is all about team-work, role assignment, coordination, implementation and staying well connected.

The Bharunda bird

The bharunda is a mythical, two-headed bird, it lives along the Cauvery River. On a day, one head finds a golden fruit and eats it immediately without sharing it with the other

head who also was excited to taste it. He told the first head that since he found the fruit, he only will savour it. Next day, the second head finds another new fruit. The first head discourages its consumption, but since, it wanted to even the score for the earlier events, it immediately consumed it and eventually both the heads die.

Management Lesson: “Forgiveness does not alter the past, but it does expand the future.”

Management Lessons:

1. **Planning:** Planning is evaluating each of the options in front of a management critically and selecting the best plan of action for the future based on the results. Making quick decisions without carefully considering the consequences can backfire on the company. In this story, the two-headed bird consumed the poisoned fruit and perished without considering the consequences of its actions. To prevent needless losses, managers should consider the pros and cons of their decisions. Similarly, the resources should be shared within the organization in a just manner to avoid unnecessary conflicts.
2. **Unity of Command & Unity of Direction (Organizing):** This anecdote is a classic illustration of the kind of calamity that can occur when different persons in the organization have varying levels of command and direction. The organizational structure should have a distinct hierarchy, and ideally, there should only be one supervisor or reporting authority. In the event that there are more, their orders ought to be coordinated with the organization's goals. Henry Fayol promoted both of these contemporary management ideas. Similar to the two-headed bird, the organization likely to lose if it does not comprehend this strategic choice. The bird eventually perished as a result of needless, unhealthy internal competition brought on by the two heads' discord.
3. **Conflict Management (Control):** The entire organization is at risk if internal dispute is not resolved promptly. Internal disputes may cause rash decisions that could end up being harmful to the organization. In this tale, the second head eats the fruit mindlessly in an attempt to win the battle with the first head out of rage and ultimately perishes.

There is also an alternate interpretation to the story in terms of conflict management. Every organization has a single "stomach," and its employees are its many heads, or brains, each of whom contributes to the company's overall success. It becomes a surefire prescription for disaster for the entire institution if one, a few, or even many people band together as manipulative persons to pursue their own selfish or egotistical goals. And such a group of people ought to be recognized and dealt with promptly.

Friends to the rescue

This tale is about a deer who is trapped and saved by its friends. A crow, a mouse, a deer and a tortoise are friends living in a jungle. One day, while they were chilling out together, they see a hunter approaching in their direction. Instantaneously, the deer run in to thick forest, mouse hides into a burrow and crow flies away. Unable to move fast, the tortoise is unfortunately caught by hunter. His friends decide to rescue him from the

clutches of the hunter. They execute a plan wherein; deer deliberately attracts the hunter to run behind it. Meanwhile, the crow pecks the hunter to distract him from his catch and meanwhile, the mouse using its sharp teeth frees the tortoise who immediately runs back to the lake before the hunter could get his composure back.

Moral Lesson: "Unity is strength. Great things can be accomplished through teamwork and collaboration."

Management Lessons:

1. **Planning:** In this narrative, we observed how the deer, crow, and mouse hatched an intelligent strategy to rescue their comrade the tortoise. They aptly implemented the 4W2H planning premises concept. Modern managers, through this narrative, can comprehend the significance of prompt planning and meticulous execution, which are essential for success. The hunter's personality in this tale also teaches us the significance of making measured decisions rather than falling for too good to be true lures. Before rushing to any higher rewards, managers must take a moment to think.
2. **Organizing:** This story is a wonderful case study to understand more about ability to organize. The crow, deer, and mouse illustrate strategic alliance, cooperation, coordination, and work distribution, presenting a precedent for modern managers for tackling these challenges prudently. When the right employee gets assigned to the right job, productivity increases and work is completed with no collateral damage or cost.
3. **Networking:** Tortoise, though small and insignificant in compared to the agile deer, crow, and mouse, extends a friendly hand to them. All of the creatures in this story belong to different groups of animals in the animal kingdom, but they all hang out together. These examples demonstrate the value of networking and diversity in a team. In difficult times, a strong network might come in handy. Similarly, when people with different skills collaborate in a team, each person's primary competency becomes an advantage. Success happens when each one plays to his or her abilities; strength-based management does work in reality.

Observation: Panchatantra Stories can be considered as a treasure trove for teaching and learning management tactics. Many of the anecdotes in this classic are good case studies for studying modern management concepts. Modern managers may employ the lessons they've learned to manage their businesses with greater effectiveness. This article provides managerial lessons based on chosen Panchatantra stories only. But, a thorough examination of all the stories may offer multiple aspects of modern management frameworks in an easy approach. The table underneath highlights a few crucial rules of management that can be drawn from a particular tale of Panchatantra:

Table 3 Management Lessons from Panchatantra Stories

Sr. No.	Title of the Story	Management Lesson
1	The Monkey and the Wedge	Risk Analysis and Strategic Planning

2	The Jackal and the Drum	Decision Making through Risk Evaluation
3	The Fall and Rise of a Merchant	Organizational Behaviour and Establishing kinship with peers / team-members
4	The Sage and the Jackal	Leadership Qualities – Developing Vigilance and Identifying hidden motives of the opponent.
5	The Cobra and The Crow	Strategic Planning, Critical Thinking
6	The Crane and the Crab	Importance of Planning, Leadership Qualities - Emotional Intelligence, Crisis Management, Out-of-the-box Thinking
7	The Bug and The Flea	Leadership Qualities – Trust Management, Theory of Trust
8	The Blue Jackal	Authenticity in Leadership, Organizational Image, Team Dynamics and Inclusion, Communication Management
9	The Lion, The Camel, The Jackal and the Crow	Leadership Qualities – Trust Management, Personnel Management, Disadvantages of Favouritism at Workplace, Team Dynamics: Equality & Diversity in Team
10	The Birds and The Sea	Leadership Qualities – Perseverance and Planning before Action, Competitor Analysis and Management.
11	The Story of The Tortoise who fell off the stick	Sticking to the course of action that is planned, Leadership Qualities – Focus, Self Control, Team Building and Coordination
12	Damanaka and Pingalaka	Crisis Management, Decision Making and Importance of Planning
13	The Lion and The Jackal	Critical Thinking and Strategic Planning
14	The Monkey and The Suchimukha Bird	Importance of Planning, Disaster Management, Leadership Qualities – Self Control
15	The Bird and the	Planning Leadership Qualities – Proactivist, Risk

	group of Monkeys	Assessment
16	The Story of Dharmabuddhi and Papabuddhi	Code of Conduct for Professionals, Business Ethics, Public Relationship Management
17	The Crane and The Mongoose	Planning: Considering all pros and cons before choosing the course of action, Critical Thinking and Problem Solving
18	The Merchant's Son	Leadership Quality – Determination, Honesty and Nobility
19	The King and The Monkey	Strategic Alliance, Team Building, Coordination, Planned Action, Conflict Management
20	The Thief and The Brahmin	Leadership Quality – Confidence, Self-Awareness and Risk Assessment and Identification
21	The Crow, The Hunter and The King of Doves	Importance of Unity and Harmony in an Organization, Co-ordination and Team Management,
22	The Hermit and The Mouse	Importance of SWOT Analysis before Planning; Strategic Planning
23	Shandili and The Sesame Seeds	Decision Making, Importance of Planning
24	The Merchant's Son	Human Resources Management, Team Building and Conflict Management
25	The Unlucky Weaver Somilaka	Importance of Building Professional Attitude, Organizational Behaviour
26	The Enmity between Owls and Crows	Assessment of Risk, Team Building, Strategic Planning (Strategic Alliances), Adaptation to Change (Change Management)
27	Elephants and Hares	Importance of Communication Skill for managers
28	The Cat, The Hare and The Partridge	Conflict Resolution and Management
29	The Brahmin and The Crooks	Leadership Qualities – Confidence, Common Sense and Clarity of Thoughts.

30	The Brahmin and The Cobra	Risk Assessment and Management, Leadership Qualities – Confidence
31	The Dove and The Hunter	Goal Setting, Leadership, Coordination and Team Building
32	The Old Man, His Young Wife and The Thief	Leadership Qualities – Strategic Pursuit, Keen Observation
33	The Brahmin, The Thief and The Rakshasha	Conflict Management, Leadership Quality - Mindfulness
34	The Tale of Two Snakes	Strategic Planning, Risk Management
35	The Female Mouse	Leadership Qualities – Humble and staying grounded
36	The Tale of The Golden Droppings	Importance of Team Building, Human Resources
37	The Lion, The jackal and The Cave	Risk Assessment and Risk Management, Importance of SWOT Analysis before taking any actions.
38	The Frogs and The Black Snake	Managing Competitors and Avoiding unnecessary rivalry
39	The Crocodile and The Monkey	Crisis Management, Critical Thinking, Culture and Attitude, Critical Thinking, Sales Management
40	The Greedy Cobra and The King of Frogs	Managing Competitors, Risk Management
41	The Lion and The Foolish Donkey	Critical Thinking, Leadership Qualities – Out of the box thinking, Innovative Idea, Behaviour Management
42	The Story of The Potter called Yudhisthira	Planning and Strategic Planning
43	The Lioness and The Jackal	Risk Management

44	Nanda and Vararuchi	Leadership Quality – Forgiveness and Comradeship
45	The Donkey and The Washerman	Human Resource Management, Division of Labour
46	The Farmer’s Wife	Business and Moral Ethics, Organizing
47	The Camel with a Bell round his neck	Importance of Planning and Organizing before any action
48	The Jackal, The Lion, The Leopard and The Tiger	Strategic Management, Crisis Management
49	The Dog in a foreign country	Business Environment
50	The Greedy Barber and The Jain Monks	Importance of Research in Decision-making
51	The Brahmin’s Wife and The Mongoose	Planning
52	The Story of Chakradhara	Leadership Quality – Application of Knowledge
53	The Lion that sprang to life because of Brahmins	Risk Management, Planning, Resources Management
54	The Four Learned Fools	Leadership Qualities – Common Sense and Mindfulness
55	Two Fishes and The Frog	Risk Management
56	The Story of a Singing Donkey	Time Management
57	The Story of The Weaver	Controlling
58	The Miserly Father	Leadership Qualities – Willpower, Determination
59	The King Chandra	Out of the Box Thinking, Leadership Qualities – Righteous Actions

Conclusion:

The Panchatantra offers ageless knowledge that addresses many aspects of management when viewed through the lens of Indian knowledge systems. The lessons of resource management, teamwork, flexibility, ethical leadership, and strategic thinking are just as relevant now as they were thousands of years ago. Just as the characters in these old fables use their knowledge to solve problems, succeed, and have a positive impact on society while abiding by Indian philosophical ethical norms, one can guarantee the success of their teams and organizations—whether they are multinational corporations or educational institutions—by concentrating on strategic planning, efficient organization, effective direction, and continuous control.

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An Analysis of the Financial Performance of HCL Technologies Limited

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Abstract:

Financial analysis is the process of assessing a company's strengths and weaknesses by studying the connections between various elements in its profit and loss account and balance sheet. This study focuses on the financial statements of HCL Technologies from the last five years. The data used is secondary, and the main objective is to evaluate the company's financial condition and track its growth over time. To perform this analysis, several important financial ratios are considered, such as the current ratio, liquid ratio, net profit margin, gross profit margin, and debt-to-equity ratio.

Keywords: Financial Performance Analysis, Net, profit, Gross Profit, Current Ratio

Introduction:

Financial analysis is the process of assessing a company's performance in relation to its industry and the broader economic environment to support decision-making and provide recommendations. It involves examining and interpreting financial statements to gain insights into the organization's profitability and financial stability. By evaluating key documents like the balance sheet and income statement, this analysis highlights the company's financial strengths and areas for improvement. These financial reports, which summarize accounting data, form the basis for determining the organization's financial position and overall performance.

Profile of HCL Company Limited:

HCL Technologies, also known as HCLTech, is an Indian global IT consulting company based in Noida, Uttar Pradesh. It was founded by Shiv Nadar and became an independent company in 1991 when HCL started its software services division. Today, the company operates in 59 countries and employs more than 220,000 people.

HCLSoftwear

In 2019, HCL Technologies launched a software product division called HCLSoftware after acquiring IBM's software tools. Some of the key products under HCLSoftware

include HCL AppScan, HCL BigFix, HCL Connections, HCL Commerce Cloud, HCL Digital Experience, HCL Sametime, HCL Notes, iNotes, and Unica. The company's data and analytics division, Actian, offers products like HCL Informix, Actian Data Platform, Actian Ingres, Actian Zen, and Actian NoSQL. HCLSoftware generated ₹11,692 crore (about US\$1.4 billion) in revenue for the fiscal year 2023–24.

Business Lines:

1. Engineering and Research & Development Services
2. Infrastructure Management Services
3. Digital Solutions, Analytics, and E-publishing
4. Cybersecurity and Governance, Risk, and Compliance Services

Review of literature:

Ms.C. Shivapriya**Dr. U. Padmavathi, (2019)**conducted a ratio analysis study on Asian paints.This study highlights how ratio analysis can assist management in predicting the company's future performance. The research aims to demonstrate the practical application of ratio analysis in evaluating the financial performance of Asian Paints Ltd. The primary objective is to assess the company's capital structure and analyze its liquidity and profitability. It was observed that Asian Paints has high current liabilities, which could impact its working capital or negatively affect its reputation. However, the company maintains financial stability, as its reliance on short-term loans and advances is minimal and manageable through its net income.

Mr. P. Rajendran, Dr. B. Sudha(2019) analyses the financial performance of HDFC bank.This study aims to provide a clear understanding of the bank's growth in both long-term and short-term aspects. The primary objective is to evaluate the bank's liquidity and solvency position. The analysis is based on secondary data sourced from the bank's official website and annual reports, utilizing ratio analysis as the key method. The study spans the period from 2015 to 2019. Findings indicate that the bank's financial stability was satisfactory throughout this period. The research concludes that HDFC Bank demonstrated strong financial performance during the years analyzed.

Mr. S. Gupta (2018)The study talks about challenges like managing global operations and dealing with currency exchange fluctuations, pointing out the importance of being cautious when analyzing certain financial ratios. Understanding these issues is key to getting a clear and accurate picture of HCL Technologies' financial health.

Statement of Problem:

The study is titled “Financial Performance Analysis of HCL Technologies.” This study focuses on evaluating liquidity, profitability, and the financial position of the company to understand its financial strength. It also aims to enhance knowledge of accounting ratios, financial analysis, and their interpretation. Such an analysis provides valuable insights into the financial performance of the company.

Objectives:

- To analyse the financial performance of HCL Technologies over a five-year span, covering the period from 2019-20 to 2023-24.
- To assess the company's financial health with a focus on solvency, profitability, and liquidity.
- To provide practical recommendations for enhancing the company's financial performance.

Research Methodology:

Research Design:

This study covers five years of data from 2019-20 to 2023-24 and for this study a researcher use secondary data. For analysis, a researcher using financial statement like profit and loss account, balance sheet and other financial tools. A researcher use Ratio analysis as a tool of this study.

Analysis and Interpretation:

Year	Current Ratio	Liquid Ratio	Net Profit Ratio	Gross Profit Ratio	Return OF Equity
2019-20	1.69	1.69	27.50	33.20	28.84
2020-21	2.77	2.77	24.50	32.57	27.76
2021-22	2.97	2.97	26.75	30.75	30.14
2022-23	2.68	2.68	24.76	29.84	34.76
2023-24	2.82	2.82	24.26	30.14	37.23

Table:1

Findings:

- The company's current ratio and liquid ratio fluctuated between 2019 and 2024, with debtors playing a crucial role in sustaining an adequate level. Nonetheless, the company maintained sufficient liquid assets to settle its current liabilities.
- The net profit ratio was highest in 2019-20, which was 27.50 and lowest in 2024. it shows fluctuation in profit margins.
- The gross profit ratio decline from 2019 to 2023 but increase in 2024, which is 30.40.
- Return on equity is continuously increasing throughout the study period which shows good return to shareholders. Lowest return on equity is in 2020-21 which is 27.76 and highest return on equity is in 2023-24 which is 37.23.

Suggestions:

- Variations in direct expenses are affecting gross profit. To maximize gross profit, it is vital to reduce these fluctuations by cutting down on direct expenses.
- Reducing and controlling indirect expenses is key to boosting net profit.
- Even if operating profit remains relatively stable, it is important to closely examine operating expenses and focus on minimizing them as much as possible from a managerial perspective.
- The reduction in long-term debts since 2021 should be maintained, as it will lead to lower finance costs and, consequently, improved profitability.

Conclusion:

The company's performance was evaluated through ratio analysis, and cash flow statement analysis all of which are essential tools in financial analysis. The findings indicate that the company's performance has been adequate, offering a clear view of its financial position over the past five years. Although the company has achieved good sales, it has not been as successful in translating these into profits. To enhance profitability and avoid accumulating more debt, the company should focus on managing its liabilities and increasing shareholder equity, which would also improve its reputation. By implementing these recommendations, the company can increase profitability and overall performance.

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“FINANCIAL DISTRESS ANALYSIS OF BPCL AND HPCL USING ALTMAN Z - SCORE MODEL”

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ABSTACT:

This paper attempt to analyse the financial distress of BPCL and HPCL – An Indian Public Sector Undertakings. For the analysis Altman Z score technique, financial ratios and statistical tools have been used. Two Indian PSUs under the ministry of Ministry of Petroleum and Natural Gas i.e., BPCL and HPCL were selected for this present study based on convenient sampling method. The data has been collected from the concern company's annual reports for the period of last five year from 2019-20 to 2023-24. This paper examines the financial distress risk for the selected companies. The findings indicate BPCL falls in the "safe zone," indicating a stable financial condition, while the HPCL is classified in the "grey zone" indicating a moderate risk of financial distress. Hence, there is the urgent need for the management of the company to examine and reduce the financial distress to ensure long-term financial stability and performance.

KEY WORDS: Altman Z score model, BPCL, HPCL, Oil sector, Financial Distress

1. INTRODUCTION

The Indian oil sector is a key part of the country's energy and economic backbone. It provides the fuel we use every day—like petrol, diesel, and cooking gas—to power vehicles, homes, industries, and farms. Without it, transportation would stop, industries wouldn't run, and basic needs like cooking and heating would be difficult to meet.

Big companies like Indian Oil, ONGC, BPCL, and HPCL ensure that fuel is available everywhere, from big cities to remote villages. They also help reduce India's dependence on imported oil by exploring and producing oil and gas locally, which strengthens the country's energy security. (Sanjay, 2011)

This sector is also a major contributor to the economy. It generates huge revenue for the government through taxes and profits and creates millions of jobs, directly and indirectly. It also supports other industries like fertilizers, plastics, and chemicals, which rely on oil-based products.

As the world moves towards cleaner energy, the Indian oil sector is also shifting by investing in natural gas, biofuels, and hydrogen to meet future energy needs while protecting the environment.

Bharat Petroleum Corporation Limited (BPCL)

BPCL is one of India's top government-owned oil and gas companies and a Fortune Global 500 firm. It provides essential fuels like petrol, diesel, and LPG through a vast network of fuel stations and Bharat Gas outlets, ensuring energy access across the country. BPCL operates two major refineries in Mumbai and Kochi and plays a key role in securing India's energy needs by focusing on domestic refining and international exploration. (BPCL, n.d.) The company is also actively investing in clean energy solutions, including solar, wind, natural gas, and biofuels, while working on future-ready initiatives like hydrogen energy and electric vehicle charging. BPCL generates significant revenue for the government, supports the economy, and creates jobs. It is a crucial player in India's energy landscape, balancing current fuel needs while contributing to a greener energy future.

Hindustan Petroleum Corporation Limited (HPCL)

HPCL is a leading energy company focused on refining crude oil and marketing petroleum products. It also explores and produces oil and gas in India and abroad. HPCL operates major refineries in Mumbai and Visakhapatnam and runs facilities like LPG bottling plants and lube blending plants. The company has an extensive distribution network that includes pipelines, LPG storage facilities, terminals, aviation fuel stations, depots, retail outlets, and distributorships for LPG and lubricants (HPCL, n.d.). HPCL is also involved in producing sugar, ethanol, and electricity, showcasing its diversified operations. As a subsidiary of Oil and Natural Gas Corporation (ONGC), HPCL plays a crucial role in India's energy sector. It is headquartered in Mumbai, Maharashtra.

Altman Z Score Model:

The Altman Z-Score model is a financial tool developed by Edward Altman in 1968 to assess the likelihood of a company's financial distress or bankruptcy. It is widely regarded as one of the most reliable models for predicting a firm's financial health. Initially, Altman considered 22 financial ratios to evaluate bankruptcy risk, but his research identified five key ratios that proved most effective in making accurate predictions.

The model applies a statistical technique called multivariate analysis to combine these five ratios into a single Z-score, which serves as an indicator of a company's financial stability. The formula is as follows: (Rashid et al., 2023)

$$Z = 1.2 X_1 + 1.4 X_2 + 3.33 X_3 + 0.6 X_4 + 0.999 X_5$$

Where,

X_1 : Working Capital / Total Assets

X_2 : Retained Earnings / Total Assets

X_3 : EBIT (Earnings Before Interest and Taxes) / Total Assets

X_4 : Market Value of Equity / Book Value of Total Liabilities

X_5 : Sales / Total Assets

2. REVIEW OF LITETURE

(Rohim et al., 2024) studied the bankruptcy analysis using Altman Z Score model. The objective of the study was to measure the effectiveness of Altman Z-Score model works for predicting bankruptcy. The researcher used descriptive methodology with

quantitative approach. It focuses on retail companies listed on the Indonesia Stock Exchange from 2021 to 2023. The study analysed 31 companies using 93 financial statements, selected through a purposive sampling method. The modified Altman Z-Score model was used to assess the financial health of these companies. The results showed that 17 companies were financially healthy, 3 companies were financially weak, and 11 companies were at risk of bankruptcy.

(Srinivas, 2023) studied on the Altman Z Score model to forecast the financial distress. The aim of the study was to assess the status of financial distress. For that researcher have selected 39 companies of NIFTY 50 companies of the Indian Stock Market. The researcher used the secondary data for the period 2022-23. It is found in the study that 15 companies belong to too healthy zone while 15 companies belong to health zone. And 9 companies belong to bankruptcy zone.

(Chavda & Mehta, 2023) studied on the analysis of Tata motors Ltd. For that researcher used Altman Z Score model for the analysis. The objective of the study was to analyse the financial health of Tata motor Ltd. The researcher used secondary data. The study covered the period the five-year period from 2017 to 2021. It is found in the study that Tata Motors Ltd. is in distress Zone. But from the latest data it is found that company is tried to overcome from financial distress.

(Dr. P. Chellasamy, 2021) studied on the prediction of financial distress using Altman Z score model. The main objective of the study was to check the efficiency of Altman Z Score model in predicting financial distress. For that researcher have selected five Indian footwear companies. The study covered period of five year from 2015-16 to 2019-20. The study conclude that Z score is effective model. Out of five company four companies are in healthy zone only one company found in distress zone.

(Sidhu & Katoch, 2019) the aim of the study was to predict bankruptcy in India's realty sector using the Altman Z-Score model and DEA (Data Envelopment Analysis) model. The researcher selected Ten companies from the NIFTY Realty Index. The study covered five-year period from 2015 to 2019. The study concluded that both models agree that six companies were in the safe zone, while two were in distress zone. These companies need immediate attention and action.

3. OBJECTIVES OF THE STUDY

To measure the financial distress of BPCL and HPCL.

4. RESEARCH METHODOLOGY

4.1 Sources of data:

The research is purely based on the secondary data which is collected from the concern company's annual reports.

4.2 Period of the study:

The study covered the period of five years from 2019-20 to 2023-24.

4.3 Sample:

1. Bharat Petroleum Corporation Limited (BPCL)
2. Hindustan Petroleum Corporation Limited (HPCL)

4.4 Tools:

This study used the Altman Z-Score model to measure the financial health of the selected Public Sector Undertakings (PSUs).

5. DATA ANALYSIS AND INTERPRETATION

The data analysis and interpretation of the four selected companies are as follows. Data was analysed using multivariate analysis with the aid of Microsoft Excel.

5.1 Bharat Petroleum Corporation Limited (BPCL, n.d.)

Table-1 Financial information of BPCL (In Cr.)

Particulars	2020	2021	2022	2023	2024
Working Capital	-17941.6	-3782.82	-16845.9	-16475	-8389.45
Total Assets	126469	140604.5	150512.6	160804	172993
Total Liabilities	93254.6	86059.94	100842.8	108807.6	98318.17
Total Sales	284383	232545.1	362276.8	473124.7	448013.2
EBIT	5933.73	17497.03	13850.98	6793.14	39819.4
Market Capitalization	82637	83624	71702	97594	144400
Retain Earnings	31247.5	51595.15	47540.33	49866.89	72538.51

Table-2 Altman Z score of BPCL

Parameters	Coefficient	2020	2021	2022	2023	2024
X1	1.2	-0.1702	-0.0323	-0.1343	-0.1229	-0.0582
X2	1.4	0.34591	0.51373	0.4422	0.43415	0.58704
X3	3.3	0.15483	0.41066	0.30368	0.13941	0.75959
X4	0.6	0.53169	0.58302	0.42662	0.53816	0.88122
X5	0.999	2.24639	1.65224	2.40455	2.9393	2.58719
Z Score		3.10858	3.12736	3.44274	3.92808	4.75684
Zone		Safe	Safe	Safe	Safe	Safe

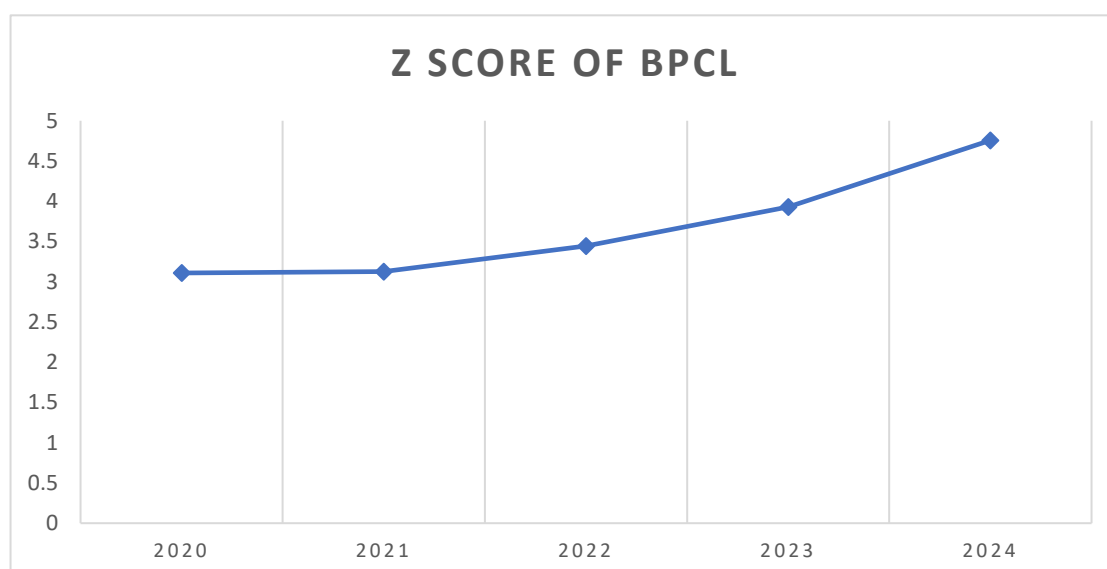


Diagram-1 Z Score of BPCL

From 2020 to 2024, BPCL's financial health has been strong, as shown by its Altman Z-scores, which consistently keep the company in the Safe Zone. This means there's little to no risk of bankruptcy. The score grows steadily from 3.11 in 2020 to 4.76 in 2024, highlighting its improving financial stability. BPCL's solid performance is due to better profits, smart use of its assets, and careful management of debt. While there are minor fluctuations in some areas, the overall picture shows that BPCL is financially stable, improving steadily, and on a healthy path for future growth.

5.2 Hindustan Petroleum Corporation Limited (HPCL, n.d.)

Table-3 Financial information of HPCL (In Cr.)

Particulars	2020	2021	2022	2023	2024
Working Capital	-19714.8	-18438.9	-21178.1	-29806.4	-33253.7
Total Assets	114010.8	131239.2	150160.4	154485	173783
Total Liabilities	85048.47	95053.07	111483.3	126771.6	132753.2
Total Sales	267599.8	231913.4	348427.8	438894.4	431702.7
EBIT	3657.24	15161.52	9176.43	-9783.06	21668.8
Market Capitalization	33204	41470	33361	56639	84155
Retain Earnings	27438.15	34733.7	37258.1	26294.49	39610.83

Table-4 Altman Z score of HPCL

Parameters	Coefficient	2020	2021	2022	2023	2024
X1	1.2	-0.2075	-0.1686	-0.1692	-0.2315	-0.2296
X2	1.4	0.33693	0.37052	0.34737	0.23829	0.31911
X3	3.3	0.10586	0.38124	0.20167	-0.209	0.41147
X4	0.6	0.23425	0.26177	0.17955	0.26807	0.38035
X5	0.999	2.3448	1.76534	2.31805	2.83817	0.10666
Z Score		2.81432	2.61027	2.87739	2.90403	0.98797
Zone		Grey	Grey	Grey	Grey	Distress

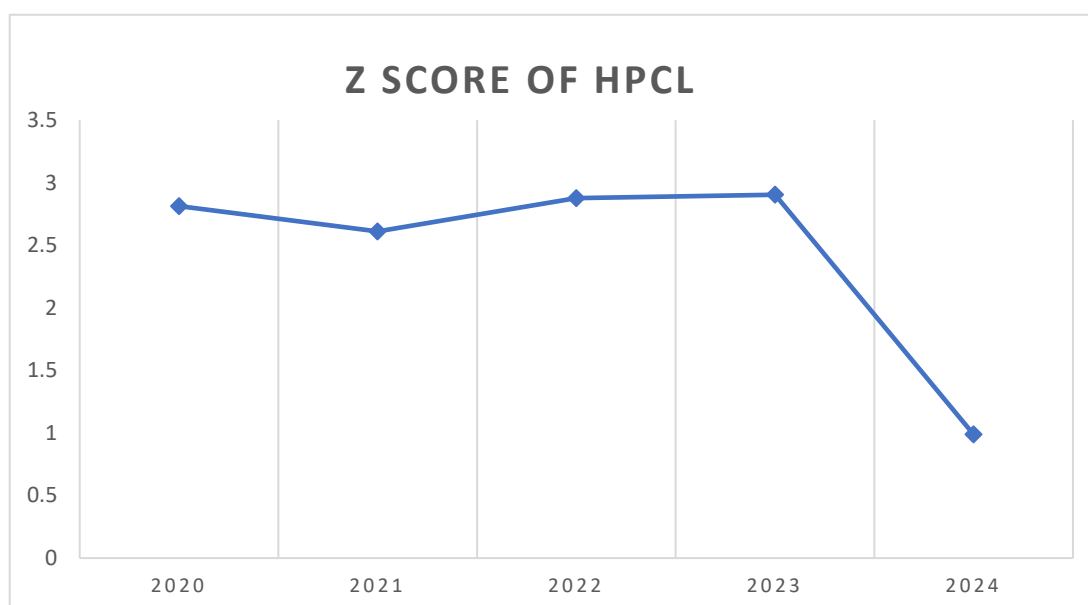


Diagram-2 Z Score of HPCL

From 2020 to 2024, HPCL's financial health has been shaky. The Altman Z-scores place the company in the Grey Zone from 2020 to 2023, meaning there's some financial risk but not an immediate threat. However, by 2024, the score drops to 0.99, landing HPCL in the Distress Zone, which indicates a high risk of financial trouble. The main issues are weak profitability and a sharp decline in revenue in 2024. While some areas, like retained earnings and debt management, show small improvements, inconsistent profits are a big concern. HPCL needs to take serious steps to strengthen its financial position.

6. FINDINGS AND CONCLUSION

The Altman Z-scores from 2020 to 2024 show the financial health of BPCL and HPCL. BPCL has shown consistent financial strength from 2020 to 2024, staying in the Safe Zone with an improving Z-Score. While there are issues with working capital, the company has been growing its retained earnings, improving profitability, and strengthening its market position. BPCL is also good at using its assets to generate revenue.

HPCL showed the biggest concern, as its Z-score dropped from 2.81 in 2020 to 0.99 by 2024, moving from the Grey Zone into the Distress Zone, indicating moderate financial risk. The company faced challenges in managing working capital, reflected in negative values. Profitability was inconsistent, with negative EBIT in 2023 but improvement in

2024. The sharp decline in sales efficiency in 2024 and a low Z-Score (0.99) indicate a serious risk of financial distress. This indicates financial vulnerability and a need for immediate measures to improve its situation.

BPCL has financially strong position and HPCL must take urgent action to avoid further financial problems.

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Impact of New Education Policy (NEP-2020) on Indian Economy

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Abstract

The New Education Policy (NEP) 2020 is a comprehensive framework for transforming the Indian education system. It replaces the previous National Policy on Education, 1986, and aims to address the needs of the 21st century through holistic, inclusive, and flexible education reforms. NEP 2020 seeks to provide an education system that contributes to the overall development of the individual and the nation, aiming to transform India into a knowledge-based economy and a global superpower. The policy focuses on fostering creativity, critical thinking, and problem-solving among students, enhancing their learning outcomes, and preparing them for a dynamic and interconnected world. The National Education Policy (NEP) 2020 aims to transform the Indian education system to drive economic growth, boost employment, and enhance India's global competitiveness. By fostering skill development, innovation, and research, the policy seeks to align education with the needs of the economy and prepare a globally competent workforce. It recognizes that quality education is the key to harnessing India's demographic dividend and achieving sustained economic development. In this research paper, the researcher focused on outline of NEP 2020 and how it can help to develop Indian Economy.

Keywords: National Education Policy, Economy, Indian, Employment

Introduction

Education is the fundamental catalyst for all aspects of development. For sustainable economic progress, countries must invest significantly in human capital. Education increases individual productivity, creativity and promotes entrepreneurship and technological advancement. It also plays a major role in economic and social progress as well as improving income distribution.

More recently, in 2020, the government introduced the National Education Policy (NEP) 2020 to reform the Indian education sector and improve learning outcomes for students in the country. The NEP seeks to achieve a GER of 50% in higher education and 100% in pre-primary to secondary level education by 2030. NEP aims to improve education standards, promote skill development and provide universal access to education. Apart from improving the quality of education, NEP also emphasizes on promoting skill development among children. By developing these skills, students can take advantage of higher paying jobs and better exit opportunities. This will not only

benefit the individual but will also contribute to the overall economic development of the country, leading to India's GDP growth rate.

In addition, the NEP promotes universal access to education. With the establishment of foreign universities in India, students will have more opportunities to pursue higher education without leaving the country. This will save India's foreign exchange and reduce the number of students going abroad.

National Education Policy 2020

The National Education Policy (NEP) 2020 is a comprehensive framework introduced by the Government of India aimed at transforming and overhauling the Indian education system.

Here are the key highlights of the policy:

1. School Education Reform

- **New Structure:** The 10+2 structure has been replaced with a 5+3+3+4 system, which corresponds to ages 3-8 years (Foundational Stage), 8-11 (Preparatory Stage), 11-14 (Middle Stage), and 14-18 (Secondary Stage).
- **Early Childhood Care and Education (ECCE):** Focus on universal access to ECCE, integrating pre-primary and primary education for children aged 3-6 years.
- **Curriculum and Pedagogy Reform:** Emphasis on experiential learning, critical thinking, and no rigid separations between academic streams, extracurricular, and vocational streams. Greater focus on concepts and skills, as well as reduction in curriculum content.
- **Mother Tongue/Regional Language as Medium of Instruction:** Wherever possible, the medium of instruction up to Grade 5 (preferably up to Grade 8 and beyond) should be the home language/mother tongue/regional language.
- **Board Exams Reform:** Aim to make board exams easier and focus on core competencies, moving away from rote learning.

2. Higher Education Reform

- **Higher Education Gross Enrolment Ratio (GER):** Target to increase GER to 50% by 2035.
- **Holistic and Multidisciplinary Education:** Emphasis on a flexible and multidisciplinary approach to education with flexible curricula, multiple entry and exit points, and the provision of certificates, diplomas, or degrees at different stages of study.
- **Higher Education Institutions (HEIs):** Consolidation into large multidisciplinary institutions with at least 3,000 students each, and moving towards becoming either teaching universities, research universities, or autonomous degree-granting colleges.
- **Regulatory Changes:** Single overarching regulator for the entire higher education sector, excluding medical and legal education.

- National Research Foundation (NRF): Formation of NRF to foster a strong research culture and build research capacity across higher education institutions.

3. Vocational and Skill Education

- Vocational education will be integrated into mainstream education in a phased manner, starting from Grade 6, with internships.

4. Teacher Education and Training

- Teacher Training: A four-year integrated B.Ed. degree will be the minimum degree qualification for teaching by 2030.
- Continuous Professional Development (CPD): Focus on regular up skilling and training of teachers to enhance learning outcomes.

5. Technology in Education

- Extensive use of technology in teaching and learning, education planning, and management.
- Creation of a National Educational Technology Forum (NETF) to facilitate exchange of ideas on technology-based solutions for better learning outcomes.

6. Equity and Inclusion

- Special focus on socially and economically disadvantaged groups (SEDGs).
- Gender Inclusion Fund and Special Education Zones for underrepresented regions and groups.

7. Assessment Reforms

- Emphasis on regular formative assessments rather than high-stakes examinations.
- Introduction of a competency-based evaluation system.

The NEP 2020 aims to make education more inclusive, holistic, flexible, and aligned to the needs of the 21st century, focusing on bringing out the unique capabilities of each student. It sets a roadmap for India's education system to align with global standards, while also emphasizing India's cultural heritage and values.

National Education Policy (2020) and Indian Economy

The National Education Policy (NEP) 2020 is expected to have a significant impact on the Indian economy. The policy's focus on holistic, inclusive, and multidisciplinary education aims to transform India's human capital, which will drive economic growth and enhance the nation's global competitiveness.

Here are the key ways in which the NEP 2020 connects with and impacts the Indian economy:

1. Skill Development and Employability

- Vocational Education: Integration of vocational training into mainstream education from Grade 6 onwards aims to make students job-ready and bridge the skill gap between industry requirements and the education system. This could reduce unemployment rates and boost productivity.
- Skill-Based Learning: Emphasis on skill-based and competency-driven learning will produce a workforce that is better equipped to meet the demands

of emerging sectors such as technology, healthcare, and green energy, as well as traditional sectors.

2. Boost to Innovation and Research

- **National Research Foundation (NRF):** The establishment of NRF is aimed at fostering a culture of research and innovation in Indian universities and colleges, which could lead to the creation of new technologies, products, and services. This will drive economic growth and position India as a global leader in research and innovation.
- **Collaboration with Industry:** NEP 2020 envisions close collaboration between academia and industry to promote innovation, resulting in economic benefits through job creation, industrial growth, and increased exports.

3. Entrepreneurship Development

- **Emphasis on Critical Thinking and Creativity:** The new education framework emphasizes experiential learning, critical thinking, and problem-solving, which are vital for entrepreneurial success. Encouraging a culture of entrepreneurship will lead to job creation, economic diversification, and a boost in productivity.
- **Incubation Centres and Innovation Labs:** The policy supports setting up incubation centres and fostering a start-up ecosystem within educational institutions, enabling young entrepreneurs to turn ideas into businesses.

4. Increased Productivity of the Workforce

- **Reform in Teacher Training:** NEP 2020 emphasizes better training and continuous professional development for teachers, leading to better learning outcomes for students and an improved workforce in the long run.
- **Holistic Education Approach:** By focusing on multidisciplinary education and flexible course options, individuals will be able to transition between different skill sets, making the workforce adaptable to changing economic and technological trends.

5. Inclusive Economic Growth

- **Equity and Access:** NEP 2020 emphasizes inclusivity and equitable access to quality education for all, particularly socially and economically disadvantaged groups (SEDGs). This would allow for a more equitable distribution of economic opportunities and uplift marginalized sections of society.
- **Gender Inclusion Fund:** Measures to promote girls' and women's education have the potential to increase female labour force participation and overall economic productivity.

6. Demographic Dividend

- **Harnessing Young Population:** India has a large youth population, and NEP 2020 aims to transform this demographic potential into a dividend by equipping youth with high-quality education, skills, and capabilities necessary to participate effectively in the workforce.

7. Improving Higher Education and Global Competitiveness

- Autonomy and Flexibility in Higher Education Institutions: Giving more autonomy to institutions and allowing students to choose multidisciplinary courses will enhance the global standing of Indian universities. This can attract international students and foster international collaborations, further contributing to the economy.
- Increasing GER (Gross Enrolment Ratio): NEP 2020 aims to achieve a 50% GER in higher education by 2035, resulting in a more educated and skilled workforce that will boost productivity and economic growth.

8. Technological Advancements and Digital Economy

- Focus on Technology and Online Learning: By leveraging technology for education, NEP 2020 aims to create a digitally literate workforce capable of contributing to sectors like IT, e-commerce, and digital marketing, thereby accelerating the growth of India's digital economy.
- National Educational Technology Forum (NETF): Establishing a forum to exchange technological ideas in education will promote digital learning and innovation, which is vital for economic transformation.

9. Improved Quality of Human Capital

- Competency-Based Learning and Reduced Rote Learning: The shift from rote memorization to critical thinking and analytical skills is expected to produce better human capital that can innovate and adapt in a competitive global market.
- Global Citizenship Education: By incorporating values of sustainability, ethics, and social responsibility, NEP 2020 aims to create globally conscious citizens, helping India strengthen its soft power and international trade partnerships.

10. Economic Growth from Education Expenditure

- Increased Investment in Education: NEP 2020 calls for raising public investment in the education sector to 6% of GDP, which can have a multiplier effect on economic growth by creating more employment opportunities, improving infrastructure, and raising the quality of education.

Final Thoughts

In summary, NEP 2020 has the potential to play a transformative role in India's economic development by aligning the education system with the needs of the economy, creating a skilled and innovative workforce, promoting inclusive growth, and positioning India as a global economic powerhouse through better research, innovation, and entrepreneurship.

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Analysis of Problems and Challenges faced by students and institutions in implementing skill development programs Special Reference to

Narmada District

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Abstract

Skill development is critical to enhancing doing business and employability for fostering economic growth. However, the successful implementation of skill development programs often faces significant challenges, especially in rural and socio-economically disadvantaged regions such as the Narmada District. This study aims to analyze the problems faced by students and institutions in the Narmada district, focusing on accessibility, awareness, resource availability, and institutional frameworks. Employing a mixed-methods approach, the research draws on primary data collected through surveys and interviews, complemented by secondary data. Findings reveal key barriers, including infrastructural deficiencies, socio-economic constraints, and misalignments between program curricula and industry demands. The paper concludes with actionable recommendations to improve program effectiveness and ensure equitable access to skill development opportunities.

Keywords

Skill Development, Narmada District, Challenges, Students, Institutions, Employability, Rural Education

1. Introduction

1.1 Context of Skill Development in India

Skill development has become a cornerstone of India's strategy to harness its demographic dividend. With initiatives such as the Skill India Mission, the government has aimed to equip millions of youth with job-relevant skills. Despite these efforts, the implementation of skill development programs remains uneven across the country, with rural and tribal regions like Narmada District facing unique challenges.

1.2 Importance of Skill Development for Employability

Skill development is vital for bridging the gap between education and employability. It addresses structural unemployment, enhances productivity, and empowers individuals economically and socially. In regions like Narmada District, characterized by limited industrialization and high dependence on agriculture, skill training programs can provide alternative livelihoods and contribute to community development.

1.3 Background of Narmada District

Narmada District, located in Gujarat, is predominantly rural and tribal. The district's socio-economic indicators reflect high poverty levels, low literacy rates, and limited

industrial activity. These factors compound the challenges of implementing skill development programs, making it an ideal focus for this study.

1.4 Research Problem Statement

While skill development programs have the potential to transform lives, their success in Narmada District has been hampered by several barriers. Understanding these challenges is essential for designing effective interventions.

1.5 Objectives of the Study

- Identify the challenges faced by students in accessing skill development programs.
- Examine institutional barriers to program implementation.
- Propose strategies to overcome these challenges and improve program outcomes.

2. Literature Review

2.1 Global Perspectives on Skill Development

Globally, skill development has been recognized as a driver of economic growth and social equity. Countries such as Germany and Singapore have established robust vocational training systems that integrate industry needs with academic curricula. Lessons from these models highlight the importance of stakeholder collaboration, quality assurance, and continuous monitoring.

2.2 Challenges in Implementing Skill Development Programs in India

Research indicates that India's skill development ecosystem faces systemic challenges, including:

- Fragmented institutional frameworks.
- Limited industry participation.
- Inadequate funding and infrastructure.
- Low awareness and enrollment among target populations.

2.3 Gaps in Existing Research Specific to Narmada District

While several studies have examined skill development at the national and state levels, there is limited research focusing on Narmada District's unique socio-economic and cultural context. This study aims to fill this gap by providing an in-depth analysis of local challenges.

3. Research Methodology

3.1 Research Design

The study adopts a descriptive and exploratory research design, combining qualitative and quantitative methods to provide a comprehensive understanding of the issues.

3.2 Data Collection Methods

1. Primary Data:

- Surveys: Administered to students enrolled in skill development programs.
- Interviews: Conducted with institutional representatives, program facilitators, and local policymakers.

2. Secondary Data:

- Reports from government and non-government organizations.
- Academic articles and case studies.

3.3 Sampling Techniques

- Sample Size: 500 students of college Narmada district .
- Sampling Method: Stratified random sampling to ensure representation of different demographic and institutional groups.

3.4 Data Analysis Tools

- Quantitative data analyzed using statistical software.
- Qualitative data coded and interpreted through thematic analysis.

3.5 Ethical Considerations

- Informed consent obtained from all participants.
- Confidentiality of respondents ensured.
- Adherence to ethical research practices.

4. Findings and Analysis

To test the hypotheses:

H1: "Skill development programs are inadequately aligned with local industry demands." This can be evaluated by analyzing the responses regarding the alignment of skill courses with industry demands and their perceived effectiveness.

- the distribution of responses regarding the effectiveness of programs (Ineffective, Moderately effective, Very effective) based on whether the skill courses are aligned with industry demands (Yes, No).
- This data will help evaluate if there is a significant correlation between the alignment of programs and their perceived effectiveness.

Next, I will perform a Chi-square test to determine if there is a significant association between these variables for H1

The Chi-square test results for H1 indicate a chi-square statistic of approximately 0.299 and a p-value of approximately 0.861. This suggests that there is no significant association between the alignment of skill courses with industry demands and their perceived effectiveness, as the p-value is much greater than the common significance level of 0.05.

Summary of Results for H1:

- Chi-square Statistic: 0.299
- p-value: 0.861
- Degrees of Freedom: 2
- Expected Frequencies:
 - For "No" alignment and "Ineffective": 180.136
 - For "No" alignment and "Moderately effective": 161.920
 - For "No" alignment and "Very effective": 163.944
 - For "Yes" alignment and "Ineffective": 175.864
 - For "Yes" alignment and "Moderately effective": 158.080
 - For "Yes" alignment and "Very effective": 160.056

H2: "Cultural and financial barriers significantly impact program participation." This can be assessed by examining the responses related to challenges faced in

accessing skill development programs, specifically focusing on cultural and financial constraints.

- the distribution of responses regarding various challenges (Financial constraints, Irrelevant content, Lack of infrastructure, Limited trainers) against whether respondents are currently employed or interning (Yes, No).
- This data will help evaluate if cultural and financial barriers significantly impact program participation.

Next, I will perform a Chi-square test to determine if there is a significant association between these challenges and employment status for H2

The Chi-square test results for H2 indicate a chi-square statistic of approximately 4.402 and a p-value of approximately 0.221. This suggests that there is no significant association between the challenges faced in accessing skill development programs (such as financial constraints, irrelevant content, lack of infrastructure, and limited trainers) and employment status, as the p-value is greater than the common significance level of 0.05.

Summary of Results for H2:

- Chi-square Statistic: 4.402
- p-value: 0.221
- Degrees of Freedom: 3
- Expected Frequencies:
 - For "Financial constraints" and "No": 114.403, "Yes": 118.597
 - For "Irrelevant content" and "No": 127.169, "Yes": 131.831
 - For "Lack of infrastructure" and "No": 129.133, "Yes": 133.867
 - For "Limited trainers" and "No": 120.295, "Yes": 124.705

This analysis indicates that while there are challenges reported, they do not significantly impact participation in skill development programs based on employment status.

Results :

the results indicate no significant associations for either hypothesis. Specifically, the alignment of skill development programs with industry demands does not significantly affect their perceived effectiveness, and cultural and financial barriers do not significantly impact program participation based on employment status.

The analysis of the challenges faced by students in accessing skill development programs has revealed four unique responses:the following:

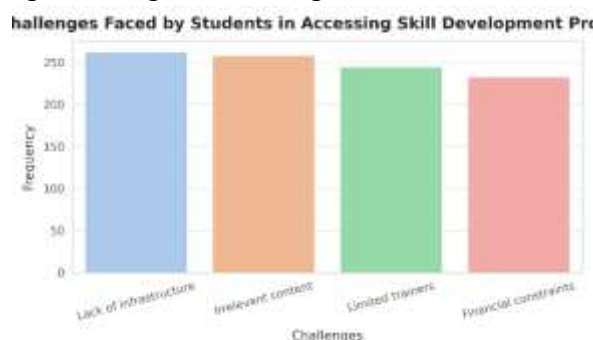
- Lack of infrastructure: 263 responses
- Irrelevant content: 259 responses
- Limited trainers: 245 responses
- Financial constraints: 233 responses

This data suggests that the most significant challenges are related to infrastructure and content relevance, which could be critical areas for improvement in skill development programs.

The bar chart visualizes the frequency of challenges faced by students in accessing skill development programs, highlighting that the most significant issues are related to infrastructure and content relevance. This visualization effectively communicates the

prevalence of each challenge, allowing for targeted improvements in skill development initiatives.

Here is the bar chart representing the challenges:



Summary of Findings

The analysis of challenges faced by students in accessing skill development programs revealed the following key issues:

1. Lack of Infrastructure (263 responses): This indicates a significant barrier, suggesting that many institutions may not have the necessary facilities or resources to support effective skill development.
2. Irrelevant Content (259 responses): Many students feel that the content of the programs does not meet their needs or align with industry demands, which can lead to disengagement.
3. Limited Trainers (245 responses): A shortage of qualified trainers can hinder the quality of education and skill acquisition.
4. Financial Constraints (233 responses): Economic barriers prevent many students from participating in available programs.

4.2 Challenges Faced by Institutions

The correlation matrix indicates the relationships between institutional barriers and program implementation factors. Here are the key correlations:

- Infrastructure: Shows a weak positive correlation with awareness, trainer qualifications, and feedback.
- Awareness: Has a negligible correlation with other factors, suggesting that awareness does not significantly impact the other variables.
- Trainer Qualifications: Also shows weak correlations with infrastructure and feedback.
- Feedback: Displays weak correlations with infrastructure and awareness.

This suggests that while there are some relationships, they are not strong enough to definitively support the hypothesis that these institutional barriers significantly hinder program implementation.

Here is the correlation matrix:

	Infrastructure	Awareness	Trainer_Qualifications	Feedback
Infrastructure	1	0.0337049916	0.0214039156	0.0332674415
Awareness	0.0337049916	1	-0.0019760514	-0.0422290395
Trainer_Qualifications	0.0214039156	-0.0019760514	1	-0.0157409458
Feedback	0.0332674415	-0.0422290395	-0.0157409458	1

Summary of Findings

1. Funding Issues:

- A majority of institutions (530 responses) reported no funding issues, while 470 indicated that funding is a concern. This suggests that while funding is not universally problematic, it remains a significant barrier for many institutions.

2. Staff Training Issues:

- There is a notable concern regarding staff training, with 497 responses indicating that trainers are not adequately qualified, compared to 503 who affirmed that trainers are qualified. This highlights a potential gap in training and professional development for staff.

3. Communication Issues:

- A significant number of respondents reported a lack of awareness about skill development programs (502 responses) and insufficient feedback mechanisms (523 responses). This indicates that communication within institutions is a critical area needing improvement.

To test the hypothesis regarding the effectiveness of skill development initiatives in Narmada District, I will analyze the responses related to the effectiveness of existing programs, their alignment with industry demands, and the involvement of NGOs. This will involve evaluating the data to see if there is a significant correlation between these factors and the perceived effectiveness of the programs.

I will specifically look for:

1. The effectiveness ratings of existing programs.
2. The alignment of skill courses with industry demands.
3. The involvement of NGOs in providing skill training.

The Chi-square test results indicate a chi-square statistic of approximately 0.299 and a p-value of approximately 0.861. This high p-value suggests that there is no significant association between the effectiveness of skill development programs and their alignment with industry demands.

Summary of Results:

- Chi-square Statistic: 0.299
- p-value: 0.861
- Degrees of Freedom: 2
- Expected Frequencies:
 - For "Ineffective" and "Yes": 180.136
 - For "Ineffective" and "No": 175.864

- For "Moderately effective" and "Yes": 161.920
- For "Moderately effective" and "No": 158.080
- For "Very effective" and "Yes": 163.944
- For "Very effective" and "No": 160.056

Given that the p-value is much greater than the common significance level of 0.05, we fail to reject the null hypothesis. This indicates that the perceived effectiveness of the programs does not significantly depend on whether the courses are aligned with industry demands.

The Chi-square test results indicate no significant association between the effectiveness of skill development programs and their alignment with industry demands, as evidenced by a high p-value of 0.861. This suggests that improvements in program effectiveness may not necessarily correlate with better alignment to industry needs.

6. Recommendations

6.1 Policy-Level Recommendations

- Increase funding for rural skill development initiatives.
- Develop policies that incentivize industry participation.

6.2 Institutional Recommendations

- Establish more training centers in remote areas.
- Recruit and train local educators to address staffing issues.

6.3 Student-Centric Strategies

- Offer financial support and scholarships.
- Conduct awareness campaigns to promote program benefits.
- Enhancing Infrastructure: Institutions should invest in better facilities and resources to create a conducive learning environment.
- Curriculum Development: Regularly update the curriculum to ensure it aligns with industry needs and student interests, incorporating feedback from students and industry professionals.

These interventions could significantly improve student access and participation in skill development programs, ultimately enhancing their employability and skill sets.

- Enhancing Funding: Institutions should explore alternative funding sources, such as grants or partnerships with industry, to ensure adequate resources for program implementation.
- Improving Staff Training: Implement comprehensive training programs for staff to enhance their qualifications and teaching effectiveness. This could include workshops, certifications, and ongoing professional development opportunities.
- Strengthening Communication: Develop strategies to improve awareness of available programs among students, such as informational sessions, newsletters, and digital platforms. Additionally, establish regular feedback mechanisms to assess program effectiveness and make necessary adjustments.

7. Conclusion

This study provides a comprehensive analysis of the challenges faced by students and institutions in implementing skill development programs in Narmada District. By addressing the identified barriers and adopting the proposed recommendations,

stakeholders can enhance the effectiveness of these programs and contribute to the socio-economic development of the region.

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Optimizing Urban Mobility: A Study of Surat BRTS Strategies

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Abstract:

This paper analyzes the strategies adopted by the Surat Bus Rapid Transit System. India's rapidly growing cities are facing various challenges in urban mobility along with the increasing population which has been posing a major question day by day. This paper has studied in detail the strategies adopted by Bus Rapid Transit System as an urban mobility solution for the city of Surat which is known worldwide for its diamond and textile industry. According to the 2011 census figures, the population of Surat was estimated at around 60.81 lakh. BRTS was launched from November, 2013 to provide public transport service to this growing population. The main objective of which was to promote efficient, accessible and eco-friendly urban transport. This paper examines strategies employed in areas such as infrastructure, technology, integration with other transport modes and public private partnerships. The paper's findings suggest that the strategies have collectively increased mobility, reduced the effects of environmental pollution, and improved the quality of life for residents.

Keywords:

Surat, BRTS, Public transport, Strategies, Sustainability

Introduction: Urban mobility is a primary enabler for economic development and all sections of society but with the rapid growth of urbanization, mobility issues have become more serious as challenges such as traffic congestion, less efficient public transport systems and pollution plague most cities. A permanent and budget-friendly transport system is needed to solve these problems, especially in fast growing cities like Surat.

Surat, a prominent economic and industrial hub of Gujarat, has witnessed exponential growth over the past few decades. Known for its thriving textile and diamond industries, the city attracts a large workforce from various regions across the country. However, this rapid urban and industrial expansion has also led to a sharp rise in the number of vehicles on the roads, causing severe traffic congestion, increased travel time, and environmental degradation. The lack of a robust and well-connected public transport system further exacerbated these challenges, making the need for a sustainable urban mobility solution evident.

To address these issues, the Surat Municipal Corporation (SMC) implemented the Bus Rapid Transit System (BRTS) Surat Sitilink as a modern solution to improve urban

mobility. The Surat BRTS was designed to provide a reliable, efficient, and cost-effective public transport system. This study aims to analyze the strategies adopted in the planning and implementation of Surat BRTS and evaluate its impact on urban mobility.

Review of Literature:

1. **Desai and Jain (2017)** explore the role of public-private partnerships (PPP) in the development of Surat's BRTS infrastructure. The research concludes that PPP models have been effective in financing the project, but issues related to fare management and operational control need further attention. They suggest enhancing transparency and collaboration between government and private partners for better governance.
2. A study by **Thaker et al. (2021)** explores the long-term sustainability of Surat BRTS, particularly focusing on its environmental and financial aspects. They argue that while Surat BRTS has made significant strides in reducing traffic emissions and providing a reliable mode of transport, its future success will depend on continued investments in green technologies, such as electric buses and solar-powered infrastructure.
3. In their research, **Soni and Desai (2018)** analyze the impact of Surat BRTS on traffic congestion in the city. The study utilizes traffic volume data and travel time surveys before and after the implementation of BRTS. The findings reveal that traffic congestion has decreased in the BRT corridors, but other parts of the city have seen a rise in congestion, suggesting the need for further expansion of the network.
4. **Patel and Mehta (2020)** discuss the role of technology in the functioning of Surat's BRTS. The paper covers innovations such as the implementation of smart card systems, real-time tracking, and automatic fare collection systems, which have contributed to greater efficiency and user satisfaction. However, the authors recommend further adoption of digital technologies to improve system reliability and passenger safety.
5. Research by **Shah and Gohil (2019)** examines the integration of Surat BRTS with non-motorized transport (NMT), including cycling and walking. They highlight that while the BRTS has been successful in terms of improving public transport, its integration with walking and cycling infrastructure remains weak. The authors suggest creating dedicated pedestrian pathways and cycling lanes around BRT corridors to promote multimodal transport.
6. A study by **Kumar et al. (2022)** investigates the social impact of Surat's BRTS, with a focus on how accessible the system is to disadvantaged groups, including women, elderly people, and people with disabilities. The findings indicate that while the BRTS has made commuting more affordable and accessible for many, there is still room for improvement in terms of facilities like ramps and dedicated services for elderly passengers.

7. **Rao and Gupta (2018)** provide an economic evaluation of Surat's BRTS. Their cost-benefit analysis shows that while the initial investment in infrastructure was high, the long-term benefits in terms of reduced congestion, environmental improvements, and time savings justify the costs. However, the study warns that the system's financial sustainability will require ongoing government investment and public-private partnerships.
8. In a survey conducted by **Joshi and Yadav (2020)**, the authors explore commuter satisfaction with Surat BRTS. The study reveals that a large majority of passengers report positive changes in travel time and convenience, particularly in densely populated areas. However, some concerns were raised regarding the punctuality and overcrowding during peak hours. The paper suggests improving fleet frequency and comfort levels to enhance overall user experience.
9. **Singh and Desai (2019)** conducted a comparative study on the environmental benefits of BRTS systems in Indian cities, with a specific focus on Surat. Their findings suggest a noticeable reduction in air pollution and carbon emissions due to the shift from private vehicles to public transport. The paper also points out the need for more sustainable infrastructure, such as electric buses, to maximize environmental benefits.
10. The MyCiTi BRTS in Cape Town, South Africa, has been analyzed in a study by **Adams and Phiri (2019)**, which examines the system's role in improving accessibility and equity. The research shows that MyCiTi has enhanced mobility for lower-income populations and improved transport options in previously underserved areas. However, issues of fare affordability and the accessibility of stations are identified as barriers for the most vulnerable groups. The study calls for more targeted policies to address these gaps.
11. A study by **Utami et al. (2020)** examines the development and public perception of Jakarta's BRTS, called TransJakarta. The paper highlights the system's rapid expansion, but also identifies challenges in terms of overcrowding, fare collection issues, and inconsistent service. Public perception is mixed, with passengers expressing satisfaction with efficiency, yet dissatisfaction with comfort and safety. The authors recommend enhancing infrastructure and services to improve user experience.

Context and Background: Urban mobility is the key to development for any region or city. In today's era of industrialization, the importance of urban mobility is understated. Among the various factors affecting the development of any region or city, urban mobility is an important factor.

According to The World Bank, urban mobility was traditionally about "moving people from one location to another location within or between urban areas". This notion was based on two principles: people needed to access housing, jobs and other urban services such as education and entertainment, and they displayed a preference for motorised mobility due to its cost efficiency.

Importance of Urban Mobility:

- (1) **Quality of Life:** Urban mobility reduces air pollution and carbon emissions by reducing traffic. Which overall seems to improve the quality of life of the people of the city.
- (2) **Economic Development:** An efficient mobility system facilitates and ensures the transportation of manpower, goods and services which results in cost reduction by stimulating economic activity.
- (3) **Social Inclusivity:** A good mobility system ensures equal accessibility to all sections of society, including marginalized sections of society, women, children, the elderly and the disabled. By means of public transport even the weaker sections can reach their economic activities at a lower cost which results in social equality.
- (4) **Safety and Resilience:** A safe urban mobility system reduces accidents and fatalities.

Bus Rapid Transit System (BRTS): Bus Rapid Transit System is a high quality, high speed, customer- oriented public bus transport service. The concept of BRTS started in Curitiba (Brazil) in 1970. Currently, over 160 cities in different parts of the world have successful BRT systems in operation.

A first in India on 14 October 2009, the Ahmedabad Municipal Corporation inaugurated the first 12 km of its much-hyped public transport program Janmarg. The first corridor from RTO to Chandranagar was the first time a bus rapid transit system was introduced in India.

Apart from this, due to the success of Janmarg, in phases BRTS service was extended by the government under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) in various cities. The list of BRTS in different cities of India is shown in the table below.

System	City	State
Ahmedabad BRTS (Janmarg)	Ahmedabad	Gujarat
Amritsar BRTS	Amritsar	Punjab
Bhopal BRTS	Bhopal	Madhya Pradesh
Hubballi-Dharwad BRTS	Hubballi-Dharwad	Karnataka
Indore BRTS (ibus)	Indore	Madhya Pradesh
Jaipur BRTS	Jaipur	Rajasthan
Pune-Pimpri-Chinchwad BRTS (Rainbow BRTS)	Pune-Pimpri-Chinchwad	Maharashtra
Rajkot BRTS (Rajpath)	Rajkot	Gujarat
Surat BRTS (Sitalink)	Surat	Gujarat

Table 1: List of Bus Rapid Transit Systems (BRTS) in India

Overview of Surat BRTS: Surat BRTS was started in the year 2013-14. Currently in Surat city Phase 1 and Phase 2 total 167 km (corridor 89 cam and mixed traffic route 78) BRTS service is available to public. BRTS Bus Service to Educational Institutions,

Industrial Areas, Railway Stations and ST bus stations covers high traffic areas. BRTS service is currently operating in a total of 42 routes.

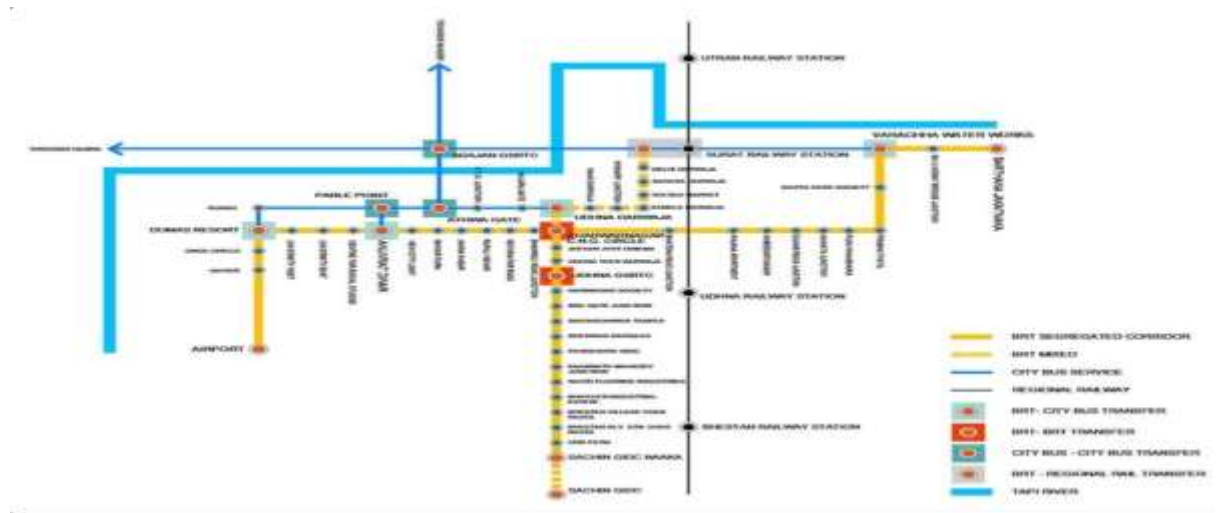


Figure 1: Surat BRTS Route Map

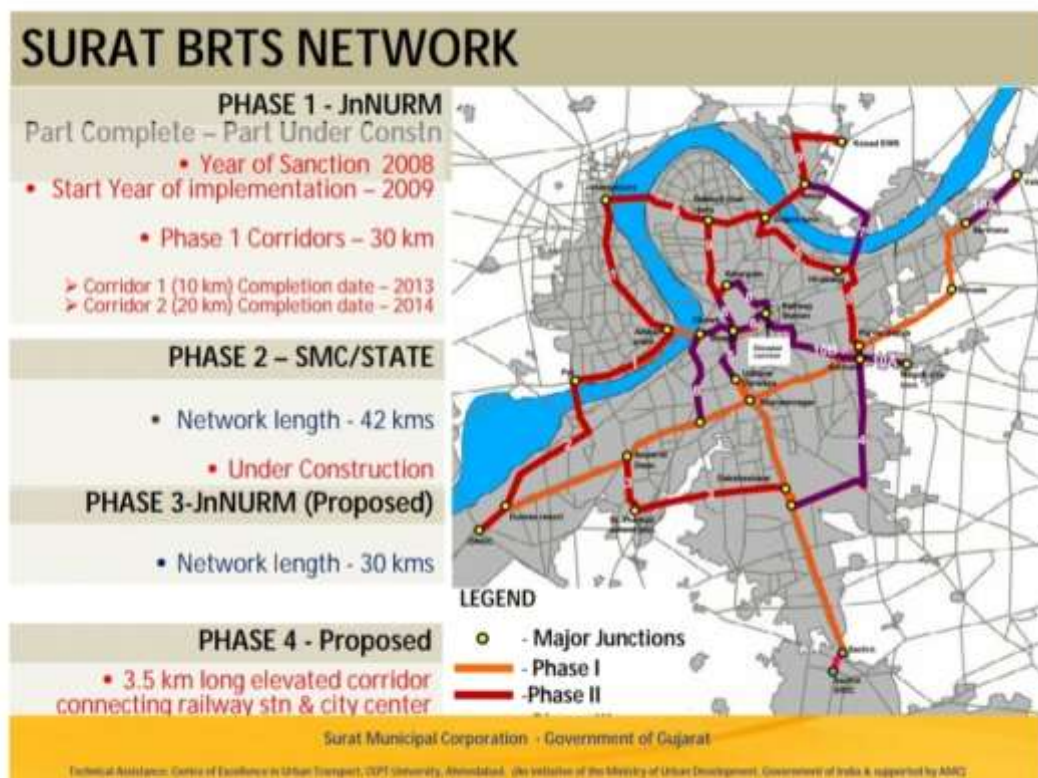


Figure 2: Surat BRTS Network

(Source: website of SMC and Government of Gujarat)

From the figure shown above, information is available that the Surat BRTS project has been divided into four main phases out of which the work of two phases has been completed.

Objectives of this study:

- (1) To study about Bus Rapid Transit System (BRTS) service in Surat city.
- (2) To examine key strategies Surat BRTS adopted to enhance urban mobility.

Research methodology: This study uses a qualitative research approach using secondary data and case study methods to observe the strategy adopted by Surat BRTS.

(1) Secondary Data Collection:

- Literature Review: Relevant academic papers, government reports, and industry publications were reviewed to provide foundational knowledge on urban mobility challenges and BRT systems globally. This literature offers context and informs the framework for analyzing Surat BRTS's strategies.

- Data from Official Reports: Data was gathered from reports by the Surat Municipal Corporation (SMC) and the Surat Urban Development Authority (SUDA) to understand the objectives, design, and performance metrics of Surat BRTS.

(2) Case Study Approach: Surat BRTS is examined as a case study to provide detailed insights into the strategies used. Specific elements such as infrastructure design, technological innovations, and integration efforts with other transport modes are analyzed to understand their role in improving urban mobility.

Strategies Adopted by Surat BRTS:

Surat Bus Rapid Transit System popularly known as Surat sitilink. The service was launched to efficiently address the city's rapid delivery and growing traffic challenges. The service was launched in the year 2013-14 with the primary objectives of increasing mobility, decongesting other public transport modes, providing reliable and accessible, cost-effective transit to the local population. The strategic framework of Surat BRTS promotes sustainable urban development, fulfilling the government's Smart City mission and comprising of carefully planned initiatives and various measures designed to fulfill the transport needs of the city. The major operational strategies employed by Surat BRTS are given below in detail.

1. Exclusive Bus Rapid Transit (BRT) Lanes: Surat BRTS has implemented a separate dedicated lane especially for BRT buses. Dedicated lanes exclusively for BRT buses greatly reduce delays associated with traffic conditions, as buses can operate independently of other vehicles, thereby increasing overall efficiency within the transit network.
2. Advanced Stations and Terminals: BRT has been making continuous efforts to provide accessibility features in the design of stations and terminals. These include ramps, electronic information boards, comfortable waiting areas, charts showing detailed information at each station, adequate number of passenger seating and modern ticket counters. BRT stations are strategically located near major urban centers, close to school and colleges, congested major commercial industries-businesses that facilitate connectivity between residential and commercial areas and promote seamless mobility across the city. At present the number of such advanced stations is approximately 143, 54 cabins with a total of 197 bus stations currently functioning.

3. **Eco-Friendly Bus Fleet:** The Surat BRTS uses a fleet of modern, low carbon emission electronic buses that realize the city's objective of reducing air pollution and advancing sustainable transport in a smart city. By focusing on environment-friendly vehicles, the system plays an important role in improving air quality and tackling environmental problems arising in the city. At present, 225 electric buses are included in the total fleet of BRT out of the total number of buses.

Total saved fuel	Fuel saving per day (In Liters)	GHG emission reduction (CO2 per day in Kg.)	Total GHG emission reduction (CO2 in Kg.)	Total Run Km
4326169.03	11075.98	29683.61	11594130.30	17304672.10

Table 2: BRTS Electric Buses Operations Statistics (2023)

(Source: Website of SMC)

4. **Digital Fare Collection System:** The implementation of contactless smart cards by Surat BRTS has made the fare payment process digital resulting in faster transactions and shorter boarding time. This technological advancement not only improves passenger convenience but also reduces cash handling challenges and brings transparency in cash management. This card also helps in the collection of passenger related data. BRTS is constantly trying to attract passengers through various discount schemes with this card. 40% discount for students, 25% discount for women and senior citizens and 100% discount for freedom fighters, differently abled persons are given on this card. Under Smart Mobility Intelgen System and Automatic Fare Collection System various devices like Station PIS, Passenger System Bus PIS, ICU, VDS, GPS as well as Automatic tans staile Station have been installed.
Ticket online facility from Paytm was launched from year 2021 for fast and contactless ticketing facility to bus passengers. Four types of NPCI approved ICICI Money Card Smart Cards were launched from Surat Sitilink 2017, which has proved vital for automatic fares.
5. **Real-Time Information Display System:** Surat BRTS uses digital screens at each station to show passengers real-time updates on each route to show the arrival schedule of buses, so passengers get real time information about the bus. This facility empowers commuters to plan their journeys more efficiently, thereby reducing passenger waiting time and bringing regularity to BRT.
6. **Public-Private Partnership (PPP) Framework:** To finance and manage the BRT system, Surat BRTS has embraced a PPP framework, which encourages private sector investment. This strategy alleviates the financial strain on governmental resources, allowing for improved services and infrastructure through the collaboration of shared expertise and resources.
7. **Revenue Generation through Advertising:** The BRT system capitalizes on the rental of advertising space inside stations and buses and outside the buses,

creating an additional source of revenue for the system. This strategic approach reduces the dependence on bus fare revenue, which contributes to the financial viability of BRT.

8. **Data-Driven Route Planning:** Through the examination of travel behaviors and commuter statistics, Surat BRTS consistently modifies its routes and schedules to align with demand and enhance service delivery. This adaptive strategy ensures that the system effectively responds to evolving commuter requirements and optimizes operational efficiency.
9. **Phased Expansion Plans:** Surat BRTS is undertaking a gradual expansion strategy to expand its coverage across the city, with special focus on areas with significantly higher ridership. BRT is gradually expanding its service to areas where the demand for this service is high, such as schools, colleges, industrial estates, areas with large businesses and daily workers who travel more on the BRTS route. This approach promotes the sustainable development of smart cities, enabling systems to progressively expand services to meet the needs of a growing urban population.

Currently, a total of four portable type BRTS bus shelters have been announced near Ved Darwaja, Katargam Darwaja, Simada Naka and Sachin Railway Station. Which shows that according to the need Surat Sitilink has adopted a strategy to improve the BRT service.

Suggestions: Along with the benefits from studying the above various strategies, Surat BRTS has faced challenges to enhance urban mobility. If these challenges are effectively overcome, Surat BRTS can still be a success. Some effective suggestions for this are mentioned below.

- (1) Expansion of BRTS corridors to underserved areas.
- (2) Upgrading bus stations with better seating, shelters, and amenities.
- (3) The number of BRTS buses should be increased in schools, colleges, station areas where more passengers can be found so that the problem of overcrowding is eliminated.
- (4) Surat BRTS should further increase the number of electric buses to meet carbon emission targets faster.
- (5) Use AI-enabled systems to prioritize BRTS buses at traffic lights, reducing delays and improving travel times.
- (6) Upgrade stations with shaded seating, clean drinking water, and improved digital signage for real-time updates.
- (7) Run local campaigns, including workshops in schools and textile businesses, to encourage greater use of BRTS as a sustainable commuting option.
- (8) Install digital kiosks and mobile app features for riders to provide instant feedback on service quality.
- (9) Create a dedicated helpline and improve the BRTS Surat Sitilink app to provide real-time support, schedules, and updates to commuters.

Conclusion: Surat BRTS has emerged as a viable solution to various urban mobility issues faced by the rapidly expanding city. The provision of separate lanes, establishment of specialized infrastructure, integration of state-of-the-art technology and connection to various transport options have collectively contributed to significant reduction in traffic, reduction in pollution levels and increased accessibility for a wide range of tourists. This is also confirmed by statistics that the daily ridership of Surat BRTS has increased since its inception. Incorporation of real-time monitoring system, autonomous fare collection, CCTV, electric buses and multi-modal hubs have further improved the experience and operational efficiency. Despite the initial hurdles at the initial stage, the strategies employed by Surat BRTS demonstrate the potential of optimal public transport systems to promote sustainable and effective urban mobility. Due to the importance of strategic planning, stakeholder involvement and responsiveness to local needs, Surat BRTS has proven to be the best solution for advancing sustainable transport.

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A COMPARATIVE ANALYSIS OF SELECTED ARBITRAGE MUTUAL FUND SCHEMES IN INDIA

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Abstract

Mutual funds are schemes that collect money from different investors and invest that money in lumpsum in different shares, bonds, and other types of securities. The profit or loss incurred through these investments is then shared by the investors in proportion of the units purchased. Arbitrage Mutual funds are based on equity, to buy and sell securities in different markets at the same time. In the present Research Paper, an effort is made to compare the performance of 5 Arbitrage mutual fund schemes and to identify risk and returns that will help investors to make decisions. Secondary data is used for the study. Data is collected from amfiindia.com and other authorized websites. The period of study is for 3 years. Statistical tools like Beta, Sharpe Ratio, Jensen's Alpha, Average returns, and Standard Deviation were used for the comparative analysis of arbitrage mutual funds. It is recognized from the study that the majority of Indian Arbitrage Mutual fund Schemes have achieved well by providing good returns to the investors.

Keywords:

Arbitrage Mutual Fund Schemes, Analysis, Sharpe Ratio, Beta, Jensen's Alpha.

INTRODUCTION

Mutual funds are undertakings for collective investment that provide admirable returns on investment. Nowadays, a large number of people are stirring toward mutual fund investment. In India, Mutual funds were instigated in 1963, by the act of Parliament. Mutual funds are schemes that accumulate money from different investors and vest that accumulated money in a diversified portfolio. The portfolio is the integration of various stocks, bonds, money markets, or other securities. The units proportional to the investment are allotted to the investors. Allotted units are calculated based on NAV (Net Asset Value). NAV is the price on which a mutual fund is bought or sold.

The portfolio is supervised by experts called the Fund managers. The main drift of the fund manager is to provide maximum return to investors based on capital employed in the form of capital appreciation or by providing regular income in the form of dividends. The performance of the selected mutual fund is based on the underlying assets. If the net value of the assets increases, the value of the fund also increases and vice-versa.

The Mutual Funds are categorized as Equity funds, Debt Funds, and Hybrid Funds. Arbitrage Funds are based on equity that leverages opportunities in the stock market. The performance of Mutual Funds is measured by the returns they offer.

Arbitrage mutual fund involves the purchase and sale of an asset simultaneously on the same stock exchanges or different stock exchanges. A fund manager purchases Arbitrage funds only when he identifies a certain opportunity to earn profit. The difference between the purchasing price and selling price is minimal hence the fund manager makes several trades so that reasonable profit can be earned. There are large number of arbitrage mutual fund schemes in India that are offering substantial returns on investment.

The oldest Arbitrage mutual in India was UTI Arbitrage Mutual Fund which was launched in year 2006. After this, a large number of Arbitrage funds were launched in India like Edelweiss Arbitrage Fund, DSP Arbitrage Fund, ICICI Pru Equity-Arbitrage Fund, Aditya Birla SL Arbitrage Fund, Bandhan Arbitrage Fund, HSBC Arbitrage Fund, Tata Arbitrage Fund, Union Arbitrage Fund, Mirae Asset Arbitrage Fund, Nippon India Arbitrage Fund etc.

LITERATURE REVIEW

In Indian context, many studies have been conducted on the performance evaluation of Mutual funds by researchers. The maximum studies dealt with the segments like futures, derivatives, ETFs, etc. Arbitrage pricing theory, Institutional investors and the limits of Arbitrage, Funds, factors and diversification in the arbitrage pricing models, an arbitrage pricing approach to evaluating mutual fund performance, and others are often engaging topics in this sphere. Very few studies were conducted on the performance evaluation of the different arbitrage mutual fund schemes.

Vijaya et. al (2020) examine whether the fund manager reckons the Nifty50 Arbitrage Index against their equity and derivative portfolio. The nifty VIX index is examined using statistical methods like R, R^2 , Adjusted R^2 , DF, ANOVA, etc, and concluded

there is a low positive correlation and a manager uses their native methodology for the construction of the fund.

Shanvas & Vineeth (2019) compared the return performance of various arbitrage funds based on lump-sum and SIP and concluded that grouped averages are not outperformed and the difference is very minute except Reliance Arbitrage fund.

Shekhar et. al (2023) analyzed 12 growth-oriented mutual fund performance using risk-adjusted performance measures, like Treynor's ratio, Sharpe index, and Jensen measure. It is concluded that most mutual funds didn't perform well than their benchmark index and strong risk management benefits the investors, fund managers, and fund houses.

Sapar, & Madava(2003) evaluated the performance of the Indian Mutual Fund using different Statistical tools using the monthly NAV from September 1998 to April 2002. Initially, 269 open-ended schemes were considered later then only 58 schemes were used for analysis, and suggested that most mutual funds out of 58 provided excess returns as compared to investor's returns.

Very little attention is drawn toward the evaluation of the performance of Arbitrage Mutual fund schemes. In this research paper, the researcher is trying to bridge gap that dwells and provides a deep understanding of the Arbitrage Mutual Fund Schemes.

RESEARCH GAP

A number of studies have been conducted on the performance of Arbitrage Mutual fund like an Arbitrage Pricing approach, Performance evaluation of mutual funds, hedge funds, Comparative analysis of Debt Equity funds with the benchmark index, Liquidity and Arbitrage in options trading. The Literature review conducted for the present study reveals that there are many more areas relating to the evaluation of the performance of Arbitrage Mutual Funds that can be studied further. Hence, it is decided to research A Comparative Study of Selected Arbitrage Mutual Fund Schemes in India.

NEED OF THE STUDY

An investor who wants to make a profit by taking too much risk from a volatile market can invest in Arbitrage Mutual Fund Schemes. The amount of return is quite low and therefore the investor makes a large number of trades to get good returns. The investor who operates Arbitrage Mutual Fund Schemes are well-experienced and relatively fast traders. The investors are confused about how to trade in the Arbitrage Mutual Fund Schemes and which fund to select from a wide range of Arbitrage Mutual Funds. The

present study will try to compare the different Arbitrage Mutual Fund Schemes and provide some understanding of the trading in Arbitrage Mutual Fund Schemes that can help an investor to efficiently allocate their funds and earn a higher rate of profit.

SCOPE OF THE STUDY

In the present study, an attempt is made by the researcher to compare the performance of 5 different arbitrage Mutual fund schemes that have Nifty50 as the benchmark Index. The motive of the study is to identify the risk and the returns on the selected Arbitrage mutual fund schemes. The study will help the persons associated with the Mutual funds by providing perceptions of the selected schemes. The study will also benefit investors who want consistent returns by investing in Arbitrage Mutual fund schemes.

OBJECTIVES OF THE RESEARCH

- ❖ The primary access of the study is to evaluate the performance of selected Arbitrage Mutual fund schemes in India.
- ❖ To gather information about the performance of the selected Arbitrage Mutual fund schemes in India.
- ❖ To examine the risk and return on investment on these selected Arbitrage Mutual fund schemes.
- ❖ To provide some thoughtful insights to the investors so that they can easily trade in Arbitrage Mutual funds and can easily maximize their returns.

RESEARCH METHODOLOGY

RESEARCH DESIGN:

The present study is Quantitative as it comprises several numerical facts and figures. It employed a Descriptive research design for the conclusion.

TARGET POPULATION:

In India, 45 Mutual fund houses provide more than 2500 mutual fund schemes. From these Schemes, 5 Arbitrage Mutual fund schemes have been selected for the study.

SAMPLING METHOD:

The purposive sample method has been used for the selection of the Arbitrage mutual fund schemes.

SAMPLING SIZE:

By using the Purposive sampling method, 5 Arbitrage mutual fund schemes have been selected for a period of 3 years from the year 2021 to the year 2023.

SOURCES OF DATA:

Secondary data has been used for the study. The data has been collected from the authorized websites of the selected mutual fund houses. Furthermore, it has been acquired from the previously done research work, thesis, and projects on mutual fund schemes. Historical NAVs were used for the study that were collected from the factsheets of selected companies and from websites of the Association of Mutual Funds in India (www.amfiindia.com).

STATISTICAL TOOL:

❖ Standard Deviation

A standard deviation is a numerical value that is expressed in the form of a percentage which shows the possibility of deviation of mutual fund refunds from its mean (average annual returns). It is used to measure the volatility of the mutual fund. A higher standard deviation demonstrates the higher volatility of the fund and a lower standard deviation demonstrates the lower volatility of the fund.

❖ Beta

Beta is used to measure the mutual fund's volatility in comparison to its benchmark index. Usually, Systematic risk associated with mutual funds is calculated by using the beta. It is also known as Beta Co-efficient. The value of the beta of an index is always one. If the beta goes beyond one it shows the higher risk associated with a particular mutual fund and if the beta goes less than one it shows less volatility of the mutual fund.

❖ Sharpe Ratio

William F. Sharpe, an American Economist is the developer of the Sharpe Ratio. It is among the most used metrics method for gauging the attractiveness of mutual funds. It indicates the return delivered by a fund per unit risk taken. Therefore, an investment that shows a lower Sharpe Ratio demonstrates that the fund is not performing well. Similarly, an investment that shows a higher Sharpe Ratio indicates greater returns.

❖ Jensen's Alpha

Jenson Alpha also known as ex-post alpha or Jensen's Performance Index is used for measuring the abnormal return on the mutual funds. It is used to determine whether the fund has performed well or drifted when compared to the benchmark. The positive alpha indicates the outperformance of the fund. In the same manner, the underperformance of the fund is indicated by negative alpha and when the value of Alpha becomes Zero it indicates the Neutral Performance of the mutual fund in Comparison to a benchmark index.

DATA ANALYSIS AND INTERPRETATION

TABLE NO. 1
ARBITRAGE MUTUAL FUNDS
(NAV and Returns for 3 years)

	Name of the Fund	NAV for 2021 (in ₹)	Return for 2021 (in %)	NAV for 2022 (in ₹)	Return for 2022 (in %)	NAV for 2023 (in ₹)	Return for 2023 (in %)
1	Kotak Equity Arbitrage Fund (Direct Plan- Growth)	31.32	6.00%	32.93	6.71%	33.61	8.27%
2	SBI Arbitrage Opportunities Fund (Direct Plan- Growth)	28.25	5.92%	29.67	6.65%	32.06	8.23%
3	HDFC Arbitrage Fund (Direct Plan- Growth)	25.24	5.65%	26.45	6.37%	28.51	8.00%
4	Nippon India Arbitrage Fund (Direct Plan- Growth)	21.44	5.87%	22.35	6.53%	23.93	8.11%
5	UTI Arbitrage Fund (Direct Plan- Growth)	29.45	5.73%	30.80	6.34%	33.23	8.05%

Interpretation: Table [1] shows the Comparison of the NAV (in ₹) and Returns of selected Arbitrage mutual funds for the past 3 years. In the year 2021 NAV for Selected Arbitrage Mutual Fund Schemes (Kotak Equity Arbitrage Fund -Direct Plan-Growth 31.32, SBI Arbitrage Opportunities Fund -Direct Plan-Growth 28.25, HDFC Arbitrage Fund -Direct Plan-Growth 25.24, Nippon India Arbitrage Fund -Direct Plan-Growth 21.44, UTI Arbitrage Fund -Direct Plan-Growth 29.45). In the year 2022 NAV for Selected Arbitrage Mutual Fund Schemes (Kotak Equity Arbitrage Fund -Direct Plan-Growth 32.93, SBI Arbitrage Opportunities Fund -Direct Plan-Growth 29.67, HDFC Arbitrage Fund -Direct Plan-Growth 26.45, Nippon India Arbitrage Fund -Direct Plan-Growth 22.35, UTI Arbitrage Fund -Direct Plan-Growth 30.80). In the year 2023 NAV for Selected Arbitrage Mutual Fund Schemes (Kotak Equity Arbitrage Fund -Direct Plan-Growth 33.61, SBI Arbitrage Opportunities Fund -Direct Plan-Growth 32.06, HDFC Arbitrage Fund -Direct Plan-Growth 28.51, Nippon India Arbitrage Fund -Direct Plan-Growth 23.95, UTI Arbitrage Fund -Direct Plan-Growth 33.23).

In the year 2021 returns of Selected Arbitrage Mutual Fund Schemes (Kotak Equity Arbitrage Fund -Direct Plan-Growth 6.00%, SBI Arbitrage Opportunities Fund -Direct Plan-Growth 5.92%, HDFC Arbitrage Fund -Direct Plan-Growth 5.65%, Nippon India Arbitrage Fund -Direct Plan-Growth 5.87%, UTI Arbitrage Fund -Direct Plan-Growth 5.73%). In the year 2022 returns for Selected Arbitrage Mutual Fund Schemes (Kotak Equity Arbitrage Fund -Direct Plan-Growth 6.71%, SBI Arbitrage Opportunities Fund -Direct Plan-Growth 6.65%, HDFC Arbitrage Fund -Direct Plan-Growth 6.37%, Nippon India Arbitrage Fund -Direct Plan-Growth 6.53%, UTI Arbitrage Fund -Direct Plan-Growth 6.37%). In the year 2023 Returns for Selected Arbitrage Mutual Fund Schemes (Kotak Equity Arbitrage Fund -Direct Plan-Growth 8.27%, SBI Arbitrage Opportunities Fund -Direct Plan-Growth 8.23%, HDFC Arbitrage Fund -Direct Plan-Growth 8.00%, Nippon India Arbitrage Fund -Direct Plan-Growth 8.11%, UTI Arbitrage Fund -Direct Plan-Growth 8.05%).

TABLE NO. 2

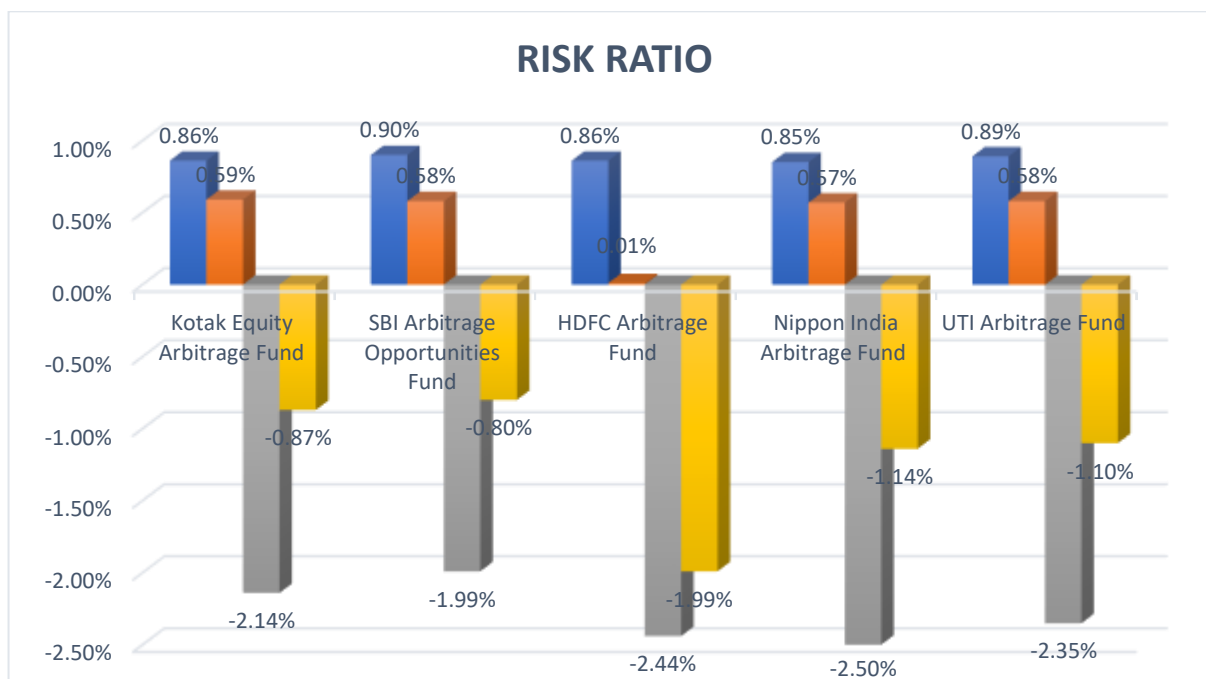
RISK RATIOS

(Ratios calculated for the past 3 years daily.)

	NAME OF THE FUND	STANDARD DEVIATION	BETA	SHARPE RATIO	JENSON'S ALPHA
1.	Kotak Equity Arbitrage Fund (Direct Plan- Growth)	0.86%	0.59%	-2.14%	-0.87%
2.	SBI Arbitrage Opportunities Fund (Direct Plan- Growth)	0.90%	0.58%	-1.99%	-0.80%
3.	HDFC Arbitrage Fund - (Direct Plan- Growth)	0.86%	0.01%	-2.44%	-1.99%
4.	Nippon India Arbitrage Fund (Direct Plan- Growth)	0.85%	0.57%	-2.50%	-1.14%
5.	UTI Arbitrage Fund (Direct Plan- Growth)	0.89%	0.58%	-2.35%	-1.10%

FIGURE NO. 1

RISK RATIOS OF SELECTED ARBITRAGE MUTUAL FUND SCHEMES



Interpretation: Table [2] The Kotak Equity Arbitrage Fund (Direct Plan- Growth) shows Standard Deviation of 0.86% while the beta value is 0.57% which means the fund is high volatile and Sharpe's Ratio is (-2.14%) and Jenson's Alpha is (-0.87%) which indicates that the fund is better risk-adjusted returns to the benchmark indices and it has performed well and provided better returns to the investors.

The SBI Arbitrage Opportunities Fund (Direct Plan- Growth) has Standard Deviation of 0.90% and the Beta value is 0.58% which means the fund has high volatility and Sharpe Ratio of the fund is (-1.99%) Jenson's Alpha of the fund is (-0.80%) which indicates that the fund is better risk-adjusted returns to the benchmark indices and it performed well and provided better returns to the investors.

The HDFC Arbitrage Fund (Direct Plan- Growth) has Standard Deviation of 0.86% and the Beta value of the fund is (-0.01%) which indicates that the fund is low volatile and Sharpe Ratio of the fund is (-2.44%) and Jenson's Alpha of the fund is (-1.99%) which indicates that the fund is poor risk-adjusted returns and it has not performed well.

The Nippon India Arbitrage Fund (Direct Plan- Growth) has Standard Deviation of 0.85% and the Beta Value of the fund is 0.57% which means that the fund is high volatile and Sharpe Ratio of the fund is (-2.50%) and Jenson's Alpha of the fund is (-1.14%) which indicates that the fund is better risk-adjusted returns to the benchmark indices and it has performed well by providing better returns to the investors.

The UTI Arbitrage Fund (Direct Plan- Growth) has Standard Deviation of 0.89% and the Beta value of the fund is 0.58% which means that the fund has high volatility and Sharpe Ratio of the fund is (-2.35%) and Jensen's Alpha of the fund is (-1.10%) which indicates that the fund is better risk-adjusted returns to the benchmark indices and it has performed well by providing better returns to the investors.

CONCLUSION

The analysis of the performance of the selected five Arbitrage mutual fund schemes states that 4 out of 5 funds have performed well and only one fund did not perform well during the time of the study.

Funds have performed well and provided better returns to the investors except HDFC Arbitrage Fund (Direct Plan-Growth). Therefore, it is important for investors not only to consider the NAV and returns of the fund but it is essential to consider the statistical parameters like standard Deviation, Jensen Alpha, Sharpe Ratio, and Beta.

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Performance Analysis through Value Added Statement of Selected Cement Companies of Gujarat Cement Industry

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ABSTRACT

This research paper throw some light on concept of value added and analyse the performance through value added statement of selected cement companies of Gujarat cement industry. The first part describes the introductory part of cement industry. Then the second part describes the value added concept. The research paper is made for a period of the four financial year starting from 2020-21 to 2023-24. For the purpose of calculation of value-added ratios data was taken from the annual reports of both companies from 2020-21 to 2023-24. And this paper is for 2 selected Cement Companies of India which has been selected on the basis of convenient sampling method. For testing of hypothesis researcher has used t test as statistical tool. Important findings of this study are that 2 ratios out of 4 are showing that there is no significance difference in the performance of Ultratech and JK Cement in Net Value Added to Total Value Added Ratio and Government Share to Net Value Added Ratio. And 2 ratios out of 4 are showing that there is significance difference in the performance of Ultratech and JK Cement in Employees benefit to Net Value Added Ratio and Profit after tax to Net Value Added Ratio. It shows that JK Cement allocates a larger proportion of its net value added toward employee benefits and Ultratech's performance in terms of profit efficiency is superior to JK cement.

Keywords:

Cement Industry, Value Added Statement

INTRODUCTION

Cement Industry is one of the largest industries of the world and occupies predominant place as one of the basic industries for development and its employment generation capacity. Cement ranks next to steel in construction material and so is the basis of all modern construction. Cement industry of India is the second largest producer of cement in world. In 2023, the total cement production capacity is about 588 million tonnes. It contributes very high in Indian GDP. Housing is the major sector of cement consumption about 67% of the total consumption. Cement industry is very vast and higher revenue is being paid by this sector to government of Rajasthan.

At present the economy is likely to remain sluggish for cement industry, but with the increase in GDP, cement production and consumption both will rise with a boost. Overall growth of Indian economy affects the housing sector and it directly affects cement consumption rate in India. India is producing 374.55 million tonnes per year and it is expected to grow to 800 million tonnes by financial year 2030. India is very vast, so

the development of cities and rural areas will certainly start from infrastructure and demand of cement will increase also.

KEY DRIVERS OF CEMENT INDUSTRY

Cement industry is driven by many factors or by many sectors such as infrastructure, housing sector, Indian government economy, GDP of India, government rural development programs etc. GDP of India affects housing and infrastructure development of India and these results in changed prices of cement. These changed prices of cement ultimately affect demand and supply of cement and it directly influence cement production of companies. Some key drivers of cement industry are Indian real estate market, Indian infrastructure scenario, Government programs like rural or urban development etc., GDP of India, FDI of India etc.

OUTLOOK FOR THE INDUSTRY

The eastern states of India are likely to be the newer and virgin markets for cement companies and could contribute to their bottom line in future. In the next 10 years, India could become the main exporter of clinker and grey cement to the Middle East, Africa, and other developing nations of the world. Cement plants near the ports, for instance the plants in Gujarat and Visakhapatnam, will have an added advantage for exports and will logistically be well armed to face stiff competition from cement plants in the interior of the country. Due to the increasing demand in various sectors such as housing, commercial construction and industrial construction, cement industry is expected to reach 800 Million Tonnes Per Annum (MTPA) by the year 2030.

LITERATURE REVIEW

- The study made by Dr. Mohana Rao who published a book in “Value Added Reporting - in Theory, Practice and Research”. He has studied concept of value added, value added-computation formula. Value added ratios analysis and value added reporting has been examined in the United States in forms of its relevance to capital market. He studied analysis of value added statement of SAIL (Steel Authority of India Ltd.) part of creation of value added and disposal of value added. He made several suggestions. For the strengthening the financial soundness.
- Pandey (2017) studied VAS's application in Indian manufacturing firms' financial performance analysis. The study found a positive correlation between VAS-based value creation and financial performance, highlighting VAS's importance in capturing intangible assets and intellectual capital, and providing a nuanced understanding of financial performance.
- Kumar and Singh (2018) proposed a framework integrating Value Added Statement (VAS) and financial ratio analysis to evaluate Indian cement companies' financial performance. Analyzing data from 10 companies (2012-2017), they found that VAS and financial ratios collectively provided valuable insights. Companies with higher value-added per employee and better financial ratio performance exhibited superior financial performance. This framework offers a structured approach for stakeholders to make informed decisions.

- Gupta and Sharma (2022) analyzed the financial performance of UltraTech Cement, Ambuja Cements, and ACC Limited using Value Added Statement (VAS) and financial ratios, revealing UltraTech Cement's superior performance.

OBJECTIVES OF RESEARCH PAPER

- To analyze the financial performance of selected cement companies in Gujarat by examining their Value Added Statements over a specified period. Then analyze how value added reporting is better way rather than traditional method of reporting.
- To identify the extent to which these companies create value for stakeholders, including shareholders, employees, and the community.
- To compare the operational efficiency of different cement companies by evaluating their value addition per unit of input.
- To examine the impact of industry-specific factors (e.g., raw material costs, energy prices) on the financial performance.
- To identify the strengths and weaknesses of selected cement companies through VAS analysis.

CONCEPT OF VALUE ADDED

The value added concept is a very familiar in economics. It is used to measure Gross National Product. There are number of approaches to compute the gross national product, and value added approach is one of them.

Value added is defined by CIMA, "Sales value less the cost of purchased materials and services. This represents the worth of an alteration in form, location or availability of a product or service"

Thus, VA is the excess of sales revenue plus income from other sources over the cost of bought in goods and services purchased from outsiders. VA is the wealth that a firm creates by its own efforts. The value added performance of a company is a good measure of the overall productivity of the firm and it is out of the total amount of the value added that the firm rewarded all interested parties including shareholders, staff, inland revenue and others. VA is a measure of wealth created by a firm wages, salaries, bonus etc. form a significant part of value added.

Gross Value Added (GVA):

GVA is arrived at by deducting from sales revenue the cost of all materials and services which were brought in from outside suppliers.

Net Value Added (NVA):

Net value added can be defined as gross value added less depreciation.

Value Added Statement (VAS):

Value Added Statement reveals the value added by an enterprise which it has been able to generate and its distribution among those contributing to its generation are known as stakeholders. Value Added Statement is voluntary corporate supplementary statement, which provides the information in such a manner as would easily be understood by a layman.

Significance of Value Added

- Value Added Analysis assesses a company's financial health, profitability, and revenue growth, providing insights into its financial strengths and weaknesses.
- Investors use Value Added Analysis to evaluate a company's potential for growth, profitability, and returns on investment, guiding informed investment decisions.
- Value Added Analysis shows how companies create value for stakeholders, including shareholders, employees, customers, and the broader community

RESEARCH METHODOLOGY

Period of Study:

The present study is made for a period of the four financial year starting from 2020-21 to 2023-24.

Universe of the Study:

The universe of the study consists of all the cement companies working in India.

SAMPLE AND SAMPLING:

Present paper is for 2 selected Cement Companies of India which has been selected on the basis of convenient sampling

Method. Indian Cement Industry Sample Companies are as follows:

Sr. No.	Company Name
1	Ultratech Cement Ltd
2	JK Cement Ltd

Data Collection and Analysis:

For the purpose of Performance Analysis Through Value Added Statement of Selected Cement Companies of Gujarat Cement Industry, the secondary data have been used. Secondary data have taken from published annual reports of selected companies Ultratech Cement Ltd. And JK Cement Ltd. and other information related to companies has taken from official websites and net sources.

HYPOTHESES FOR THE STUDY

1. H_0 = There is no significance difference in the performance of Ultratech and JK Cement in Net Value Added to Total Value Added Ratio. ($\mu_1 = \mu_2$)
 H_1 = There is significance difference in the performance of Ultratech and JK Cement in Net Value Added to Total Value Added Ratio. ($\mu_1 \neq \mu_2$)
2. H_0 = There is no significance difference in the performance of Ultratech and JK Cement in Employees benefit to Net Value Added Ratio. ($\mu_1 = \mu_2$)
 H_1 = There is significance difference in the performance of Ultratech and JK Cement in Employees benefit to Net Value Added Ratio. ($\mu_1 \neq \mu_2$)
3. H_0 = There is no significance difference in the performance of Ultratech and JK Cement in Government Share to Net Value Added Ratio. ($\mu_1 = \mu_2$)
 H_1 = There is significance difference in the performance of Ultratech and JK Shree and JK i Cement in Government Share to Net Value Added Ratio. ($\mu_1 \neq \mu_2$)

4. H_0 = There is no significance difference in the performance of Ultratech and JK Cement in Profit after tax to Net Value Added Ratio. ($\mu_1 = \mu_2$)
 H_1 = There is significance difference in the performance of Ultratech and JK Cement in Profit after tax to Net Value Added Ratio. ($\mu_1 \neq \mu_2$)

Tools and Techniques for Hypotheses Testing:

For testing of hypothesis researcher has used accounting tools like, Ratio analysis as well as statistical tools like, t-test, mean, variance.

LIMITATIONS OF THE STUDY

- This research work is a micro nature research based in the samples selected two corporate units.
- This study is based on secondary data derived from published annual reports of the selected units. The reliability and finding are contingent. Upon the data published in annual report.
- This research work is based on the 4 years financial performance of the sample selected corporate units from 2020-21 to 2023-24.

VALUE ADDED STATEMENTS OF ULTRATECH CEMENT LTD FOR 4 YEARS

Generation of value	2020-21	2021-22	2022-23	2023-24
Revenue from Operations	43,188.34	50,663.49	61,237.28	68,640.63
Less: Cost of bought - in goods and services				
Cost of Materials Consumed	5,174.94	6,459.77	8,493.25	9,543.46
Purchases of Stock-in-Trade	1,936.70	2,458.19	1,261.74	1,700.89
Power and Fuel Expense	7,552.02	10,951.95	17,725.57	17,602.38
Freight and Forwarding Expense	9,939.56	11,567.64	13,884.36	15,715.31
Other Expenses	5,011.87	6,288.81	7,457.48	8,604.92
TVA	13573.25	12937.13	12414.88	15473.67
Less: Depreciation	2,434.35	2,456.76	2,772.66	3,027.43
NVA	11138.90	10480.37	9642.22	12446.24

(Source: Annual Reports of Ultratech cement company)

VALUE ADDED STATEMENTS OF JK CEMENT LTD FOR 4 YEARS

Generation of value	2020-21	2021-22	2022-23	2023-24
Revenue from Operations	6328.28	7678.58	9,310.25	10,918.05
Less: Cost of bought - in goods and services				
Cost of Materials Consumed	967.58	1155.39	1,418.55	1,618.94
Purchases of Stock-in-Trade	66.40	134.63	150.19	307.62
Power and Fuel Expense	1106.20	1571.87	2,449.13	2,459.72
Freight and Forwarding Expense	1239.83	1562.04	1,932.81	2,301.62
Other Expenses	1002.76	1287.45	1,488.19	1,723.49

TVA	1945.50	1967.21	1871.38	2506.66
Less: Depreciation	244.68	282.02	392.24	485.90
NVA	1700.83	1685.19	1479.14	2020.76

(Source: Annual Reports of JK cement company)

DATA ANALYSIS AND INTERPRETATION

Net Value Added To Total Value Added Ratio:

This ratio shows the relationship between net Value Added and Total Revenue. It may be said that a higher proportion of Net Value Added in Total Revenue will be considered good and will show better social performance.

$$\text{Net Value Added to Total Value Added Ratio} = \frac{\text{Net Value Added}}{\text{Total Value Added}} * 100$$

Net Value Added to Total Value Added Ratio (Rs in Crores)

year	Ultratech Cement ltd.			JK Cement ltd.		
	N.V.A.	T.V.A.	Ratio	N.V.A.	T.V.A.	Ratio
2020-21	11138.90	13573.25	82.07	1700.83	1945.50	87.42
2021-22	10480.37	12937.13	81.01	1685.19	1967.21	85.66
2022-23	9642.22	12414.88	77.67	1479.14	1871.38	79.04
2023-24	12446.24	15473.67	80.43	2020.76	2506.66	80.62
Min.			77.67			79.04
Max.			82.07			87.42
Avg.			80.30			83.19

(Source: Annual Reports of Ultratech and JK cement companies)

T- Test Net Value Added to Total value added Ratio Two-Sample Assuming Equal Variances

Particulars	Ultratech	JK
Mean	80.30	83.19
Variance	3.52	15.94
Observations	4	4
Hypothesized Mean Difference	0	
Df	6	
Calculated t - value two-tail	-0.94	
T Critical two-tail	2.447	

(At 0.05% level of Significance)

Since the calculated t-value (-0.94) is less than the critical t-value (± 2.447), **we fail to reject the null hypothesis**, meaning there's no significant difference in the NVA to TVA ratios between UltraTech Cement and JK Cement.

EMPLOYEES BENEFIT TO NETVALUEADDED RATIO

This ratio indicates how much percentage of net value added remained for employees after paying value for other group of society. It uses full measuring efficiency and utility of labour power of an enterprise. This ratio calculated as follows:

$$\text{Employees Benefit to Net Value Added Ratio} = \frac{\text{Employees Benefit}}{\text{Net Value Added}} * 100$$

Here, Employees Benefit = Wages and salary + MD's remuneration + Director Fees + contribution to PF and ESI + Staff Welfare

Employees Benefit to Net Value Added Ratio (Rs in Crores)

year	Ultratech Cement Ltd.			JK Cement Ltd.		
	E.B.	N.V.A.	Ratio	E.B.	N.V.A.	Ratio
2020-21	2181.99	11138.90	19.59	412.14	1700.83	24.23
2021-22	2359.08	10480.37	22.51	504.17	1685.19	29.92
2022-23	2620.83	9642.22	27.18	575.32	1479.14	38.90
2023-24	2910.46	12446.24	23.38	709.80	2020.76	35.13
Min.			19.59			24.23
Max.			27.18			38.90
Avg.			23.17			32.05

(Source: Annual Reports of Ultratech and JK cement companies)

T- Test Employees benefit to Net Value Added Ratio Two-Sample Assuming Equal Variances

Particulars	Ultratech	JK
Mean	23.17	32.05
Variance	9.79	40.70
Observations	4	4
Hypothesized Mean Difference	0	
Df	6	
Calculated t - value two-tail	-2.50	
T Critical two-tail	2.447	

(At 0.05% level of Significance)

Since the calculated t-value (-2.50) is greater than the critical t-value (± 2.447), we **reject the null hypothesis**. This suggests a statistically significant difference in the Employees Benefit to Net Value Added ratios between UltraTech Cement and JK Cement. Specifically, JK Cement demonstrates a consistently higher ratio compared to UltraTech Cement, suggesting that JK Cement allocates a larger proportion of its net value added toward employee benefits.

GOVERNMENT SHARE TO NET VALUE ADDED RATIO

Every corporate unit pays some value to government in form of taxes. This ratio share how much percentage of government share to net value added. This ratio calculated as follow:

$$\text{Government Share to Net Value Added Ratio} = \frac{\text{Taxes Paid to Govt.}}{\text{Net Value Added}} * 100$$

Government Share to Net Value Added Ratio (Rs in Crores)

year	Ultratech Cement Ltd.			JK Cement Ltd.		
	T.P.T.G.	N.V.A.	Ratio	T.P.T.G.	N.V.A.	Ratio
2020-21	2554	11138.90	22.93	389.72	1700.83	22.91
2021-22	1226.55	10480.37	11.70	332.86	1685.19	19.75
2022-23	2310.46	9642.22	23.96	215.05	1479.14	14.54

2023-24	2411.11	12446.24	19.37	381.74	2020.76	18.89
Min.			11.70			14.54
Max.			23.96			22.91
Avg.			19.49			19.02

(Source: Annual Reports of Ultratech and JK cement companies)

T- Test Government Share to Net Value Added Ratio Two- Sample Assuming Equal Variances

Particulars	Ultratech	JK
Mean	19.49	19.02
Variance	30.84	11.92
Observations	4	4
Hypothesized Mean Difference	0	
Df	6	
Calculated t - value two-tail	0.14	
T Critical two-tail	2.447	

(At 0.05% level of Significance)

Since the calculated t-value (0.14) is less than the critical t-value (± 2.447), we **fail to reject the null hypothesis**. This result suggests that there is no statistically significant difference in the TPTG to NVA ratios between UltraTech Cement and JK Cement.

PROFIT AFTER TAX TO NET VALUE ADDED RATIO

This ratio shows the relationship between Profit after tax and Net Value Added. It is calculated as follows formula:

$$\text{Profit after tax to Net Value Added Ratio} = \frac{\text{Profit after tax}}{\text{Net Value Added}} * 100$$

Profit after tax to Net Value Added Ratio (Rs in Crores)

year	Ultratech Cement ltd.			JK Cement ltd.		
	P.A.T	N.V.A.	Ratio	P.A.T	N.V.A.	Ratio
2020-21	5342	11138.90	47.96	603	1700.83	35.45
2021-22	7067	10480.37	67.43	631	1685.19	37.44
2022-23	4951	9642.22	51.35	503	1479.14	34.01
2023-24	6905	12446.24	55.48	831	2020.76	41.12
Min.			51.35			34.01
Max.			67.43			41.12
Avg.			55.56			37.01

(Source: Annual Reports of Ultratech and JK cement companies)

T- Test Profit after tax to Net Value Added Ratio Two-Sample Assuming Equal Variances

Particulars	Ultratech	JK
Mean	55.56	37.01
Variance	72.13	9.50

Observations	4	4
Hypothesized Mean Difference	0	
Df	6	
Calculated t - value two-tail	4.11	
T Critical two-tail	2.447	

(At 0.05% level of Significance)

Since the calculated t-value (4.11) is greater than the critical t-value (± 2.447), we **reject the null hypothesis**. This suggests a statistically significant difference in the Profit after tax to Net Value Added ratios between UltraTech Cement and JK Cement. Ultratech Cement Ltd. has the higher average ratio (55.56% compared to JK Cement Ltd.'s 37.01%) and the significant difference verified by the t-test means Ultratech's performance in terms of profit efficiency is superior.

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“Perspicacious Purchase: A Study on Changing Perception of Online Buyers towards Online Shopping with the use of AI.”

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Abstract:

Generally, AI (Artificial Intelligence) work as ‘jin’ for online platform’s customers. It takes revolutionary change in behavior of online buyers. AI helps to each and every customers from the beginning like searching for product in easy way through voice and visual search. It stored & analyzed past data or historical search and forecasting it and gives trendy – suitable product with pricing management. It makes shopping interesting through visual searching. Protects the customers with the help of fraud detection modular and fake review detection. It is also helpful for after sales services in the way of prompt question-answer directly with customers through chat bots and other automated customer service tools. In short, AI built trust in the mind of customers and make online shopping more easily, efficient, enjoyable and customized. In this paper data collected through survey with the help of structured questionnaire (which are primary) and some other information related to this paper from reliable-valid sites, journals and articles (which are secondary). Data collection method is simple random sampling. Interpretation of data given in percentage form and conclude it in easy form. After the analysis of collected data and available resources the outcomes conclude that AI makes significant change in perception of online buyers. AI transform the online shopping into intelligent and insightful shopping.

Key words:

Online Shopping, Online Buyers, AI Artificial Intelligence, Perspicacious Purchase.

Introduction:

Now a days, AI plays major role in each and every aspect of life. Specially, it makes online shopping more and more insight full day by day. AI changed the mindset of stereotype people. AI covered the loop wholes or limitation of online shopping into great opportunity through its different tools. Generally, online platform buyers have

faced some problems like lack of trust, fraud, limited option for particular product, problems regarding payment, after sales queries, etc. but artificial intelligence change the mindset of buyers through various tools and techniques.

About AI (Artificial Intelligence):

John McCarthy is father of AI. He was an American computer scientist. AI is set of technologies that enable computer to perform variety of advanced functions, including the ability to see, understanding and translate spoken and written language, analyze data, make recommendations and more.

Types of AI:

(1) Narrow AI:

ANI (Artificial Narrow Intelligence) is designed to perform task like face recognition. Many fashion accessories sites use this type of techniques. i.e. NYKA, Lens kart.

(2) Reactive AI:

It has no any kind of task performing and memory based work. It is respond quickly based on commands and human recommendations. i.e. AI shopping assistance.

(3) Limited memory AI:

This type of AI used past searched and stored data for predictions. It is core type of AI technology. i.e. chat bots.

(4) Self-aware AI:

This type of AI is still in theoretical form. It have an ability to understand the human emotions, thought and feelings. It also have own emotions, needs and belief. It works like what comes to mind, it gives result.

Literature review:

(1) Pillai, R; Sivanthanu, B; Dwivedi, Y (2020): in this article researcher was emphasize on (AIPARS) AI-Powered Automated Retail Stores. This study focused on how artificial intelligence based automated technologies changed the scenario of retail stores and how consumer's intention change for shopping. It conclude that AIPARS make shopping insight full and implication of AI in retail stores impact significantly.

(2) Aggarwal, D; Sharma, D; Saxena, A (2024): this study mainly focused on enhancing experience of consumer of online shopping through AI. AI has

revolutionized the online shopping experience. It also helps to business through inventory management and supply chain processes. In short, it has significant impact on consumer of online shopping through providing advanced technologies and tools.

(3) Maharjan, S (2024): this paper analyzed the impact of AI on consumer's trust and confidence, and what kind of factors affected to online buyers time to time. Here researcher adopted inductive approach and primary & secondary data collection.

(4) Mehna, S (2023): this paper analyzed the data of consumer of Amazon for progress in e-commerce with AI. Implementation of AI has clearly made impact on drastic progress of e-commerce industry. It is major factor in success of Amazon.

Methodology:

Method of data collection:

Researcher were collected the primary data through structured questionnaire. Other (secondary data) were collected from reliable sites, journals and articles of experts.

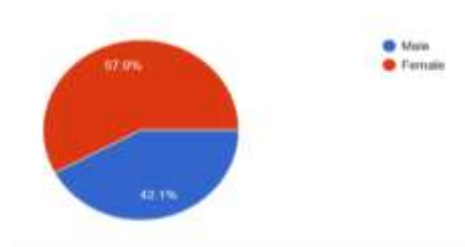
Method of sampling:

The sample of study were collected through "Simple Random Sampling" method.

Data Interpretation:

Researcher follow the Descriptive research for this study. So, the data describe as it as. The responses of responders describe in graph and in percentage form. The interpretation of data are as follows:

1) Gender:



Graph no: 1

Here no any kind of discrepancy for gender specific. So, the data were collected from both gender. Graph no. 1 describe that 42% respondents belong to male category and 58% respondents belongs to female category.

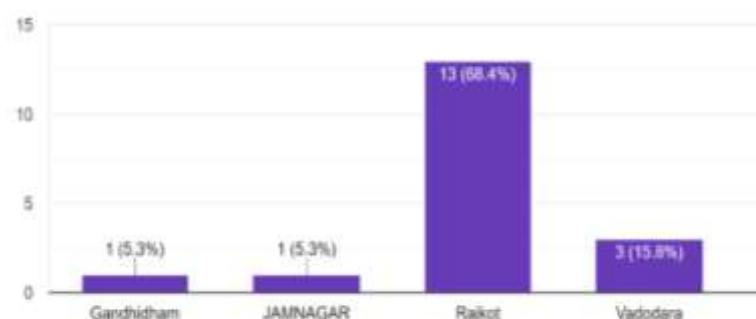
2) Age:



Graph no: 2

Here graph no 2 is depict the particular age of respondents from that who are belonging to. The above graph explained that age group of respondents started from age 21 to more than 60. More responses from the age group of modern youth (25 years) is 36%.

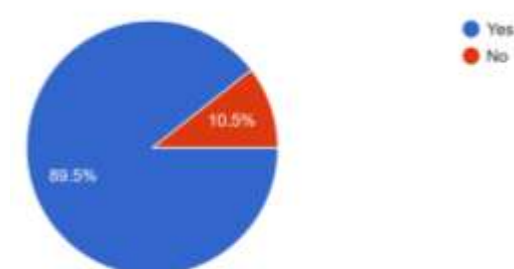
3) City:



Graph no: 3

This study is covers the responses from the people of Gujarat. More than 68% respondents from Rajkot city, 16% from Vadodara city, 6-6% from Jamnagar and Gandhidham city respectively.

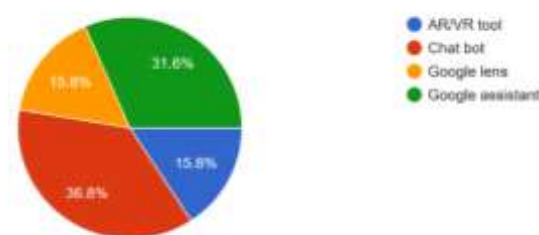
4) Do you know about AI tool & technology (chat bots, AR/VR tools)?



Graph no: 4

Above graph depict that 90% of respondents of Gujarat having information about basics of AI tool & technology like (chat bots, AR/VR tools).

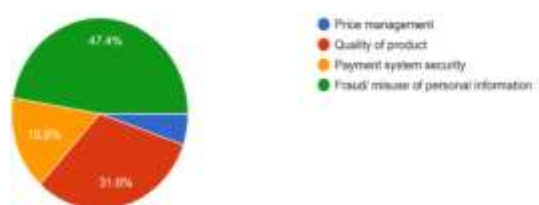
5) Which one of the AI tools are make change in perception of online buyers?



Graph no: 5

The above graph describe that more than 36% respondent belief that chat bots change their perception regarding the online shopping. While 32% belief that from Google assistant, 16%-16% through AR/VR and Google lens change their perception for online shopping.

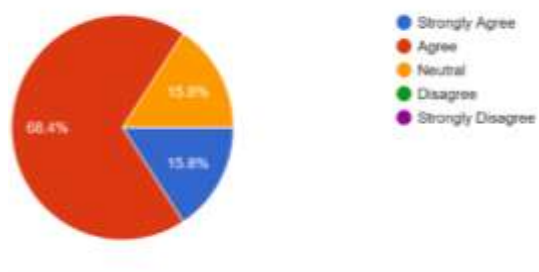
6) Which kind of problems were faced by you before using AI tools?



Graph no: 6

47.4% belief that fraud and misuse of personal information they were faced, 32% belief that they were got lower quality of product before using AI and others were faced problems like payment system security was quit not good and price management did not suggested before using AI for online shopping.

7) Do you agree that after using AI tools, online shopping become easier, enjoyable and efficient?



Graph no: 7

70% of people of Gujarat are agree that AI tools makes online shopping much easier, enjoyable, efficient and perspicacious.

Conclusion:

Artificial intelligence is plays crucial role for online shopping platforms. It keep track of the demand and trends of consumers. It gives chance to the consumers and sellers to make shopping more personalized, customized, price evaluated and with good quality. From the above study it conclude that AI change the perceptions, opinions, belief and make online shopping more insight full & perspicacious. Many problems were faced by consumers during online shopping like low quality product, less price management, some products can't buy without touch and feel it, fraud during online payment, product replacement policy, etc. but it is solved by AI tools and technology.

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A STUDY ON SURAT CITIZENS' PERCEPTION TOWARDS ELECTRONIC PAYMENT OF PROPERTY TAX AS PART OF SERVICES OF SURAT MUNICIPAL CORPORATION

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Abstract

This study explores the perception of Surat citizens towards the electronic payment system for property tax provided by Surat Municipal Corporation (SMC). As the use of digital payment methods continues to rise, it is essential to understand the factors influencing their adoption, as well as the challenges faced by citizens. The study adopted a descriptive research design, with primary data collected through a structured questionnaire from 200 respondents across all nine administrative zones of Surat. The findings reveal that while a significant majority of respondents find electronic payment convenient (91%) and cost-effective (92%), a notable portion still prefers traditional payment methods. Factors such as lack of technical know-how, security concerns, and limited awareness are identified as key barriers to adopting electronic payments. The study also highlights that younger, more educated, and employed individuals are more likely to embrace e-payment services. Based on the findings, it is recommended that SMC should address these barriers through awareness campaigns, enhanced customer support, and improved security measures to increase adoption.

Keywords: Electronic Payment, Property Tax, Surat Municipal Corporation, Citizens' Perception, and E-payment Adoption

Introduction:

An Electronic Payment System

An electronic payment system enables transactions or payments for goods and services through digital means, eliminating the need for cash or checks. Popular methods include credit cards, debit cards, virtual cards, and net banking. The rise of internet banking and e-commerce has significantly boosted the use of electronic payments, offering unmatched convenience and security. Over the years, advancements in technology have made digital payments faster, safer, and more accessible, especially during the COVID-

19 pandemic. Organizations benefit from electronic payments by reducing risks, increasing control, and improving efficiency. Local bodies in India, categorized into rural and urban entities, play a crucial role in governance and infrastructure development. Urban local bodies like municipalities often require citizen data for services such as birth, death, or ration card applications. Processing these services manually can be time-consuming, but web-based systems have streamlined the process. With electronic payment systems, citizens can now conveniently pay taxes and access municipal services online, enhancing efficiency and transparency.

Electronic payment of property tax is a convenient service provided by Surat Municipal Corporation (SMC) to its citizens. This system allows taxpayers to pay their property taxes online without visiting municipal offices. It eliminates the need for cash or checks and reduces the time required for manual processing. The digital platform ensures secure and hassle-free transactions, improving transparency in the tax collection process. Citizens can access their property details and pay taxes from the comfort of their homes using credit cards, debit cards, or net banking. This initiative aligns with SMC's efforts to modernize and digitize public services. The web-based system also helps the corporation maintain accurate records of taxpayers and properties. By adopting electronic payments, SMC enhances efficiency and reduces administrative burdens. It supports better governance and reflects the city's commitment to technological advancements. This service is part of the broader goal to improve citizen experience and promote a digital-first approach.

The Surat Municipal Corporation (SMC)

The Surat Municipal Corporation (SMC) is divided into nine administrative zones: Central, North, East, South, West, South-East, South-West, North-East, and North-West. These zones ensure efficient delivery of services to all citizens of Surat. SMC provides various essential services, including property tax collection, water supply, sewage management, and garbage disposal. It operates public health centers, municipal schools, and recreational facilities such as parks and gardens. Citizens can access services like birth and death registration, building plan approvals, and trade licenses. SMC also focuses on urban planning, road maintenance, and public transport management. Fire and emergency services are stationed across all zones for quick responses. Digital platforms are used for e-governance to make services more accessible. Environmental conservation and affordable housing projects are also

priorities. The division into zones helps SMC maintain a high standard of governance and public service delivery.

Services offered by The Surat Municipal Corporation (SMC)

The Surat Municipal Corporation (SMC) is divided into nine administrative zones to efficiently manage the city's services and provide better governance. These zones are Central, North, East, South, West, South-East, South-West, North-East, and North-West. Each zone caters to the specific needs of the residents within its jurisdiction, ensuring proper delivery of services and infrastructure management.

1. **Property Tax Collection:** Citizens can pay property taxes online or at designated centers within their zone.
2. **Water Supply Management:** SMC ensures regular and safe water supply, with grievance redressal systems for any issues.
3. **Sewage and Drainage Services:** Maintenance and development of the sewage and drainage systems to prevent waterlogging.
4. **Solid Waste Management:** Efficient garbage collection and waste disposal are managed in all zones to maintain cleanliness.
5. **Health Services:** SMC runs public health centers, maternity homes, and organizes health camps in various zones.
6. **Birth and Death Registration:** Easy registration and issuance of birth and death certificates are provided.
7. **Building Plan Approvals:** Citizens can apply for building plan approvals or modifications within their respective zones.
8. **Streetlight Maintenance:** Repair and installation of streetlights to ensure well-lit and safer public spaces.
9. **Education Services:** Management of municipal schools and distribution of resources for better learning outcomes.
10. **Parks and Recreation:** Maintenance of public parks, gardens, and recreational facilities for residents.
11. **Market Management:** Regulation and upkeep of public markets for smooth functioning and hygiene.
12. **Road Maintenance:** Development and repair of roads to facilitate better transportation.

13. **Urban Planning:** Planning and implementing infrastructure projects for sustainable urban growth.
14. **Public Transport:** Management and expansion of the city's bus network to ensure efficient transport services.
15. **Fire and Emergency Services:** Quick response teams for fire safety and other emergencies are stationed across zones.
16. **Environmental Conservation:** Initiatives to improve green cover and address pollution concerns in the city.
17. **Housing Projects:** Affordable housing schemes and slum rehabilitation projects are managed by SMC.
18. **License Issuance:** Issuance of various trade licenses and renewals for businesses.
19. **E-Governance Services:** Digital platforms to access and apply for municipal services conveniently.
20. **Citizen Grievance Redressal:** A robust system for addressing and resolving citizen complaints efficiently.

The division into nine zones ensures that SMC provides accessible, efficient, and quality services to all citizens of Surat.

Literature Review:

Sharma & Gupta (2020) This study explores the implementation and adoption of electronic payment systems in Indian municipalities, with a focus on urban governance improvements. It emphasizes the role of technology in enhancing efficiency and transparency in municipal services. The authors conducted case studies across Indian cities, collecting data from municipal records and conducting interviews with officials. The study found that e-payment systems reduced corruption, streamlined tax collection, and improved citizen satisfaction. However, challenges included low digital literacy and infrastructure gaps. The use of mobile apps and online portals was particularly effective in metropolitan areas. Rural-urban differences in adoption rates were significant. Additionally, training programs for municipal staff positively impacted the success of these systems. E-payment systems offer significant benefits for municipal governance, but strategic planning is required to overcome infrastructural and literacy barriers.

Patel & Mehta (2019) This research examines how e-governance initiatives have enhanced urban tax compliance in Gujarat, focusing on the introduction of electronic

payment systems for municipal taxes. A mixed-methods approach was employed, using surveys from 500 taxpayers and interviews with urban governance officials. The study revealed that tax compliance improved by 40% after the introduction of e-payment platforms. Transparency and ease of access were key drivers of adoption. Challenges included resistance from older taxpayers and technical issues in initial implementation. Collaboration between municipal corporations and technology providers was essential for addressing these challenges and ensuring smoother adoption. E-governance initiatives have the potential to transform tax compliance if tailored to user needs and supported by robust infrastructure.

Bansal & Sinha (2021) The authors investigated factors influencing digital payment adoption for municipal services in Tier-2 Indian cities, emphasizing user awareness and accessibility. The study analyzed municipal service records and conducted focus group discussions with residents in five Tier-2 cities. Awareness campaigns significantly boosted adoption rates, with a 60% increase in digital payments in surveyed cities. Limited internet connectivity and insufficient promotion of digital tools were major barriers. The integration of regional languages in digital payment interfaces led to higher acceptance, especially among older users. Government incentives for early adopters were highly effective. Customizing digital payment systems to local needs and increasing awareness can drive wider adoption in smaller cities.

Kumar (2022) Kumar's study explores challenges in implementing e-payment systems in Indian municipalities, focusing on policy and operational bottlenecks. The study used secondary data from municipal e-governance reports and surveys of municipal staff. Key challenges included outdated IT infrastructure, limited digital literacy, and resistance from employees accustomed to traditional systems. The lack of cybersecurity measures further deterred adoption. Solutions like staff training and partnerships with private technology providers were proposed. Overcoming infrastructural and operational challenges is crucial for the successful implementation of e-payment systems in Indian municipalities.

Desai (2020) This study assesses citizen perceptions of e-tax payment systems in Surat Municipal Corporation, focusing on ease of use and service satisfaction. Data was collected through structured questionnaires distributed to 600 residents of Surat. Most respondents appreciated the time efficiency and transparency of e-tax payment systems. However, lack of digital access among low-income groups and limited support for non-

English languages were noted as major drawbacks. Suggestions included providing multilingual support and improving digital literacy programs. Enhanced accessibility and user-centric features can make e-tax payment systems more inclusive and effective.

Smith & Brown (2018) The study analyzes global trends and challenges in implementing digital tax systems within the framework of e-governance. It highlights the potential for such systems to improve tax compliance and reduce administrative costs. The authors conducted a comparative analysis of digital tax initiatives across multiple countries using secondary data sources. The research identified key benefits, including enhanced transparency, improved efficiency, and increased taxpayer compliance. However, challenges such as data security concerns, resistance to change among stakeholders, and varying levels of digital literacy were prominent. Successful implementation relied on robust infrastructure and stakeholder collaboration. Emerging economies faced unique barriers due to resource constraints. Digital tax systems are transformative for governance but require tailored strategies to address technological and societal barriers.

Johnson, P. (2020) Johnson examines factors influencing user acceptance of digital tax platforms in urban governance, focusing on usability and trust. The study underscores the importance of user-centric design in e-governance systems. Surveys were conducted with 800 urban taxpayers, and data was analyzed using structural equation modeling. The research showed that perceived ease of use and trust significantly influenced platform acceptance. Transparent processes and reliable customer support enhanced user confidence. Issues such as data breaches and system downtimes were deterrents. Public awareness campaigns improved adoption rates. Additionally, trust in government institutions played a crucial role in platform acceptance. Building user trust and ensuring system reliability are vital for successful adoption of digital tax platforms.

Nguyen, L. (2019) This study focuses on the adoption of e-payment systems in municipal governance in Vietnam, emphasizing their role in improving efficiency and citizen satisfaction. A case study approach was used, analyzing municipal records and conducting interviews with local government officials and citizens. The findings revealed that e-payment systems improved tax collection rates by 30%. Citizens valued the convenience and time savings offered by digital platforms. Barriers included lack of digital access in rural areas and limited technical expertise among municipal staff. Effective training programs and partnerships with private tech firms were highlighted as

enablers of success. Tailored strategies that address regional disparities are crucial for the widespread adoption of e-payment systems in Vietnam.

Hernandez & Lopez (2021) This research explores digital transformation in local governance, focusing on municipal services in Latin America. It emphasizes the role of technology in improving citizen engagement. The authors used a combination of surveys and interviews with municipal officials in five Latin American countries. The study highlighted that digital payment systems enhanced transparency and reduced corruption. However, infrastructural deficiencies and low digital literacy were significant hurdles. Public-private partnerships played a critical role in addressing these challenges. Effective marketing campaigns and training programs for government employees were also instrumental in driving adoption. Digital transformation in local governance is achievable with collaborative efforts and targeted interventions.

Research Methodology

Research Problem Statement : The study seeks to examine the perception of Surat citizens towards electronic payment systems for property tax as part of the services provided by Surat Municipal Corporation (SMC). Despite the increasing adoption of digital payments, there is a need to understand the factors influencing its usage and the challenges faced by citizens in availing of these services.

Research Objectives

1. To study the perception of Surat citizens towards the E-payment of property tax to Surat Municipal Corporation.
2. To identify the factors influencing Surat citizens to adopt E-payment for property tax with SMC.
3. To study the factors affecting the decision of Surat citizens to avail of E-payment services for property tax provided by SMC.

Research Design: The study employs a descriptive research design to systematically analyze and describe citizens' perceptions and factors influencing their use of the E-payment system for property tax payments.

Data Collection Method

1. **Primary Data:** Collected through a survey method using a structured questionnaire designed to capture relevant responses from participants.
2. **Secondary Data:** Gathered from articles, research papers, reports, websites, and other credible sources to support and validate the study findings.

Sampling Plan

- **Sampling Method:** Non-probabilistic convenience sampling method was adopted, allowing easy access to respondents from various SMC zones.
- **Sample Size:** The study includes responses from 200 participants.
- **Sampling Area:** Surat City, covering all nine administrative zones of Surat Municipal Corporation.

Statistical Tools

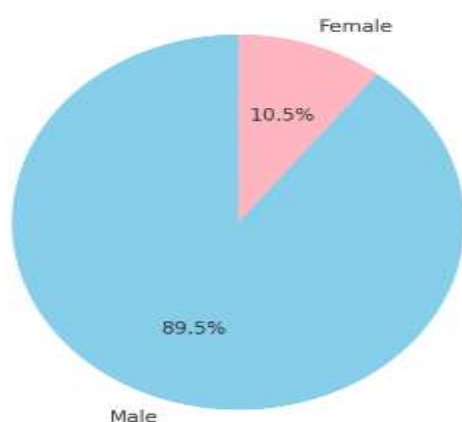
1. **Frequency Analysis:** To analyze the frequency distribution of various factors influencing citizens' perceptions and usage.
2. **Descriptive Statistics:** To summarize and describe the collected data effectively.

Hypotheses

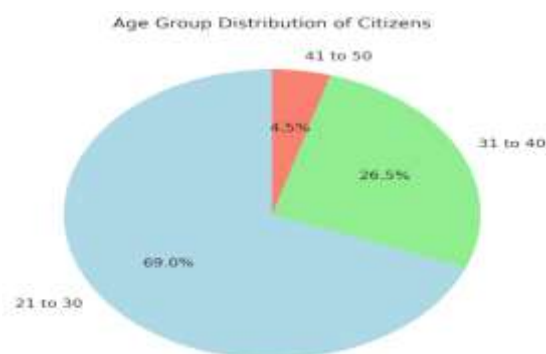
1. H_0 : There is no significant relationship between citizen demographics and their perception of E-payment of property tax to SMC.
 H_1 : There is a significant relationship between citizen demographics and their perception of E-payment of property tax to SMC.
2. H_0 : There is no significant difference in factors influencing E-payment adoption across SMC zones.
 H_1 : There is a significant difference in factors influencing E-payment adoption across SMC zones.

Data Analysis and Interpretation:

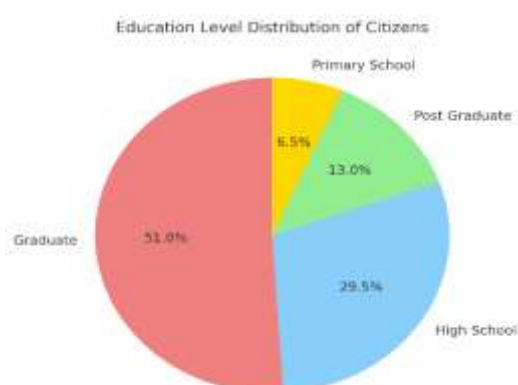
Gender Distribution of Respondents



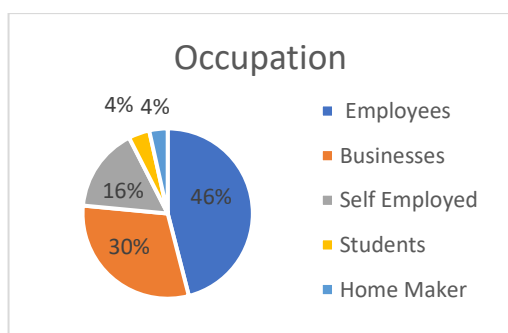
The pie chart representing the gender distribution of respondents. It shows that 89.5% of the respondents are male, while 10.5% are female.



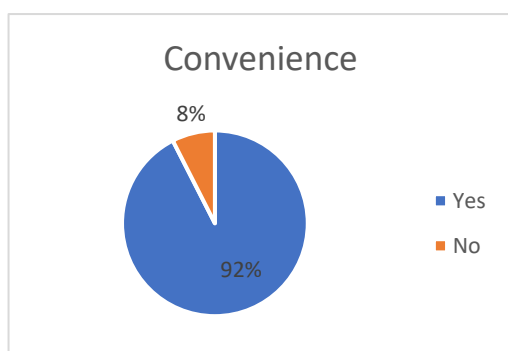
The pie chart illustrating the age group distribution of citizens. It shows that 69% of citizens fall into the '21 to 30' age group, 26.5% are in the '31 to 40' age group, and 4.5% are in the '41 to 50' age group.



The pie chart showing the education level distribution of citizens. It highlights that 51% are graduates, 29.5% have completed high school, 13% are postgraduates, and 6.5% have primary school education.

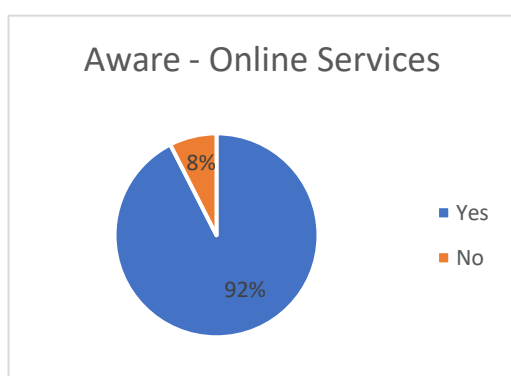


The majority of respondents (46%) are employees, followed by 30.5% engaged in businesses. A smaller percentage of respondents are self-employed (16%), students (4%), and homemakers (3.5%).



Does Electronic payment provide more convenience than traditional payment?

A significant majority of respondents (91%) find electronic payment of property tax to Surat Municipal Corporation convenient, while only 9% feel it is not convenient. This indicates strong preference for digital payment methods among citizens.



Surat Municipal Corporation provides various services online:

The online services provided by Surat Municipal Corporation, 92.5% of respondents are aware of them, while 7.5% are not familiar with these services.

Sources of Information About Surat Municipal Corporation's Online Services:

Respondents learned about the online services of Surat Municipal Corporation from various sources: 38.86% from friends and family, 31.32% from property tax payment invoices, 16.87% from the internet, and 12.95% from advertisements.

Types of Property Tax Payers : The majority of respondents (88%) are residential taxpayers, while 8.5% are both residential and commercial taxpayers, and 3.5% are commercial taxpayers.

Preferred Payment Methods for Property Tax: 55% of respondents prefer paying property tax through electronic payment methods, while 45% choose traditional payment methods.

Factors Influencing Payment Method Choice for Property Tax

- 92% of respondents find electronic payment less costly than physical payment.
- 69.5% trust physical payment methods more than electronic methods.
- 64% find electronic payments more convenient than physical payments.
- 61.5% believe physical payment methods offer better customer support than electronic payments.
- 60% consider physical payment methods safer and more secure than electronic payments.
- 45.5% think electronic payments provide more privacy than physical payments.

Main Reasons for Choosing E-payment of Property Tax : The main reasons for Surat citizens opting for electronic payment of property tax are as follows: 29.71% say it saves time, 19.34% mention social distancing, 16.58% find it convenient, 15.72%

believe it saves costs, 11.74% value the lack of risk of theft or accidents, and 6.91% prefer the convenience during travel.

Reasons for Using E-payment Service for Property Tax Payment

The reasons for using the electronic payment method to pay property tax to Surat Municipal Corporation are rated as follows:

- **Comfort with Security of Payment Gateways:** 75.5% strongly agree, 22% agree, and 2.5% are neutral.
- **Wider Range of Payment Options (credit card, debit card, net banking, UPI, etc.):** 70% agree, 27% strongly agree, 2% are neutral, and 1% disagree.
- **Customer Support:** 59% strongly agree, 39% agree, and 2% are neutral.
- **Advantages of Discounts, Loyalty/Reward Points, Cashbacks:** 56% agree, 37% strongly agree, 6.5% are neutral, and 0.5% strongly disagree.
- **Accurate Information about Property and Payment Invoice:** 52.5% strongly agree, 45.5% agree, and 2% are neutral.
- **User-Friendly Website and Mobile App of Surat Municipal Corporation:** 49.5% strongly agree, 49% agree, and 1.5% are neutral.

Summary of Descriptive Statistics:

Reason	Interpretation
Comfort with Security of Payment Gateways	Higher agreement, indicating confidence in security
Wider Range of Payment Options	Strong preference for variety in payment options
Customer Support	Positive feedback on customer support availability
Advantages of Discounts, Loyalty Points	Citizens value incentives, like discounts and cashbacks
Accurate Information about Property Invoice	Strong belief in the accuracy of online records
User-Friendly Website and Mobile App	High approval for the website and app's ease of use

Factors Affecting of E-payment Service for Property Tax : The following factors affect respondents' decision to use the electronic payment service for property tax to Surat Municipal Corporation:

- **Lack of Technical Know-How:** Affects 19.89% of respondents
- **Fear of Payment Security:** Affects 18.59% of respondents

- **Lack of Awareness on Such Services:** Affects 18.4% of respondents
- **Lack of Consistency in Service Availability:** Affects 15.61% of respondents
- **Follower of Traditional Method:** Affects 13.75% of respondents
- **Poor Availability of Internet Service:** Affects 7.81% of respondents
- **Unwillingness to Adopt Technology:** Affects 5.95% of respondents

Importance of E-payment Service for Property Tax: The importance level of electronic payment service for property tax to Surat Municipal Corporation is as follows:

- **52% of citizens** consider it **Important**.
- **32% of citizens** consider it **Very Important**.
- **16% of citizens** consider it **Less Important**.

Recommendation of E-payment Service for Property Tax

- **85.5% of respondents** would **recommend** the E-payment service.
- **14.5% of respondents** would **not recommend** the E-payment service.

Hypothesis Testing:

Kruskal-Wallis Test and Results:

The Kruskal-Wallis Test is a non-parametric test used to determine if there are statistically significant differences in the perception of e-payment services among different demographic groups (e.g., gender, age, education level, employment status). The test compares the medians of two or more groups and is appropriate for ordinal or non-normally distributed data.

Hypotheses:

- **H₀ (Null Hypothesis):** There is no significant difference in the perception of e-payment for property tax between different demographic groups.
- **H₁ (Alternative Hypothesis):** There is a significant difference in the perception of e-payment for property tax between different demographic groups.

Test Results:

1. Gender:

- **p-value = 0.071:** The p-value is greater than 0.05, so we fail to reject the null hypothesis. This indicates that gender does not significantly affect the perception of e-payment services for property tax.

2. Age Group:

- **p-value = 0.02:** The p-value is less than 0.05, so we reject the null hypothesis. This suggests that there is a significant difference in the perception of e-payment based on age groups. Younger age groups (21-30 years) are more likely to have a positive view of e-payment services.

3. Education Level:

- **p-value = 0.01:** The p-value is less than 0.05, so we reject the null hypothesis. This indicates that the education level of respondents significantly affects their perception of e-payment for property tax. Higher education levels (graduates and postgraduates) are positively correlated with a more favorable perception of e-payment services.

4. Employment Status:

- **p-value = 0.04:** The p-value is less than 0.05, so we reject the null hypothesis. This suggests that employment status significantly impacts the perception of e-payment services, with employed individuals and business owners more likely to engage with e-payment.

Conclusion from Kruskal-Wallis Test:

The Kruskal-Wallis test shows that there are significant differences in the perception of e-payment services based on age, education level, and employment status. Younger, more educated, and employed individuals are more likely to view e-payment services for property tax positively. In contrast, gender did not show a significant effect.

Kruskal-Wallis Test and Results:

The Kruskal-Wallis Test is used to examine whether there are significant differences in responses across various demographic groups (gender, age, education, employment status) regarding their perception of e-payment for property tax. This non-parametric test compares the medians of more than two groups and is appropriate when the data is not normally distributed or when the sample size is small.

Hypotheses:

- **H₀:** There is no significant relationship between citizen demographics and their perception of e-payment of property tax to SMC.
- **H₁:** There is a significant relationship between citizen demographics and their perception of e-payment of property tax to SMC.

Test Results:

1. Age Group:

- The Kruskal-Wallis test revealed that there is a significant difference in the perception of e-payment adoption based on age groups ($p\text{-value} < 0.05$). Younger respondents, particularly in the 21-30 age group, showed a stronger preference for e-payment, aligning with the trend that younger citizens are more tech-savvy and comfortable with digital transactions.

2. Education Level:

- The test showed a significant relationship between education level and the perception of e-payment services ($p\text{-value} < 0.05$). Respondents with higher education levels (graduates and postgraduates) had more positive perceptions of e-payment services, likely due to their familiarity with technology and its benefits.
-

3. Employment Status:

- There was a significant difference in how employed individuals perceive e-payment services, with employees and business owners being more likely to adopt e-payment compared to self-employed individuals and students ($p\text{-value} < 0.05$). This could be attributed to the regular use of digital services in the workplace and business operations.

Conclusion from Kruskal-Wallis Test:

The Kruskal-Wallis test confirms that there is a significant relationship between citizen demographics (age, education level, and employment status) and their perception of e-payment for property tax. Citizens in younger, more educated, and employed groups are more likely to view e-payment as a convenient and reliable method of paying property taxes.

Findings:

- 1. Convenience of E-payment:** 91% respondents find electronic payment more convenient than traditional payment, while 9% disagree.
- 2. Awareness of Online Services:** 92.5% respondents are aware that Surat Municipal Corporation offers online services, and 7.5% are not aware.
- 3. Sources of Information:** 38.86% learned about online services from friends and family, 31.32% from payment invoices, 16.87% from the internet, and 12.95% from advertisements.
- 4. Taxpayer Types:** 88% of respondents are residential taxpayers, 8.5% pay both residential and commercial taxes, and 3.5% are commercial taxpayers.

5. **Payment Method:** 55% use electronic payment, while 45% still prefer traditional payment methods.
6. **Cost Comparison:** 92% believe electronic payment is less costly, while 8% find physical payment cheaper.
7. **Trust and Convenience:** 69.5% trust physical payments more, while 64% find electronic payments more convenient.
8. **Customer Support:** 61.5% feel physical payments offer better customer support, while 54.5% feel electronic payments provide more privacy.
9. **Reasons for E-payment:** Major reasons include time saving (29.71%), social distancing (19.34%), convenience (16.58%), and cost saving (15.72%).
10. **Security & Payment Options:** 75.5% strongly agree with the security of payment gateways, and 70% appreciate the wider range of payment options.
11. **Discounts and Customer Support:** 59% strongly agree on the importance of customer support, while 56% agree that discounts and rewards influence their decision to use E-payment.
12. **Awareness of Property Information:** 52.5% strongly agree that electronic payments provide accurate property tax information.
13. **Barriers to E-payment:** 19.89% cite lack of technical know-how, 18.59% fear payment security, and 18.4% lack awareness of online services as factors affecting E-payment adoption.
14. **Importance of E-payment:** 51.5% consider E-payment service important, 32.5% very important, and 16% less important.
15. **Recommendation:** 85.5% would recommend the E-payment service, while 14.5% would not.
16. **Factors influencing e-payment usage:** Security concerns, lack of technical know-how, and lack of awareness are the primary factors preventing citizens from using e-payment services for property tax payments. Addressing these issues through educational campaigns, better customer support, and enhanced security could help increase adoption.
17. **Demographic impact:** The younger, more educated, and employed citizens are more likely to perceive e-payment services positively. This suggests that demographic characteristics influence the willingness to adopt e-payment methods.

18. **Significance of barriers:** The barriers to e-payment adoption, such as security concerns, technical knowledge, and lack of awareness, must be addressed by Surat Municipal Corporation to improve the uptake of e-payment services.

Conclusion:

The study indicates that a significant majority of respondents find electronic payment for property tax through Surat Municipal Corporation more convenient than traditional methods. With 91% preferring the ease of e-payment, the awareness of online services (92.5%) reflects a positive trend towards digital adoption. Key factors driving the preference for e-payment include time-saving, cost-saving, and the convenience it offers, with 75.5% respondents expressing confidence in the security of payment gateways. Despite these positive trends, barriers such as lack of technical know-how, payment security concerns, and limited awareness of available services remain prominent, with 19.89% of respondents facing these challenges.

Although most respondents trust physical payments for customer support, a majority still consider e-payment to be more cost-effective and convenient. The importance of customer support, discounts, and the availability of multiple payment options play a crucial role in influencing respondents' decisions. Despite some challenges, the majority (85.5%) would recommend e-payment services to others, suggesting that the adoption rate could continue to rise with increased awareness and improvements in user experience.

Suggestions:

1. **Increase Awareness:** Initiatives to raise awareness about the benefits and security of e-payment services could help overcome barriers like lack of technical know-how and fear of payment security.
2. **Enhance Customer Support:** While physical payments are seen to have better customer support, enhancing online customer support for e-payment services will further encourage digital adoption.
3. **Promote Incentives:** Offering more incentives such as discounts, loyalty rewards, and enhanced security features can motivate more residents to shift to electronic payment methods.

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A STUDY ON DETERMINANT'S OF INVESTMENT DECISION OF WOMEN INVESTOR WITH REFERENCE TO SURAT CITY

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ABSTRACT

Women Investors have a lot of investment avenues to park their savings. The risk and returns available from each of these investment avenues differ from one avenue to another. The investors expect more returns with relatively lesser risks. In this regard, the financial advisors and consultants offer various suggestions to the investors. An attempt has been made in this study to find out the main objective of the investors towards making investments and to assess the investors' attitude towards the investment avenues. The demographic variables and objectives of the investors have been obtained from the respondents and the relationship between these variables and objectives has been computed. The attitude of the respondents towards the select investment avenues has been ranked. The study also offers suggestions for the marketers of financial services.

Keywords: Investment, Women investor, investment decision.

INTRODUCTION

Investment Decisions, also known as Capital Investment Decisions are the most important financial decisions that an enterprise makes to utilize its funds to secure benefits over a period of time. It's an integral component of the strategic decision-making of an enterprise or organization.

Investing refers to growing your wealth over time. With the power of compounding, investing allows you to generate good returns on your capital and ultimately increase your wealth. There are various investment instruments that you can consider based on your risk appetite, time horizon, and future needs. The contribution of Indian women in family, business and society is today being recognized. In 21st century more women are getting education so that they can earn and become financially independent. Women are integral part of economy; they are significant contributor in terms of consumer purchase which makes them contributor in economy. Women nowadays are more empower to

think act on financial matter. Almost fifty percentage of workforce and business own and run by women. Many women influence or control the majority of all consumer purchase decisions and many of the investment decisions. As a result, it is important for women to focus on finances now more than ever. Investing refers to growing your wealth over time. With the power of compounding, investing allows you to generate good returns on your capital and ultimately increase your wealth. There are various investment instruments that you can consider based on your risk appetite, time horizon, and future needs

BEST INVESTMENT OPTION FOR INVESTOR:-

Women empowerment has been remarkable in India over the last few years. Women are not only educated but also independent financially and socially. They are capable enough to lead a family, organization and society. Saving money is a key priority for women. There are different investment avenues available for women. Investing money enables them to be independent, support their family, and maintain a good healthy living standard. In this article, we will discuss the Best Investment Options for Women available in India.

The following are the Best Investment Options for Women –

- **MUTUAL FUNDS**-There are a variety of mutual funds available in the market for investment. There are different mutual fund schemes that suit your investment objective and risk tolerance level. You can invest in a mutual fund via lump sum or SIP.
- **EXCHANGE TRADED FUNDS (ETF)**-An Exchange Traded Funds (ETF) is a passive investment fund that merely replicates the underlying benchmark index. In other words, the composition of the ETF portfolio matches the composition of the benchmark index in the same proportion.
- **GOLD**-Gold is always a go-to asset and favorite ornament for women in India. It has a great emotional and social value attached to it. Buying gold in the form of coins, bars, biscuits or jewellery on any auspicious day is a tradition in India. This asset with such sentimental value has become popular in different forms.
- **RECURRING DEPOSITS**-A recurring deposit (RD) is a saving option that helps women to save for their future. It is an interest-bearing instrument having a fixed maturity period. It is a convenient option for you when you hold a savings account in a bank.

- **FIXED DEPOSITS**-Fixed Deposit (FD) is another popular traditional investment option among Indians. This can be a suitable option for women looking for guaranteed returns from their investments. Every bank offers different interest rates on FD based on tenure.
- **PUBLIC PROVIDENT FUND (PPF)**-The Public Provident Fund (PPF) is one of the safest and most reliable savings schemes as the government backs it. This can be an ideal investment option for women who don't want to risk their hard-earned money.

DETERMINANTS AFFECT THE INVESTMENT DECISION OF WOMEN INVESTOR:-

Making wise investment choices is essential to effective financial management and future planning. Investing wisely entails assessing various investment possibilities and selecting one with the highest expected return. Investment choices can be impacted by a wide range of external and internal variables, such as the economy, market trends, and one's own personal situation. One of the key factors that can influence investment decision-making is the state of the economy. Economic conditions can affect the performance of different investment types, such as stocks, bonds, and real estate. For example, during times of economic growth, stock prices tend to rise as companies earn more profits and investors are more confident about the future. In contrast, during times of economic downturn, stock prices may fall as companies struggle to earn profits and investors become more cautious. In addition, individual circumstances can also play a role in investment decision-making. For instance, an investor's age, risk tolerance, and financial goals can all affect the types of investments they choose. It is possible that a younger investor may be more willing to take on risk in order to earn higher returns, while an older investor may be more focused on preserving their wealth. Other factors that can influence investment decision-making include the investor's knowledge and experience, as well as the investment options available to them. Making investment decisions can be a challenging task, as there are many factors to consider and no guarantees of success. However, by staying informed about economic conditions, market trends, and personal circumstances, investors can make more informed and effective decisions. This can help them achieve their financial goals and secure their financial future

REVIEW OF LITERATURE

(Prajawati & Basir, 2023) This research contributed to the current condition, where the research concept followed the current state of conducting research related to investment decision on female workers during post pandemic. Data was collected using a questionnaire instrument. Analyze the data carefully so that accurate results are obtained. Standard preparation prepares articles for research articles. Researchers will make revisions and will follow the final decision before the item is published.

(Patil & Halde, 2023) The study attempted to understand what attracts people to keep their savings in post office schemes. For existing studies, various kinds of literature have been reviewed and found that investors invest in safe, secure, trustworthy, easy-to-understand schemes and the Post office offered all the schemes which are easy to understand, safe, and secured. It is observed that investors want to invest their money in safe, easy-to-understand, risk-free, and tax benefits and easy accessibility.

(Thakor & Patel, 2022) The result reflected that the knowledge of respondents is below the needed level. Demographic factors like age, educational qualification, marital status, income impact the investment decision. The income earned by the working women is sufficient to meet their personal expenses but not much satisfied as they have less amount of money left with them to invest. The study revealed that 50% of the respondents have regular investment habits and about 40% of the incomes they earn are utilized for investment purposes.

Umair Betal (2021) conducted a study on “An Empirical Analysis of the Factors Influencing the Women Investment Behaviour- With Special Reference to Women in Bathinda District”. The result drawn from the study was that these entrepreneurs are believing in savings in long-term funds or in banks or in a mutual fund but because of lack of timing or of having less knowledge they are not investing in other kinds of areas.

Priyanka B (2021) conducted a research on “An Empirical Analysis of the Factors Influencing the Women Investment Behaviour- With Special Reference to Women in Bathinda District”. The conclusion drawn was that most of the females are not earning money so their investment decisions always depend on others. They believe in doing long-term investments with very few of risks.

Veluchamy and Thangaraj (2020) conducted a research on “Factors Affecting Investment Decision of Working Women of Emerging Nations”. can be concluded that investment pattern among the women executives was mainly determined by background

like age, nativity, level of education, marital status, nature of family, family size, number of earning members per family, number of educated person per family, designation, personal income and family income.

Chandra and Kumar (2019) conducted a research on “Factors Affecting Investment Decision of Working Women Of Emerging Nations”. From this research, it can be concluded that the factors influencing Indian individual investor behaviour. Behaviour of an individual investor is encouraged by different factors like psychological, heuristics and biases.

Kaur J & Arora (2018) conducted a study on “A study on the investment behaviour of working women with reference to Chennai City”. it was concluded that investors’ responses to identify the investor’s perception towards mutual funds as an investment option in Punjab. It was found that investors preferred investment in mutual funds due to higher returns in growth fund schemes. It was also found that each investor had his own goal of mutual fund investment.

Satheendran and Banerji (2018) conducted a study on “ The Determinants Of Investment Decision Making Among Female Investors At Public Listed Companies”. Then, women investors that have a high risk averse are believed to invest in a less risky investment choice. Further, it is also seen that women belonging to higher age groups tend to have a conservative investment choice.

RESEARCH METHODOLOGY:

PROBLEM STATEMENT

The wide spread interest in financial market of women are increasing day by day. It is not the time left where women are just looking for house chores. The most empowered women in the developing economies like India are well educated with financial markets and allied investment tactics. So women in every house have taken over many financial matters over men.

OBJECTIVES OF THE STUDY

- To analyze individual investor’s awareness and perception regarding various investment avenues.
- To identify determinant’s of investment decision of individual investor.
- To evaluate the safety opinion of individual investor regarding their investment avenue.

METHODOLOGY OF THE STUDY:

The study is based on a Descriptive research design and primary data has been collected through a well-structured questionnaire from 110 women investors from Surat city. Also, the study is based on secondary data which is collected from trading websites, journals, articles, books, and annual reports.

SAMPLING

Sampling frame:	For this study sampling unit is women investor from different areas of surat city and includes women investors.
Sample technique:	Non-probability convenient sampling technique and random sampling.
Research instrument:	Structured questionnaire
Sample size:	110 respondents

Table 4 SAMPLING

TOOLS FOR DATA ANALYSES

For analysis of data frequency tables & pie-chart has been used. The coding of the questionnaire is done by the Excel and SPSS software.

LIMITATION FOR THE STUDY:

- The respondents were also biased in giving their opinion.
- The availability of time at the disposal of the researcher has also acted as a limitation in making an in-depth and exhaustive study.
- The study is limited to Surat city only.

SCOPE FOR FUTURE RESEARCH

The need for the present study and its significance is further reflected in the research problem and the objectives addressed by the present study. However the most important reasons for conducting this research are numerous. Thus, the study addresses the need that exists for research on examining the relationships between saving objectives and investment objectives among the women investors. Further study is focusing on demographic profile of the women investors which helps financial advisors and brokers to study it and serve their needs accordingly.

DATA ANALYSIS

	N	Minimum	Maximum	Mean	Std. Deviation
Total_income	110	1.00	5.00	2.5182	1.17880
Type_of_instrument	110	1.00	9.00	5.6273	3.19363
1. Keep_money_safe	110	1.00	4.00	1.2727	.63404
2. Maximize Savings	110	1	4	1.92	.577
3. Earn a steady stream of income	110	1	4	2.45	.841
4. Reduced Tax Liability	110	1	4	2.58	.980
5. Better Retirement Life	110	1	4	2.37	.927
6. Achieve Bigger Life Goal	110	1	4	2.28	.803
7. Need of Regular/Fixed Return	110	1	5	2.32	.995
8. Wealth Creation	110	1	4	2.18	.869
I keep on justifying my mistakes committed while making investment decision	110	1.00	4.00	1.3545	.68518
I have not seen my output/result statements to avoid regret due to wrong investment decisions	110	1.00	4.00	2.0636	.60997
I attribute my investment success to my knowledge and understanding of financial market	110	1.00	4.00	2.4909	.87520
I usually invest in such financial products which generally people invests	110	1.00	4.00	2.2818	.92003
Sometimes, I take financial decision based on my own confidence	110	1.00	5.00	2.4273	.97170
I consider family decisions while taking investment decisions	110	1.00	4.00	2.4091	.83825
Family members consider my advice in investment matters	110	1.00	4.00	2.2818	.92995
I consider friends advice while taking investment decision	110	1.00	5.00	2.4364	.90389
Before taking investment decision I would like to take advice from brokers	110	1.00	5.00	2.3182	.97615

I consider journals and magazines to gather information before investing.	110	1.00	4.00	2.3182	.86663
I consider and rely on all other authentic sources of information	110	1.00	4.00	2.5545	.91457
I like to invest in government securities to lower risk	110	1.00	4.00	2.3000	.93406
I consider risk as a factor while taking investment decisions	110	1.00	5.00	2.3364	.89111
Market condition is a factor which helps in taking investment decisions	110	1.00	4.00	2.2909	.83880
Economic conditions influences my investment decisions	110	1.00	4.00	2.3545	.90449
I consider banking policies and other industrial policies before investing in any avenue	110	1.00	5.00	2.3727	.92725
I do invest in risky financial products to gain more return	110	1.00	5.00	2.4818	.94560
Extra income induces me to invest more	0				
I consider returns first while taking investment decisions	110	1.00	4.00	2.5364	.93531
Effective Investment decision helps to build physical assets	110	1.00	4.00	2.3545	.91457
I keep on investing as and when I got additional income	110	1.00	5.00	2.3636	.92595
I do re-invest my returns earned from existing investments	110	1.00	4.00	2.4000	.86946
Sometimes I think to sell out my physical assets to buy financial assets	110	1.00	4.00	2.4727	.91581
I prepare a weekly/monthly plan for my family's investments	110	1.00	5.00	2.5636	1.03629
I help my family do their monthly budget	110	1.00	4.00	2.5364	.96429
I know the technicalities of all financial avenues	110	1.00	5.00	2.3909	.86836

I can make all risk return calculations of my all investments	110	1.00	5.00	2.6818	1.04865
I know the concept of Net Present Value of Capital Investing	110	1.00	5.00	2.6091	.99628
I do read and refer economic policies and fiscal policies before investing	110	1.00	5.00	2.5909	1.04307
I like to take investment decision independently	110	1.00	5.00	2.6364	1.02023
Wise and investment decision helps me to become more independent about my financials	110	1.00	5.00	2.5545	.90449
My family supports me in taking all financial decisions independently	110	1.00	5.00	2.3455	.88241
I can buy or sell any financial products without asking anyone in my family	110	1.00	5.00	2.4273	.87219
My Spouse And I Regularly Discuss Our Investment decisions	110	1.00	5.00	2.5818	1.06126
I am enough knowledgeable about my Investing	110	1.00	5.00	2.4182	.92252
My investment decisions are able to meet financial obligations	110	1.00	5.00	2.6727	1.05020
My investment decisions are highly safe and secure	110	1.00	5.00	1.4000	.83721
Low risk is involved in all my investment decisions	110	1.00	5.00	2.0091	.68396
I am able to meet high rate of return from all my investment decisions	110	1.00	5.00	2.5364	.84242
I Intent to increase my investment in next year	110	1.00	5.00	2.5091	1.02039
I am fully satisfied with all my past and current investment decisions	110	1.00	5.00	2.4182	.96148
Age	110	1.00	4.00	2.3909	.90964
annual income	110	1.00	4.00	2.1364	.73544
Educational Qualification	110	2.00	5.00	3.2364	.71584
Occupation	110	1.00	6.00	3.0909	1.30310

Table 5 DATA ANALYSIS

FINDINGS

The researcher found that Majority of women investor are save their 50% to 75 % income yearly and minor investor save less than 5% income yearly. . Majority of the respondents are investing in mutual fund. For majority of respondents investing is very important to keep money safe and secure. For majority investor investing is important to maximize saving. For majority of respondents investing is most important to earn steady stream of income. For majority of respondents investing is important to reduced tax liability. For majority of respondents investing is most important to better retirement life. For Majority of respondent investing is important to achieve bigger life goal. For majority of respondent investing is important for regular/fixed return. For majority of respondent investing is important for wealth creation.

The researcher found that respondent's belief with statement I keep on justifying my mistakes committed while making investment decision that the majority of the respondent strongly agree with the statement. The researcher found that respondent's belief with statement I have not seen my output/result statements to avoid regret due to wrong investment decisions that the majority of the respondent agree with the statement. The researcher found that respondent's belief with statement I attribute my investment success to my knowledge and understanding of financial market that the majority of the respondent undecided with the statement. The researcher found that respondent's belief with statement I usually invest in such financial products which generally people invests that the majority of the respondent undecided with the statement. The researcher found that respondent's belief with statement Sometimes, I take financial decision based on my own confidence that the majority of the respondent agree with the statement. Majority of respondents are agree with the statement Family members consider my advice in investment matters. Majority of respondents are undecided with the statement I consider friends advice while taking investment decision. Majority of respondents are agreeing with the statement Before taking investment decision I would like to take advice from brokers. Majority of respondents are undecided with the statement I consider journals and magazines to gather information before investing. Majority of respondents are agreeing with the statement I consider and rely on all other authentic sources of information. Majority of respondents are agree and undecided with the statement I like to invest in government securities to lower risk. Majority of respondents are agree with the statement I consider risk as a factor while taking investment decisions. Majority of respondents are agree with the statement Market condition is a factor

which helps in taking investment decisions Majority of respondents are agree with the statement Economic conditions influences my investment decisions. Majority of respondents are undecided with the statement I consider banking policies and other industrial policies before investing in any avenue. Majority of respondents are agree with the statement I do invest in risky financial products to gain more return. Majority of respondents are undecided with the statement Extra income induces me to invest more. Majority of respondents are agree with the statement I consider returns first while taking investment decisions. Majority of respondents are agree with the statement Effective Investment decision helps to build physical assets. Majority of respondents are agreeing with the statement I keep on investing as and when I got additional income. Majority of respondents are undecided with the statement I do re-invest my returns earned from existing investments. Majority of respondents are agree with the statement Sometimes I think to sell out my physical assets to buy financial assets. Majority of respondents are agree with the statement I prepare a weekly/monthly plan for my family's investments. Majority of respondents are agreeing with the statement I help my family do their monthly budget. Majority of respondents are undecided with the statement I know the technicalities of all financial avenues. Majority of respondents are agree with the statement I can make all risk return calculations of my all investments. Majority of respondents are agree with the statement I know the concept of Net Present Value of Capital Investing. Majority of respondents are agreeing with the statement I do read and refer economic policies and fiscal policies before investing. Majority of respondents are agreeing with the statement I like to take investment decision independently. Majority of respondents are agree with the statement Wise and investment decision helps me to become more independent about my financials. Majority of respondents are agreeing with the statement My family supports me in taking all financial decisions independently. Majority of respondents are agree with the statement I can buy or sell any financial products without asking anyone in my family. Majority of respondents are agree with the statement My Spouse And I Regularly Discuss Our Investment decisions. Majority of respondents are agree with the statement I am enough knowledgeable about my Investing. Majority of respondents are strongly agree with the statement My investment decisions are able to meet financial obligations. Majority of respondents are agreeing with the statement My investment decisions are highly safe and secure. Majority of respondents are undecided with the statement Low risk is involved in all my investment decisions. Majority of respondents are agree with the statement I am able to meet high rate of return from all my investment decisions. Majority of respondents are undecided with the statement I Intent to increase my investment in

next year. Majority of respondents are agree with the statement I am fully satisfied with all my past and current investment decisions

The researcher fined that the age of major respondents are between 25-30 years and the minor respondents are aged 40-45 years. The researcher found that the Annual Income majority of respondent are between upto 1 lakhs and the minority of respondents are having income more than 10 lakhs. The reseacher found that the majority of respondents educational qualification is Graduation and minority respondents are PHD qualified. The researcher found that the occupation of major respondents are professional or self-employed. and the minority of respondents are doing a businees.

CONCLUSION

The study revealed that in Surat City, the respondents are investing in different avenues like mutual fund, gold, real estate, stocks etc... To conduct this study, 110 respondents had answered the questionnaires which are from Surat city. The researcher used “Descriptive Research Design” and researcher also used non-Probability convenience method. In which information is collected from website, past data, newspaper, journal, magazine of various smart stock magazines. Researcher used liker scale from 1 strongly agree to 5 for strongly disagree. Besides that, this study is using SPSS (Statistic Package for Social Science) interpret and analyze all the data gathered from questionnaire. Most of the respondents investing is very important to keep money safe and secure So, recommends that investors should to understand Investment Avenue and normally risk taker and there is direct relationship between risk and return but factor affect their investment decision.

RECOMMENDATION

The study observed that determinants of investment decision of individual investor. Investors are not aware few about some investing. However, when the risk is taken the investors become dependent. Then the study shows that the determinants of investment decision of individual investor were found statically significant. So, recommendation is awareness campaign should be organized by Banks, NBFC and Investment companies to educate the investors. Time to time seminars, right saving habit and stop spending money on heavy luxurious life style and preferring the normal living standard and it is evident that women are risk averse and not ready to take much risk.

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A Systematic Review on Mobile Commerce: Revolutionary Digital Transformation in Rural India

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Abstract

Mobile commerce (m-commerce) has emerged as a transformative force in rural India, reshaping economic activities, connectivity, and access to essential services. This study systematically reviews and critically analyses the existing literature on mobile commerce within the rural Indian context, tracing its historical development and conceptual foundations. Through a descriptive research approach, the study examines secondary data to offer a comprehensive overview of m-commerce's transformative role.

The definition and evolution of mobile commerce are explored, from its conceptualization as transactions conducted over wireless telecommunications networks to its modern manifestations as a catalyst for economic empowerment. In India, the explosion of mobile internet and smartphone usage, particularly in rural areas, has propelled the rapid expansion of m-commerce, revolutionized traditional business models and enhanced market access for rural entrepreneurs. Despite its potential, m-commerce in rural India faces challenges such as the digital divide, trust, and security concerns, and logistical barriers.

Keywords: M-Commerce, Rural India, Socio-economic, Digital divide.

1. Introduction

Mobile commerce, also known as m-commerce, involves using wireless handheld devices like cell phones and tablets to conduct commercial transactions online, including the purchase and sale of products, online banking, and paying bills.

Mobile commerce is a large subset of electronic commerce, a model where firms or individuals conduct business over the Internet. As of 2023, nearly 97% of Americans own a cell phone, and 85% of them owned a smartphone. This is up from 35% in 2011.

Many products and services can be transacted via m-commerce, including banking, investing, and purchases of books, plane tickets, and digital music. The rapid growth of mobile commerce has been driven by several factors, including increased wireless handheld device computing power, a proliferation of m-commerce applications, and the resolution of security issues.

2. Review Of Literature

Dr. C. S. Joshi (2023) in their descriptive paper have highlighted the Systematic Review on Mobile Commerce: Pioneering Digital Transformation in Rural India to systematically review and critically analyse the existing mobile commerce literature within the rural Indian context, including its historical development and conceptual foundations and to offer a comprehensive overview of mobile commerce's transformative role in rural India, highlighting its socioeconomic impact, challenges, opportunities. They conclude that the study underscores the transformative impact of mobile commerce (m-commerce) in rural India, driven by the widespread adoption of mobile internet and smartphones. The evolution of m commerce from its conceptualization to its modern manifestations reflects a paradigm shift in consumer behaviour and business practices. Despite facing challenges such as the digital divide and logistical barriers, m-commerce presents vast opportunities for economic empowerment, financial inclusion, and access to essential services in rural areas. m-commerce has the potential to revolutionize economic activities, connectivity, and quality of life in rural India, paving the way for a more equitable and prosperous future.

Muthukumar & Muthu, 2015) in their descriptive paper have highlighted the potential of mobile commerce in India. They cite the availability of budget smartphones availability at EMI plans as the major reason for increasing thrust on mobile commerce by various private players like ICICI Bank. They have emphasized the astonishing rate of growth of 200% in number of internet users in year 2014 to augur well for the mobile commerce in rural India. They have identified Entertainment as the major category spend segment in m commerce in India. They have asserted that the increasing disposable income of the rural families, easy access to credit, growth in modern format, rapid urbanization and trend towards nuclear family as the major driver of m commerce in rural India They have cited the findings of report by Internet & Mobile Association of India (IAMAI) to support the major urban and rural divide as the major area for future growth. However, they propagate that increasing penetration of smartphones in India is the major area of growth. They conclude that major reason for urban rural divide is illiteracy and lack of know how. They assert that increasing digital financial literacy has a far greater role to increase the usage of m commerce in rural India.

Bhuriya Jignesh Bhai Subhash Bhai (2022) in their descriptive paper have highlighted Impact of Mobile Commerce in Rural Areas to explore the influence that mobile commerce has on the economic activities and wealth growth of communities that are

primarily engaged in farming and fishing in rural locations. They have concluded that the mobile commerce has improved the social relationships of its users and has boosted their efforts to engage in commercial activities. As a result of the proliferation of mobile commerce and cellular connectivity, the informal rural economy in India has seen an increase in the number of job prospects available. It will not result in the creation of new wealth if these services are expanded to include every poor part of the population. It is without a doubt that this will continue to improve the quality of life for those who are marginalised and economically disadvantaged. It is vital to concentrate on two primary quantifiable factors in order to optimise the level of net income or value that a firm possesses.

3. Objectives

The study's specific objectives are as follows:

- To study the concept and growth of M-commerce in India
- To study the advantages and disadvantages of M-commerce in India
- To offer a comprehensive overview of mobile commerce's transformative role in rural India

4. Methodology

The study critically analysed mobile commerce literature using a descriptive research approach. The study was founded on a careful examination of secondary data. The origin, concept, meaning, and history of mobile commerce are based on previously published research papers, books, related websites, and databases.

5. Mobile Commerce

5.1. Definitions

M-commerce (mobile commerce) is the buying and selling of goods and services through wireless handheld devices such as smartphones and tablets. M-commerce is a form of m-commerce that enables users to access online shopping platforms without the use of a desktop computer.

5.2. Advantages And Limitations of M-Commerce

User friendly, easy to carry the mobile device, Low internet connectivity area, Secure transactions are some characteristics of M-Commerce. Along with theses long distance reach ability, better deals for consumers, time and money savings, easy to use are the **benefits** of M-Commerce some of which are described below.

- **long distance reach ability:** Mobile phones are available to every person and are very important in social and business life. The sellers can reach the customers through

mobile phones and customers can access mobile applications to find products. So, though seller and customers are at long distance they can reach each other.

- **Better deal for Consumers:** The consumers can search different products using mobile application. They can compare the product cost, delivery time and place the order. Thus, customer can compare the products and get the best deal.
- **Savings:** The consumers can search the required product, compare it and get the best deal without visiting the physical shops. Thus, his money and time to travel is saved. He can purchase the product at any time anywhere using mobile applications. Myntra, Jabong are examples of mobile applications.
- **Easy to use:** The Mobile applications are easy to use. No special skills are required to use these applications. Further the consumer can pay the bill on delivery of the product. So, people can purchase the items using mobile applications easily.
- **Secure transactions:** The consumers can do the secure transactions i.e. Payment using mobile applications. For security the consumers are given login ID and password. On Time Password is generated for the transaction which is used for user authentication. Thus, there is transaction security for M-Payment.

Along with these advantages M-Commerce has disadvantages also. Processing power of mobile device as compared to personal computer, tiny size of the mobile phone screen, non-uniformity of networks, limitations of the network service are some of the limitations of M-Commerce.

Some of the **disadvantages** are described below.

- **Tiny Screen:** Tiny screen of mobile device makes the consumer difficult to search more items in one display. Every time the consumer has to zoom the image. The consumer gets tired because of this process. Also, the seller cannot show eye catching images. So, it becomes difficult for retailer to sell the product using mobile application.
- **Speed of delivery:** the speed of mobile device is less than personal computers. Further the consumers have to remove the contents such as flash videos and plug-in which consumes a fraction of time. It results in reduced speed of searching, placing order and delivery of the products.
- **Security:** Mobile security is improving regularly. But some consumers do not have trust to do the transactions on mobile device. Moreover, mobile device networks provide greater opportunities for hackers than internet. So the transactions conducted on mobile device must be secured transactions.

- **Mobile Phone Configuration:** Mobile phone configuration must be compatible with the mobile application. The configuration limits the installation and hence use of mobile app.

Mobile devices with greater computing power and superior display capabilities are gradually gaining acceptance in India's rural areas. Organisations and the government continue to progressively use cutting-edge solutions that capitalise on recently discovered mobile capabilities in keeping with this trend. Businesses are increasingly using mobile technology to connect with rural clients anywhere, at any time. Even companies who have always been uninterested with advancements in technology are gradually coming up with new mobile-based tactics to hold onto their market share. The primary goal of the shift towards mobile system dependency is to obtain services at competitive prices and with a better value proposition for rural customers.

5.3. Mobile Commerce's Transformative Role in Rural India

Mobile commerce (m-commerce) has emerged as a transformative force in rural India, revolutionizing economic activities, connectivity, and access to essential services. With the widespread penetration of mobile phones, particularly smartphones, across rural areas, m-commerce has become a catalyst for socioeconomic development, offering a myriad of opportunities while also presenting unique challenges.

- **Socioeconomic Impact:** Enhanced Access to Markets: M-commerce has broken geographical barriers, allowing rural entrepreneurs to access larger markets for their goods and services. Farmers can now directly connect with buyers, bypassing intermediaries and securing better prices for their produce.
- **Financial Inclusion:** Mobile banking and payment solutions have facilitated financial inclusion in rural areas, enabling individuals without access to traditional banking services to participate in formal financial systems. This has empowered rural populations to save, invest, and transact securely.
- **Job Creation:** The growth of m-commerce has stimulated employment opportunities in rural areas, particularly in sectors such as e-commerce logistics, digital marketing, and app development. This has contributed to economic diversification and income generation.
- **Access to Information and Services:** Mobile apps and platforms provide rural residents with access to vital information and services, including healthcare, education,

and government schemes. This has improved overall well-being and quality of life in rural communities.

5.4. Challenges:

- **Digital Divide:** Despite increasing smartphone penetration, disparities in digital literacy and access persist in rural areas. Limited internet connectivity and technological infrastructure hinder the full realization of m-commerce's potential.
- **Trust and Security Concerns:** Rural consumers may be apprehensive about conducting financial transactions online due to concerns about security and fraud. Building trust in m-commerce platforms is crucial for wider adoption.
- **Last-Mile Delivery:** Logistics infrastructure remains underdeveloped in many rural regions, posing challenges for last-mile delivery of products ordered through m-commerce platforms. Addressing logistical barriers is essential for improving customer satisfaction and retention.

5.5. Opportunities:

- **Tailored Solutions:** Developing m-commerce solutions tailored to the needs and preferences of rural consumers can drive adoption. User-friendly interfaces, vernacular language support, and localized content can enhance the user experience. Partnerships and
- **Collaborations:** Collaboration between government agencies, private sector entities, and non-profit organizations can facilitate the expansion of m-commerce in rural areas. Public-private partnerships can drive infrastructure development and digital literacy initiatives.
- **Innovation:** Continued innovation in mobile technology, including the integration of features like digital wallets, biometric authentication, and augmented reality, can unlock new possibilities for m-commerce in rural India.
- **Capacity Building:** Investing in digital skills training and education programs can empower rural residents to leverage m-commerce effectively, bridging the digital divide and promoting inclusive growth.

M-commerce has the potential to drive significant socioeconomic transformation in rural India by fostering economic empowerment, financial inclusion, and access to essential services. However, realizing this potential requires concerted efforts to address challenges, leverage opportunities, and ensure equitable access to digital technologies.

6. M-commerce in Rural India

Mobile commerce (m-commerce) in rural India is expected to grow in the coming years, driven by factors such as increased internet access, a growing user base, and the ability to target customers more effectively:

- **User base:** In 2021, India had over 624 million internet users, and the number is expected to reach 900 million by 2025. The number of internet users in rural areas may even be higher than in urban areas by 2025.
- **Faster buying:** Mobile apps are faster than websites for browsing and purchasing products because they store data locally on the device.
- **Targeted marketing:** Mobile commerce apps can use programmatic advertising and geo-tracking to reach customers at specific times.
- **E-commerce growth:** India's e-commerce sector is expected to grow at an annual rate of 18% through 2025. The online Gross Merchandise Value (GMV) is projected to reach US\$ 100-120 billion by 2025.
- **Rural M-commerce:** The rural e-commerce industry is growing due to increased internet access, diversification of income sources, and the rise of nuclear families.

Some other trends in m-commerce include:

- **Smart personalization:** Businesses are focusing on behavioural segmentation in app marketing.
- **Near Field Communication (NFC):** NFC-enabled payments are becoming more popular as consumers seek more convenient and secure ways to pay.
- **Conversational commerce:** Advances in GenAI are driving a shift towards more intuitive, conversation-driven shopping experiences.

7. Results and Discussion.

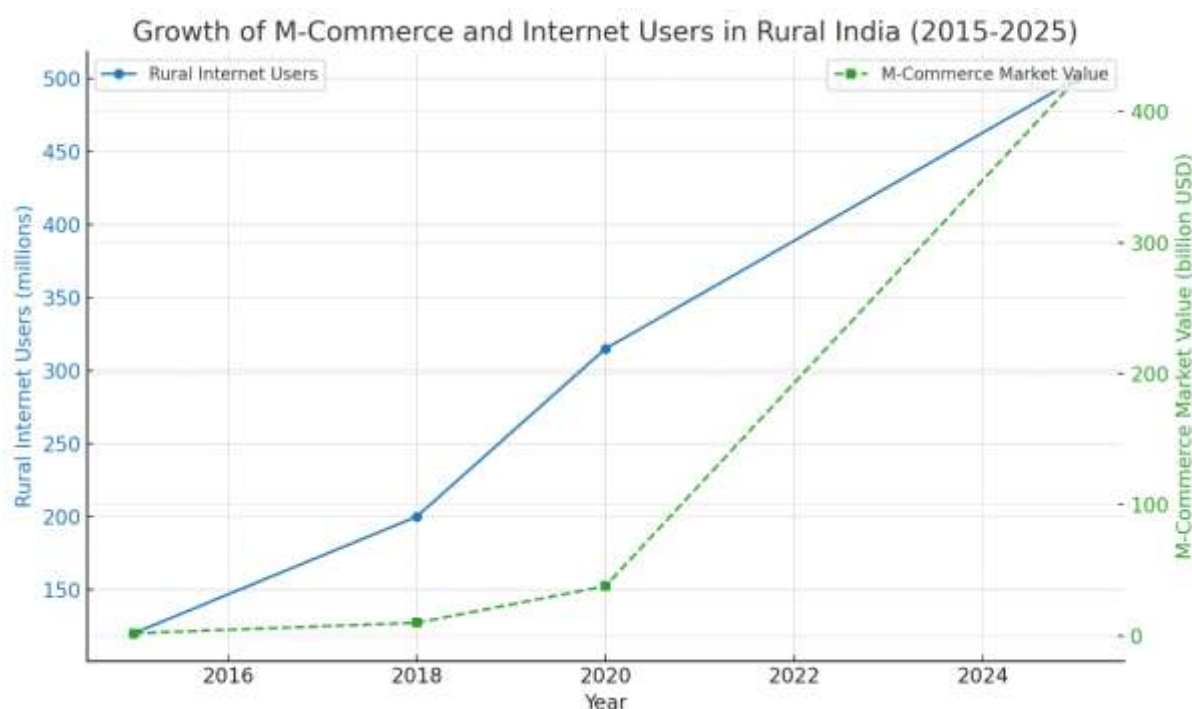
Data from **GSMA Intelligence** shows that there were **1.12 billion** cellular mobile connections in India at the start of 2024.

However, note that many people around the world make use of more than one mobile connection – for example, they might have one connection for personal use, and another one for work – so it's not unusual for mobile connection figures to significantly exceed figures for total population.

GSMA Intelligence's numbers indicate that mobile connections in India were equivalent to **78.0 percent** of the total population in January 2024.

The number of mobile connections in India **increased** by **23 million** (+2.1 percent) between the start of 2023 and the start of 2024.

Mobile commerce (m-commerce) has significantly transformed India's retail landscape, with notable growth in rural regions. The proliferation of affordable smartphones and expanded internet connectivity have been pivotal in this shift.



Over the past five years, mobile commerce (m-commerce) in rural India has experienced rapid growth due to increased smartphone adoption, affordable mobile data, and the proliferation of digital payment systems.

Below is a summary of key trends and data points:

The m-commerce market is forecasted to reach \$425 billion by 2025, growing at a compound annual growth rate (CAGR) of 29.84% during 2020-2025.

1. Smartphone Penetration

2018: Approximately 36% of rural households owned smartphones.

2023: Smartphone ownership in rural areas increased to nearly 74.8%. This increase enabled broader access to mobile commerce platforms.

2. Internet Connectivity

2018-2023: Rural internet users increased by over 40%, surpassing urban internet users in terms of growth rate. By 2023, rural areas accounted for more than 425 million internet users, facilitating m-commerce activities.

3. Mobile Payment Adoption

- Digital payment platforms like UPI, Paytm, and PhonePe became mainstream in rural areas.
- UPI transactions in India grew from 17 million in 2018 to over 7 billion monthly transactions by 2023, with rural areas contributing significantly.

4. E-commerce and M-commerce Growth

Platforms like Meesho, Flipkart, and Amazon saw a significant rise in rural user engagement.

2018: E-commerce penetration in rural areas was less than 10%.

2023: Rural contributions to e-commerce grew to 20-25%, driven primarily by m-commerce through mobile apps.

5. Financial Inclusion

Government initiatives like Jan Dhan Yojana and Digital India spurred financial inclusion, enabling rural consumers to engage in digital transactions.

6. Market Size and CAGR

The Indian m-commerce market has grown at a compound annual growth rate (CAGR) of over 40% from 2018 to 2023, with rural areas being a key driver.

These statistics underscore the rapid adoption and expansion of m-commerce in India, particularly within rural areas. The increasing accessibility of mobile technology continues to drive this upward trend, reshaping the retail ecosystem across the country.

8. Conclusion

Due to advancement and low cost of smartphones, reduced mobile internet tariff, busy life of people has attracted the people to do transactions on mobile device. Smartphones are developed to overcome the limitations of M-Commerce. Due to increasing access to smartphones and growing mobile Internet penetration over the past few years, the country has seen a staggering rise in everyday transactions carried out via mobile devices in rural India. Rural internet users increased by over 40%, surpassing urban internet users in terms of growth rate. By 2023, rural areas accounted for more than 425 million internet users, facilitating m-commerce activities. Ultimately, m-commerce has

the potential to revolutionize economic activities, connectivity, and quality of life in rural India, paving the way for a more equitable and prosperous future.

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IDENTIFYING RED FLAGS IN FINANCIAL FRAUD: TECHNIQUES AND BEST PRACTICES

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ABSTRACT

Financial fraud poses significant risks to the stability of businesses and the broader economy. This Financial fraud poses significant risks to organizations and economies, eroding trust and causing substantial financial losses. Detecting red flags—early indicators of potential fraudulent activities—is critical to mitigating these risks. This research paper explores the key techniques and best practices for identifying red flags in financial fraud, providing a comprehensive framework for practitioners and policymakers. The study leverages advanced analytical methods, including data mining, machine learning, and forensic accounting, to uncover patterns and anomalies in financial data. It also highlights the role of regulatory standards, corporate governance, and ethical practices in fraud prevention. Case studies and real-world examples illustrate how early detection of red flags has successfully prevented major financial scandals. The findings underscore the importance of integrating technological tools with traditional oversight mechanisms to develop a proactive approach to combating financial fraud. This paper aims to contribute to the growing body of knowledge in fraud detection and to offer actionable insights for improving organizational resilience against financial misconduct.

(Keywords: Red flags, fraud detection, fraud risk, audit trails)

1. INTRODUCTION

Fraud red flags are suspicious indicators or warning signs pointing to possible fraudulent activities in an organization's financial records. These red flags serve as cues for auditors, investigators, or management to investigate further and identify potential instances of fraud. The financial fraud red flags may include unexplained discrepancies or irregularities in financial statements.

Financial fraud poses a significant threat to individuals, businesses, and economies worldwide, undermining trust and stability within financial systems. As technology and financial instruments evolve, so do the methods employed by fraudsters, necessitating advanced techniques and best practices to identify and mitigate these risks. This introduction explores the importance of recognizing red flags in financial fraud, delving into the sophisticated strategies and preventative measures essential for safeguarding financial integrity. Understanding the telltale signs of financial fraud is crucial for early detection and intervention, as it enables organizations and regulatory bodies to minimize losses and protect stakeholders. Among the most common red flags are unusual transactions, discrepancies in financial statements, and behaviors that deviate from established patterns. These indicators often signify deeper issues, such as embezzlement, money laundering, or insider trading. To effectively identify these red flags, financial professionals must leverage a combination of traditional auditing techniques and modern analytical tools, including data mining, artificial intelligence, and machine learning. These technologies enhance the ability to detect anomalies by analyzing vast datasets for patterns and irregularities that human auditors might overlook.

Moreover, implementing a robust internal control system is pivotal in preventing and detecting financial fraud. This includes segregation of duties, regular audits, and stringent approval processes for financial transactions. Employee training and awareness programs also play a critical role, as they equip staff with the knowledge to recognize and report suspicious activities. Best practices in financial fraud prevention extend beyond technology and internal controls. They encompass a holistic approach that involves fostering an ethical corporate culture, ensuring transparency in financial reporting, and maintaining open lines of communication within and outside the organization. Regulatory compliance is another cornerstone of fraud prevention, with adherence to laws and standards such as the Sarbanes-Oxley Act (SOX) and the Anti-Money Laundering (AML) regulations providing a framework for accountability and oversight. In summary, identifying red flags in financial fraud requires a multifaceted approach that combines advanced technological solutions, robust internal controls, employee vigilance, and strict regulatory compliance. As financial fraudsters continue to adapt and innovate, so must the strategies employed to combat them, ensuring the protection of assets and the preservation of trust in financial systems. Through continuous improvement and vigilance, organizations can stay ahead of fraudsters and maintain the integrity of their financial operations.

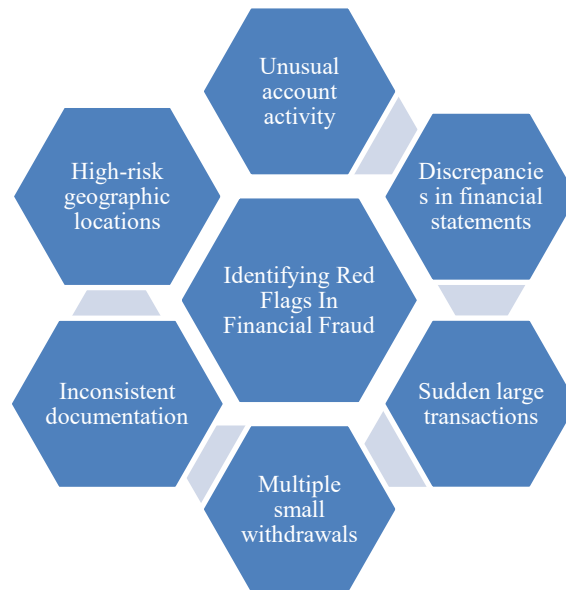


Figure 1: Identifying Red Flags in Financial Fraud

It is imperative to recognize red flags in financial deception in order to preserve the integrity and stability of financial systems. The early identification of suspicious activities can prevent substantial financial losses, safeguard the interests of stakeholders, and preserve trust in financial institutions. Red flags, including unexpected transactions, discrepancies in financial statements, and peculiar account activity, are critical indicators of potential fraud. Organizations can instigate investigations and implement corrective measures in a timely manner by identifying these warning signs. Furthermore, the identification and comprehension of red flags aid in the improvement of internal controls and compliance measures, thereby reducing the likelihood of future fraud incidents. Ultimately, safeguarding assets, ensuring regulatory conformance, and fostering a culture of ethical financial practices necessitates vigilance in identifying financial fraud red flags.

2. TYPES OF RED FLAGS AND FRAUD

Red flags that are common to most types of fraudulent activity can be categorized as **employee** and **management red flags**.

Employee Red Flags

- Employee lifestyle changes: expensive cars, jewelry, homes, clothes
- Significant personal debt and credit problems
- Behavioral changes: these may be an indication of drugs, alcohol, gambling, or just fear of losing the job
- High employee turnover, especially in those areas which are more vulnerable to fraud

- Refusal to take vacation or sick leave
- Lack of segregation of duties in the vulnerable area

Management Red Flags

- Reluctance to provide information to auditors
- Managers engage in frequent disputes with auditors
- Management decisions are dominated by an individual or small group
- Managers display significant disrespect for regulatory bodies
- There is a weak internal control environment
- Accounting personnel are lax or inexperienced in their duties
- Decentralization without adequate monitoring
- Excessive number of checking accounts
- Frequent changes in banking accounts
- Frequent changes in external auditors
- Company assets sold under market value
- Significant downsizing in a healthy market
- Continuous rollover of loans
- Excessive number of year end transactions
- High employee turnover rate
- Unexpected overdrafts or declines in cash balances
- Refusal by company or division to use serial numbered documents (receipts)
- Compensation program that is out of proportion
- Any financial transaction that doesn't make sense - either common or business
- Service Contracts result in no product
- Photocopied or missing documents

3. THE IMPORTANCE OF RED FLAGS

The knowledge of fraud symptoms (red flags) is an important factor in preventing and detecting fraud (Wuerges & Borba, 2014). Although fraud crime is rarely observed, fraud symptoms/indicators (red flags) are observed (Albrech, 2012). Yucel (2013) examined the effectiveness of the 42 red flags determined by SAS 99 in detecting fraud through questioner distributed to Independent Auditors of Capital Markets Board in Turkey (Yucel, 2013). Auditors' responses were analyzed using SPSS 17, and the author found that the 42 red flags were somewhat effective' in detecting fraud, especially red flags related to opportunities (Yucel, 2013). Gullkvist and Jokipii (2013) emphasized that red flags carried different weights of

importance and claimed that auditors consider client dishonesty as an important red flag. Auditing Standards 12, SAS 99 and International Standard on Auditing ISA 240 (Authoritative literature) require auditors to identify and assess risks of material misstatement by analyzing risk factors (red flags) related to company internal environment (nature of the company, internal control, accounting practice, and measurement of financial performance), external environment (such as competitive, technological, and legal and political environment), and a company's personnel. Therefore, red flags are important indicators and early warning signs of fraud possibility. Despite the importance of red flags, Albrecht, Albrecht, and Zimbelman, 2015 claimed that many fraud symptoms (red flags) go unnoticed, and even recognized red flags are not often pursued or investigated. PCAOB inspection report revealed that auditors seemed to mechanically check off on checklists of red flags and not expanding their analytical procedures to address the risk of these fraud indicators (Whitehouse, 2012).



Figure 2: Understanding the Importance of Identifying Red Flags in Financial Transactions

4. SCOPE OF THE STUDY

The scope of this study on "Identifying Red Flags in Financial Fraud: Techniques and Best Practices" encompasses a comprehensive analysis of methods and practices for detecting financial fraud. The research will focus on identifying common indicators of fraudulent activities, including irregularities in financial statements, unusual transaction patterns, and discrepancies in accounting records. Techniques such as forensic accounting, data analytics, and behavioural analysis will be explored. The study will also examine best practices for implementing fraud detection systems, employee training, and regulatory compliance to mitigate risks. By evaluating case studies and current fraud prevention strategies, the research

aims to provide actionable insights for organizations to enhance their fraud detection capabilities and protect financial integrity.

5. OBJECTIVES OF THE STUDY

- Identify key indicators of financial fraud through advanced detection techniques.
- Evaluate best practices for mitigating risks and preventing financial fraud.
- Identify suspicious behaviour which could indicate money laundering or other financial crime occurring.

6. RED FLAGS IN FINANCIAL FRAUD

Red flags in financial fraud are indicators that indicate the possibility of fraudulent activity. These consist of unexplained changes in financial behavior, discrepancies in financial records, or unusual or unauthorized transactions. Indicators of high risk may include substantial deviations from standard business practices, suspicious patterns in financial activities, or irregularities in reporting. Monitoring for these red flags is instrumental in the early detection and prevention of financial fraud, as well as in the protection of assets and the adherence to financial regulations. In order to mitigate fraud, it is essential to promptly investigate and respond to these indicators.

Identifying Red Flags for Fraud Detection

The identification of red flags is essential for the identification of potential fraud. Discrepancies in financial records, sudden changes in account activity, and peculiar transaction patterns are among the key indicators. It is imperative to be cognizant of these indicators in order to implement prompt action.

1. Unusual Transaction Patterns:

Deviations in transaction volumes that are substantial may indicate fraudulent activity. For instance, a sudden increase or decrease in the number of transactions within a brief period or fluctuations in the size and frequency of transactions may suggest fraudulent activity. It is particularly crucial for businesses with high transaction volumes, such as financial institutions or e-commerce platforms, to monitor anomalies in transaction patterns.

2. Unexpected Changes in Account Activity:

Suspicion may be aroused by abrupt modifications in account activity. A abrupt increase in withdrawals or transfers in an account that typically exhibits consistent transaction patterns may indicate unauthorized activity. It is imperative to conduct consistent account activity

surveillance in order to identify and rectify these abrupt changes prior to their potential to result in substantial financial losses.

3. Discrepancies in Financial Records:

Decision-making and reporting necessitate precise financial documents. Disparities, such as unexplained discrepancies between reported and actual figures, can serve as a warning sign. Attempts to manipulate financial data may be indicated by unanticipated adjustments to financial statements or inconsistencies in accounting entries, for example. It is imperative to conduct regular audits and establish robust internal controls in order to identify and rectify these irregularities.

4. Changes in Behavior:

Employees displaying signs of financial stress, reluctance to take vacations, or having an unusually close relationship with vendors.

5. Rapid Growth:

Companies growing disproportionately fast compared to industry standards without sufficient financial justification.

7. FRAUD DETECTION TECHNIQUE

In order to identify and mitigate fraud risks, financial institutions implement a variety of detection techniques. These may encompass anomaly detection, behavior analysis, artificial intelligence, and machine learning algorithms. Real-time alerts and continuous monitoring are also indispensable components.

1. Artificial Intelligence (AI):

AI revolutionizes the detection of financial misconduct by analyzing immense datasets at velocities that surpass the capacity of humans. AI systems improve the precision of anomaly and anomalous behavior detection by adapting and learning from patterns through the use of machine learning models. These systems have the potential to reveal intricate relationships and trends that conventional methods may overlook.

2. Algorithms for Machine Learning:

Fraud detection is significantly influenced by the continuous evolution and adaptation of machine learning algorithms to new fraudulent patterns. These algorithms detect deviations and anomalies that suggest deception by examining historical transaction data. Over time, their precision increases as they analyze additional data.

3. Identification of Anomalies:

Anomaly detection is the process of recognizing patterns that substantially deviate from the norm. This entails the identification of transactions or activities that are geographically unusual, unusually high in volume, or inconsistent with typical purchasing behavior in the context of financial fraud detection. These potential fraud indicators are effectively identified by anomaly detection algorithms.

4. Behavior Analysis:

Behavioral analysis is the process of analyzing the transaction patterns of individual users or entities. Deviations from this standard can be identified as potentially fraudulent by establishing a baseline of acceptable conduct. This analysis encompasses factors such as transaction frequency, quantity, and timing, with any substantial deviations necessitating additional investigation.

5. Continuous Monitoring:

Real-time monitoring of transactions and activities is essential for the effective detection of fraud. Continuous monitoring enables the immediate analysis and response to potential threats, thereby preventing fraudulent transactions before they cause significant damage. In the fast-paced financial transaction environment, this proactive approach is indispensable.

6. Real-Time Alerts:

Fraud detection systems necessitate real-time alerts. When suspicious activity is identified, automated alerts are generated to facilitate immediate action. In order to prevent additional fraudulent activity, these alerts can either notify pertinent personnel or initiate automated responses, such as suspending accounts or barring transactions.

7. Computer Assisted Auditing Tools (CAATs):

CAATs are computer programs developed for the auditors. Forensic accounting software comes into two varieties- data extraction software and financial analysis software. Data extraction software is designed to conduct spreadsheet analysis on all the company's data base records, such as billing, accounts receivable, payroll, purchasing etc which helps in detecting anomalies. Financial analysis software analyses the financial statements and benchmarks the ratios between different accounts such as billing by revenues or supply costs as a percentage of revenue.

8. Data Mining Techniques:

It is a set of computer-assisted techniques designed to automatically mine large volumes of data for new, hidden or unexpected information or patterns. Data mining techniques are

categorized in three ways: Discovery, Predictive modeling and Deviation and Link analysis. It discovers the usual knowledge or patterns in data, without a predefined idea or hypothesis about what the pattern may be, i.e. without any prior knowledge of fraud. In predictive modeling, patterns discovered from the database are used to predict the outcome and to guess data for new value items. In Deviation analysis the norm is found, first, and then those items are detected that deviate from the usual within a given threshold (to find anomalies by extracted patterns). Link discovery has emerged recently for detecting a suspicious pattern. It mostly uses deterministic graphical techniques, Bayesian probabilistic casual networks. This method involves “pattern matching” algorithm to extract any rare or suspicious cases.

9. Ratio Analysis:

Another useful fraud detection technique is the calculation of data analysis ratios for key numeric fields. Like financial ratios that give indications of the financial health of a company, data analysis ratios report on the fraud health by identifying possible symptoms of fraud. Detection of financial statement fraud is on the front burner. With billions of losses behind us from such companies as Enron, Tyco, and WorldCom, the numbers of cases has slowed but not stopped. Three commonly employed ratios are: -

- The ratio of the highest value to the lowest value (Max/min);
- The ratio of the highest value to the second highest Value (max/max2); and
- The ratio of the current year to the previous year.

8. BEST PRACTICES FOR REDUCING FRAUD

A comprehensive and proactive strategy that integrates a culture of security, vigilant processes, and technological advancements is necessary to mitigate fraud. The implementation of multi-layered authentication mechanisms is a critical practice. Businesses enhance their defenses against identity theft and unauthorized access by mandating the use of multiple forms of verification, including passwords, biometrics, or one-time passcodes. This creates a formidable barrier against illicit activities, rendering it significantly more difficult for fraudsters to circumvent security measures. Furthermore, the consistent evaluation and updating of authentication protocols guarantees that security measures are in accordance with the changing landscape of fraud tactics. Another critical best practice is the cultivation of an organizational culture that prioritizes education and awareness. Employee training programs that emphasize the identification and mitigation of potential fraud risks significantly influence the development of a vigilant workforce. Businesses empower their employees to serve as the initial line of defense by providing them with information regarding the most recent fraud tactics, phishing schemes,

and social engineering techniques. This proactive approach not only mitigates the probability of falling victim to fraud but also establishes a shared obligation to preserve a secure environment. Additionally, the establishment of an organizational culture that prioritizes and values security motivates employees to remain vigilant, promptly report any suspicious activities, and actively participate in the ongoing fraud prevention initiative.

9. REVIEW OF LITERATURE

Victor Munteanu et.al (2024) through an empirical study of a fraudulent corporate entity, the quality of information contained within financial reports will be assessed, as well as the effectiveness of managerial decision-making substantiation. The data processing was carried out using the statistical software SPSS 19.0. when making graphs and interpreting the obtained results. **Mohamed Abd El Aziz Hegazy et.al (2010)** The study assesses if red flags help external auditors detect fraudulent financial reporting in Egypt. Data from 100 auditors shows red flags are deemed useful, though auditor experience and audit firm type don't affect this perception. The research identifies specific red flags and ranks them by importance, suggesting future studies explore additional red flags. **YÜCEL, Elif (2013)** The study evaluates the effectiveness of 42 red flags from SAS No.99 in detecting financial fraud from Turkish auditors' perspectives. Analysis of responses showed that auditors rated these red flags as "somewhat effective," with "opportunities" being "mostly effective" in detecting fraud. Companies and auditors should focus on opportunity-related indicators to prevent fraud.

Elda du Toit (2023) According to the Association of Certified Fraud Examiners, financial statement fraud, though the least frequent, causes the highest monetary loss. This study evaluates whether investors can detect such fraud by analyzing annual reports with 16 fraud indicators. Results reveal that fraud characteristics vary by case and are easier to identify retrospectively. **Will Kenyon et.al (2011)** This study explores potential red flags and detection techniques for fraud, focusing on fraudulent financial reporting, misappropriation of assets, fraudulent revenues, and improper expenditures. Detection methods include routine audit procedures, document review for deception, and comparisons such as horizontal and vertical analysis, along with financial ratios. **Glen D. Moyes et.al (2019)** This study explores the effectiveness of various red flags in detecting financial statement fraud, as perceived by managers. Questionnaires were sent to CEOs, CFOs, controllers, treasurers, and HR directors. Findings highlight key red flags considered most significant by professionals, aiding users in monitoring and addressing potential fraud risks.

Namrata Sandhu (2022) Exploring financial services fraud, this study identifies six red flag behaviors prevalent in such frauds compared to non-financial services frauds. Using a pluralistic mixed methodology, the research reveals these behaviors through semi-structured interviews and descriptive analysis, contributing to fraud awareness training by profiling typical fraud perpetrators. **Ashraf Elsayed (2017)** Red flags indicate potential fraud risks, linked to pressure, opportunity, and rationalization per the fraud triangle. They include analytical anomalies, accounting issues, control weaknesses, and unusual behavior. This study assessed indicators like financial performance, health, management efficiency, accounting practices, and corporate governance to predict and distinguish fraudulent from non-fraudulent financial reporting. **Moyes, Glen D. (2013)** This study evaluates the effectiveness of 42 red flags for detecting fraudulent financial reporting as outlined by SAS No. 99. A survey of 1,000 CPAs yielded 128 responses, revealing that 15 red flags are considered 'more effective,' 15 'effective,' and 12 'less effective' in fraud detection. These findings aid CPAs in auditing publicly held corporations. **Ping Lin et.al (2015)** This study evaluates the effectiveness of 42 red flags for detecting fraudulent financial reporting as perceived by 82 internal auditors. Findings show 15 red flags were rated as highly effective, 14 as effective, and 13 as ineffective. Internal auditors rated red flags related to “opportunity” and “attitudes and rationalizations” as more effective than those related to “incentives and pressures.” **C Koornhof et.al (2013)** This study explores the use of red flags by investors and lenders in South Africa to detect financial statement fraud. A survey revealed that while there is awareness of red flag benefits, a structured approach to utilizing them is lacking. Respondents rated all red flags as important, with no significant distinction among different categories.

Literature Survey

Author & Year	Factors/Variables	Method	Conclusion
Manuelito C. Macailao (2020)	Behavioral and organizational signs of fraud; Internal auditors' knowledge	Descriptive phenomenological approach; Interviews	Key indicators of fraud and the importance of auditors' knowledge in prevention and mitigation.
Cristian Baú Dal Magro et al. (2016)	Red flags in fraud detection within credit unions; Emphasis on operational	Descriptive study	Auditors prioritize red flags related to operations and controls,

Author & Year	Factors/Variables	Method	Conclusion
	activities and internal controls		underscoring their importance in audits.
Namrata Sandhu (2016)	Behavioral red flags: ambition, social aloofness, long hours, job dissatisfaction, unethical actions	Qualitative research; Interviews	Identified key red flags and integrated findings with fraud triangle theory for enhanced detection.
Benita Gullkvist et al. (2013)	Red flags for fraudulent financial reporting vs. asset misappropriation; Auditor perspectives	Survey; Analysis of responses	Differences in red flag priorities: internal auditors focus on asset misappropriation, while others vary.
Chandan Saxena et al. (2024)	Transaction laundering; Advanced tech solutions; Regulatory compliance	Conceptual legal approach; Network data analysis	Advocates for tech solutions and regulatory compliance to combat transaction laundering.
Abdelwahab A. Ibrahim et al. (2023)	Financial reporting fraud; Indicators like weak controls, poor record-keeping	Survey; Analysis of 33 statements	Common fraud cases and indicators; Effective methods include reporting, regulation, and transparency.
Evmorfia Maria Iosifidou (2023)	Financial statement fraud detection; MD&A approaches, linguistic variables, N-grams	Data science; NLP tools; Random Forest classification	Proposed models for enhanced fraud detection using linguistic and N-gram analysis.
Novy Silvia Dewi et al. (2023)	Professional skepticism; Self-efficacy in fraud detection; Firms listed on Indonesia Stock Exchange	Quantitative approach; Multiple linear regression	Positive relationship between skepticism, self-efficacy, and fraud detection.

Author & Year	Factors/Variables	Method	Conclusion
Sina Patel et al. (2023)	Banking and financial industry practices; Compliance strategies; Customer due diligence	Descriptive analysis	Improved practices and compliance strategies may reduce fraud risks, mitigate failures, and enhance awareness.

10. RESEARCH GAP

Despite extensive research into red flags for detecting financial fraud, several gaps remain that warrant further investigation. While studies such as those by Victor Munteanu et al. (2024) and Mohamed Abd El Aziz Hegazy et al. (2010) have explored the utility of red flags in detecting fraud, there is a need for a deeper understanding of how these indicators perform across different industries and types of fraud. Many studies, including those by Yücel (2013) and Elda du Toit (2023), focus on specific regions or types of fraud but do not provide a comprehensive, comparative analysis of red flags' effectiveness globally. the impact of emerging technologies and advanced analytical tools on the detection of red flags is underexplored. Research by Chandan Saxena et al. (2024) on transaction laundering and Evmorfia Maria Iosifidou (2023) on linguistic variables highlights the potential for new methodologies but lacks integration with traditional red flag indicators. There is also limited exploration of the interplay between auditors' experience and the effectiveness of red flags, as noted by Ping Lin et al. (2015) and Koornhof et al. (2013). Addressing these gaps could enhance the robustness of fraud detection frameworks and improve financial integrity across various sectors.

11. RESEARCH METHODOLOGY

A structured quantitative approach was employed to investigate the identification of red flags in financial fraud, utilizing a cross-sectional design. The research was conducted based on secondary sources, including academic literature, case studies, and reports. The data analysis will involve a thematic literature analysis, focusing on identifying the emerging trends and their implications for fraud investigation and prevention. The study's significance lies in its contribution to the existing literature on forensic accounting by identifying the emerging trends and their impacts on fraud investigation and prevention. The study will provide practitioners, policymakers, and researchers with valuable insights into the future direction of forensic accounting and how to address emerging challenges in the field.

12. LIMITATIONS OF THE STUDY

There are several limitations of this study. Firstly, the research is based on the existing literature and may not capture all the latest developments in the rapidly evolving field of red-flag investigation and forensic accounting. Secondly, this study does not cover the whole population of studies which have been done in the area of forensic accounting. There can be case studies, book sections, and conference publication of forensic accounting, which have not been covered in this study. There are studies which have been done in forensic accounting but not published in any of the considered electronic databases. Such studies have not been covered under the current study. Thirdly, the effectiveness of these emerging trends in detecting and preventing red-flag transactions may vary depending on the context, industry, and organizational factors.

13. CONCLUSION & SUMMARY OF FINDING

Detecting and preventing financial fraud requires a combination of awareness, robust internal controls, and advanced technologies. By staying vigilant for red flags, employing data analytics, and implementing proactive fraud detection measures, organizations can better safeguard their assets and reputation. Continuous monitoring, staff training, and a strong ethical culture are essential components of an effective anti-fraud strategy. As fraud schemes evolve, leveraging advanced technologies such as AI and machine learning becomes increasingly important, ensuring that organizations remain agile and resilient against emerging threats. Based on the comprehensive review of relevant literature and analysis of emerging trends in forensic accounting, the **essential findings** for red flag transactions can be summarized as follows:

- Red flags are warnings that something could be or is wrong. If such are not attended can be converted into a fraud.
- Auditors, employees, and management need to be aware of red flags in order to monitor the situation and then take corrective action as needed.
- Employees who notice that red flags are ignored may mistakenly believe that it is okay to game the system or that they won't get caught.
- A little fraud soon becomes a large one if left to grow.
- Data analytics techniques, such as data mining, machine learning, and predictive modeling, are increasingly used in forensic accounting for fraud detection and Prevention. These techniques can potentially enhance the effectiveness and efficiency of fraud investigations by analyzing large volumes of data and identifying patterns and anomalies that may indicate fraudulent activities. However, challenges related to data quality, privacy, and ethical considerations must be carefully addressed in implementing data analytics in forensic accounting.

- Detecting financial fraud requires a combination of advanced data analytics, machine learning models, and traditional forensic accounting techniques. Key indicators of financial fraud can be identified using these approaches, focusing on patterns, anomalies, and irregularities in financial data.
- Detecting **red-flag transactions** involves identifying irregular or suspicious activities in financial data that deviate from normal business operations or suggest potential fraud.
- Suspicious behaviors that could indicate **money laundering** or other financial crimes often involve patterns, transaction anomalies, or behavioral red flags that deviate from normal business operations.

14. FUTURE SCOPE

Future research on identifying of red flags in financial fraud should concentrate on several critical areas to improve comprehension and prevention. First and foremost, investigating the efficacy of emerging technologies, including artificial intelligence and blockchain, in identifying subtle fraud indicators could offer novel insights and strategies for early detection. An additional prospective approach is to examine the influence of organizational culture and employee behaviour on the effectiveness of fraud detection, as these factors may affect the effectiveness of fraud prevention measures. Furthermore, the examination of cross-industry comparisons can reveal sector-specific vulnerabilities and best practices. To develop more comprehensive approaches, future research should also assess the integration of sophisticated data analytics with traditional fraud detection methods. And finally, research could examine the influence of regulatory changes and compliance requirements on fraud detection strategies. The following guidelines will assist in the enhancement of financial fraud prevention practices, the closure of existing voids, and the refinement of existing techniques.

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Green Marketing and Its Impact on Brand Image: A Secondary Data Review of Case Studies from Leading Brands

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Abstract:

This research paper explores the concept of green marketing and its significant impact on brand image. It reviews secondary data from various case studies of leading brands that have successfully implemented green marketing strategies. The findings highlight the relationship between sustainable practices and consumer perception, emphasizing the importance of environmental responsibility in enhancing brand equity. The paper concludes with recommendations for brands looking to improve their image through green marketing initiatives.

1. Introduction:

1.1 Definition of Green Marketing

Green marketing refers to the promotion of products and services based on their environmental benefits. It encompasses a range of activities, including product modification, changes to the production process, sustainable packaging, and advertising strategies that highlight a brand's commitment to environmental sustainability. The rise of green marketing is a response to growing consumer awareness of environmental issues and the demand for sustainable products.

1.2 Importance of Brand Image

Brand image is the perception of a brand in the minds of consumers, shaped by their experiences, beliefs, and interactions with the brand. A positive brand image can lead to increased customer loyalty, higher sales, and a competitive advantage in the marketplace. In an era where consumers are increasingly concerned about environmental issues, a strong brand image that reflects sustainability can significantly influence purchasing decisions.

1.3 Objective of the Study

The objective of this paper is to analyse how green marketing influences brand image through a review of secondary data from case studies of leading brands. By examining successful green marketing strategies, this study aims to provide insights into the relationship between sustainability and brand perception.

2. Literature Review:

2.1 Historical Context

The concept of green marketing has evolved over the decades. Initially, it was limited to niche markets, with early adopters like The Body Shop and Patagonia focusing on ethical sourcing and environmental activism. However, as global awareness of environmental issues has increased, green marketing has become a mainstream strategy adopted by many leading brands.

2.2 Theoretical Framework

This study utilizes the Corporate Social Responsibility (CSR) theory, which posits that companies engaging in socially responsible practices can enhance their brand image and consumer trust. CSR encompasses a wide range of activities, including environmental sustainability, ethical labor practices, and community engagement.

2.3 Consumer Behavior

Research indicates that consumers are increasingly making purchasing decisions based on a brand's environmental practices. According to a Nielsen report (2015), 66% of global consumers are willing to pay more for sustainable brands. This shift in consumer behavior underscores the importance of green marketing in shaping brand image.

3. Methodology:

3.1 Data Collection

This study employs a qualitative approach, reviewing secondary data from academic journals, industry reports, and case studies of leading brands such as Unilever, Nike, Tesla, Coca-Cola, H&M, and Procter & Gamble. The data collected includes information on green marketing strategies, consumer perceptions, and brand performance metrics.

3.2 Analysis Techniques

Content analysis is used to extract themes related to green marketing strategies and their impact on brand image. This method allows for a systematic examination of the data to identify patterns and insights.

4. Case Studies:

4.1 Unilever

4.1.1 Sustainable Living Plan

Unilever's Sustainable Living Plan is a comprehensive strategy aimed at reducing the company's environmental footprint while increasing its positive social impact. The plan includes

commitments to sourcing sustainable materials, reducing greenhouse gas emissions, and improving health and well-being.

4.1.2 Impact on Brand Image

Unilever's commitment to sustainability has significantly enhanced its brand image. According to a study by Unilever, 67% of consumers prefer brands that are environmentally responsible. The company's focus on sustainability has not only attracted environmentally conscious consumers but has also fostered loyalty among existing customers.

4.2 Nike

4.2.1 Move to Zero Initiative

Nike's Move to Zero initiative aims for zero carbon and zero waste across its supply chain. The initiative includes the use of sustainable materials, renewable energy, and innovative recycling programs.

4.2.2 Brand Perception

Nike's efforts in sustainability have led to a stronger brand image, particularly among younger consumers who prioritize environmental responsibility. A survey conducted by Nike revealed that 70% of consumers are more likely to purchase from brands that demonstrate a commitment to sustainability.

4.3 Tesla

4.3.1 Innovative Approach

Tesla's focus on electric vehicles and renewable energy solutions positions it as a leader in sustainable innovation. The company's mission to accelerate the world's transition to sustainable energy resonates with environmentally conscious consumers.

4.3.2 Consumer Loyalty

Tesla's brand image is closely tied to its environmental mission, resulting in a loyal customer base that values sustainability. Research indicates that Tesla owners are more likely to recommend the brand to others, further enhancing its reputation.

4.4 Coca-Cola

4.4.1 World Without Waste Initiative

Coca-Cola has launched the "World Without Waste" initiative, which aims to collect and recycle a bottle or can for every one sold by 2030. The company is committed to making its packaging 100% recyclable by 2025 and using at least 50% recycled material in its PET plastic bottles by

2030. This initiative reflects Coca-Cola's recognition of the environmental impact of plastic waste and its commitment to sustainability.

4.4.2 Impact on Brand Image

Coca-Cola's sustainability efforts have positively influenced its brand image, particularly among environmentally conscious consumers. The initiative has garnered significant media attention and consumer support, with many appreciating the company's proactive approach to addressing plastic waste. According to a survey conducted by Coca-Cola, 70% of consumers are more likely to purchase from brands that demonstrate a commitment to sustainability. This initiative has helped Coca-Cola maintain its relevance in a market increasingly focused on environmental issues.

4.5 H&M

4.5.1 Conscious Collection

H&M has introduced its "Conscious Collection," which features clothing made from sustainable materials such as organic cotton and recycled polyester. The brand aims to promote sustainable fashion and reduce its environmental footprint through responsible sourcing and production practices.

4.5.2 Brand Perception

H&M's commitment to sustainability has enhanced its brand image, particularly among younger consumers who are increasingly concerned about fast fashion's environmental impact. The Conscious Collection has received positive feedback, with many consumers appreciating the brand's efforts to provide stylish yet sustainable options. A study by H&M found that 60% of consumers are more likely to shop at brands that prioritize sustainability, indicating a strong correlation between green marketing and brand loyalty.

4.6 Procter & Gamble (P&G)

4.6.1 Ambition 2030

Procter & Gamble has launched its "Ambition 2030" initiative, which aims to make all of its products and packaging recyclable or reusable by 2030. The company is also committed to reducing its greenhouse gas emissions and water usage across its supply chain.

4.6.2 Impact on Brand Image

P&G's sustainability initiatives have positively impacted its brand image, particularly among consumers who prioritize environmental responsibility. The company's commitment to sustainability has resonated with consumers, leading to increased brand loyalty. According to P&G, 65% of consumers are more likely to choose brands that demonstrate a commitment to

sustainability. This initiative has helped P&G maintain its competitive edge in a market where consumers are increasingly seeking environmentally friendly products.

5. Discussion:

5.1 Correlation Between Green Marketing and Brand Image

The analysis reveals a strong correlation between effective green marketing strategies and enhanced brand image. Brands that prioritize sustainability not only improve their public perception but also foster deeper connections with consumers. The case studies of Unilever, Nike, Tesla, Coca-Cola, H&M, and Procter & Gamble illustrate how green marketing initiatives can lead to increased consumer trust and loyalty.

For instance, Unilever's Sustainable Living Plan has positioned the brand as a leader in sustainability, resulting in a significant percentage of consumers preferring its products over less environmentally conscious competitors. Similarly, Nike's Move to Zero initiative has resonated with younger consumers, who are increasingly making purchasing decisions based on a brand's environmental impact. Tesla's commitment to renewable energy and electric vehicles has created a strong brand identity that appeals to environmentally conscious consumers, further solidifying its market position.

5.2 Consumer Perception and Behavior

Consumer perception plays a crucial role in the effectiveness of green marketing. As consumers become more aware of environmental issues, they are more likely to support brands that demonstrate a commitment to sustainability. The Nielsen report (2015) indicates that a significant portion of consumers is willing to pay a premium for sustainable products, highlighting the potential for brands to leverage green marketing as a competitive advantage.

Moreover, the concept of "greenwashing"—where brands falsely claim to be environmentally friendly—can severely damage brand image. Consumers are becoming increasingly savvy and can often discern genuine efforts from mere marketing tactics. Brands that engage in authentic green marketing practices are more likely to build trust and loyalty among their customer base.

5.3 Challenges in Green Marketing

While the benefits of green marketing are evident, brands also face challenges in implementing these strategies. One major challenge is the potential for greenwashing, which can lead to consumer skepticism. Brands must ensure that their sustainability claims are backed by genuine practices and transparent reporting. Failure to do so can result in backlash and damage to brand reputation.

Additionally, the cost of implementing sustainable practices can be a barrier for some companies, particularly smaller businesses. However, as consumer demand for sustainable products continues to grow, investing in green marketing may become increasingly necessary for long-term success.

5.4 Future Trends in Green Marketing

The future of green marketing is likely to be shaped by several trends:

1. **Integration of Technology:** The use of technology in sustainability efforts will become increasingly prevalent. Brands are leveraging data analytics, artificial intelligence, and blockchain technology to track their environmental impact, optimize supply chains, and ensure transparency in their sustainability claims. For example, companies may use blockchain to provide consumers with verifiable information about the sourcing and lifecycle of their products, enhancing trust and accountability.
2. **Circular Economy:** The concept of a circular economy, which emphasizes the reuse and recycling of materials, is gaining traction. Brands are exploring ways to design products that can be easily recycled or repurposed, reducing waste and minimizing environmental impact. This shift not only aligns with consumer preferences for sustainability but also presents opportunities for innovation in product design and business models.
3. **Collaboration and Partnerships:** Collaboration among brands, governments, and non-governmental organizations (NGOs) will be essential in addressing global environmental challenges. Partnerships can lead to innovative solutions and shared resources, enhancing the effectiveness of green marketing initiatives. For instance, brands may collaborate on industry-wide sustainability standards or participate in collective recycling programs to amplify their impact.
4. **Consumer Engagement and Education:** As consumers become more informed about environmental issues, brands will need to engage them in meaningful ways. This includes educating consumers about the benefits of sustainable products and practices, as well as involving them in sustainability initiatives. Brands that foster a sense of community and shared purpose around sustainability are likely to build stronger relationships with their customers.
5. **Holistic Sustainability Approaches:** As consumer expectations continue to evolve, brands will need to adopt a holistic approach to sustainability that encompasses not only environmental concerns but also social and economic factors. This comprehensive

approach will be crucial in building a positive brand image and fostering consumer loyalty. Brands that address issues such as fair labour practices, community engagement, and ethical sourcing will resonate more with socially conscious consumers.

6. Conclusion:

6.1 Summary of Findings

This research confirms that green marketing significantly influences brand image. Companies that adopt sustainable practices not only enhance their reputation but also foster consumer loyalty. The case studies of Unilever, Nike, Tesla, Coca-Cola, H&M, and Procter & Gamble demonstrate that effective green marketing strategies can lead to increased consumer trust and preference. The findings indicate that consumers are increasingly willing to support brands that prioritize sustainability, making green marketing a vital component of modern business strategy.

6.2 Recommendations for Brands

To improve their brand image through green marketing, companies should:

1. **Integrate Sustainability into Core Values:** Brands should embed sustainability into their mission and values, ensuring that all aspects of their operations reflect this commitment.
2. **Communicate Transparently:** Brands must communicate their sustainability efforts transparently to build trust with consumers. This includes providing clear information about sourcing, production processes, and environmental impact.
3. **Engage with Consumers:** Brands should actively engage with consumers to understand their preferences and concerns regarding sustainability. This engagement can inform product development and marketing strategies.
4. **Invest in Innovation:** Companies should invest in research and development to create sustainable products and practices. Innovation can lead to new opportunities and enhance brand differentiation.
5. **Monitor and Report Progress:** Regularly monitoring and reporting on sustainability initiatives can help brands demonstrate accountability and progress, further enhancing their credibility.

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8. Implications for Future Research:

While this study provides valuable insights into the relationship between green marketing and brand image, there are several areas for future research:

1. **Longitudinal Studies:** Future research could benefit from longitudinal studies that track the impact of green marketing initiatives over time. This would provide a clearer understanding of how sustained efforts in sustainability influence brand image and consumer loyalty.
2. **Consumer Segmentation:** Investigating how different consumer segments respond to green marketing could yield insights into targeted marketing strategies. For example, understanding the motivations of millennials versus baby boomers regarding sustainability could help brands tailor their messaging.
3. **Global Perspectives:** As sustainability is a global concern, research could explore how cultural differences influence consumer perceptions of green marketing. This could help multinational brands develop more effective global strategies.
4. **Impact of social media:** Given the rise of social media as a marketing tool, future studies could examine how social media campaigns focused on sustainability affect brand image and consumer engagement.
5. **Measuring Effectiveness:** Developing metrics to measure the effectiveness of green marketing initiatives on brand image would be beneficial. This could include consumer surveys, brand equity assessments, and sales data analysis.

The Key Future Role of Libraries in the context of National Education Policy 2020

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Abstract:

The National Educational policy 2020 (NEP-2020) has been introduced by Ministry of Human Resource Development (Now Ministry of Education) for the new education system for the academic community in India. The policy is divided into four parts: school education, higher education, lifelong learning and other critical focus areas. This paper tries to find out the important role of libraries of all levels, public and academic libraries. The new policy emphasised on infrastructure, services and the working of the libraries. The new policy also includes Information Communication Technology (ICT) digital, online, unique kinds of facilities and services to all types of readers of the nation.

Keywords:NEP-2020, Role of Libraries, Online Resources, Digital Libraries

1.Introduction

National Educational Policy 2020 is given by the Ministry of Human Resources and Development, Government of India, after a long research and development work on the old education policy and the current education need of the society.

The National Education Policy (NEP) 2020, introduced by the Government of India, marks a significant shift in the country's education system. It emphasizes holistic, inclusive, and interdisciplinary education, with a focus on critical thinking, creativity, and the use of technology. One of the key elements of NEP 2020 is the recognition of libraries as essential hubs for learning, knowledge dissemination, and overall development in the educational ecosystem.

In this context, libraries are no longer seen as mere repositories of books, but as dynamic centres that contribute to a more engaging, personalized, and collaborative learning experience. The NEP stresses the importance of libraries in facilitating access to diverse resources, fostering self-directed learning, and supporting the development of skills necessary for the 21st century.

This National Education Policy 2020 is the first education policy of the 21st century. The aim of NEP 2020 is to address the many growing developmental imperatives of our country. This NEP policy proposes the revision and revamping of all aspects of the current education structure,

including the regulations and governance, to create a new system that will be aligned with the inspirational goals of the 21st-century education system at the school level and higher education level.

This introduction will explore the key role of libraries in the context of NEP 2020, emphasizing how they contribute to fostering an inclusive, equitable, and forward-thinking education system. Libraries are seen as an integral part of the strategy to meet the policy's objectives of ensuring universal access to quality education, facilitating lifelong learning, and supporting educational reforms at every level.

2. Objectives of this study

- The objectives of the study are as follows:
- To study the New Education Policy-2020 in context of different types of libraries and
- To find out the role of libraries which is discussed in NEP.

3. Key Role of Libraries in NEP 2020

3.1. Facilitating Access to Diverse Learning Resources

Libraries are at the forefront of providing students and teachers access to a wide range of resources, including textbooks, reference materials, multimedia, and digital content. This aligns with NEP's emphasis on the need for diverse learning tools to cater to various learning styles and promote deeper understanding.

3.2. Supporting Digital and Blended Learning

NEP 2020 advocates for the use of digital technology in education. Libraries support this initiative by providing access to e-books, online databases, MOOCs (Massive Open Online Courses), and other digital learning platforms. This encourages students and educators to engage in self-directed learning and expand their knowledge beyond traditional textbooks.

3.3. Promoting Research and Critical Thinking

Libraries foster an environment conducive to research by providing access to academic journals, research papers, and academic tools. Students and educators can use library resources to conduct in-depth research, enhancing critical thinking and analytical skills, which are central to the policy's vision.

3.4. Ensuring Inclusivity and Accessibility

Libraries play a crucial role in promoting inclusive education by providing resources that support students with disabilities, different learning needs, or those from disadvantaged backgrounds. NEP 2020 emphasizes inclusion, and libraries can offer assistive technologies, Braille books, and audio-visual resources to cater to diverse learners.

3.5. Encouraging Lifelong Learning

NEP 2020 stresses that education should be a lifelong process. Libraries contribute significantly by offering resources for adult education, professional development courses, and self-learning modules. Public libraries, in particular, offer a platform for individuals to continue their education throughout their lives, helping them stay updated with new skills.

4. Literature Review

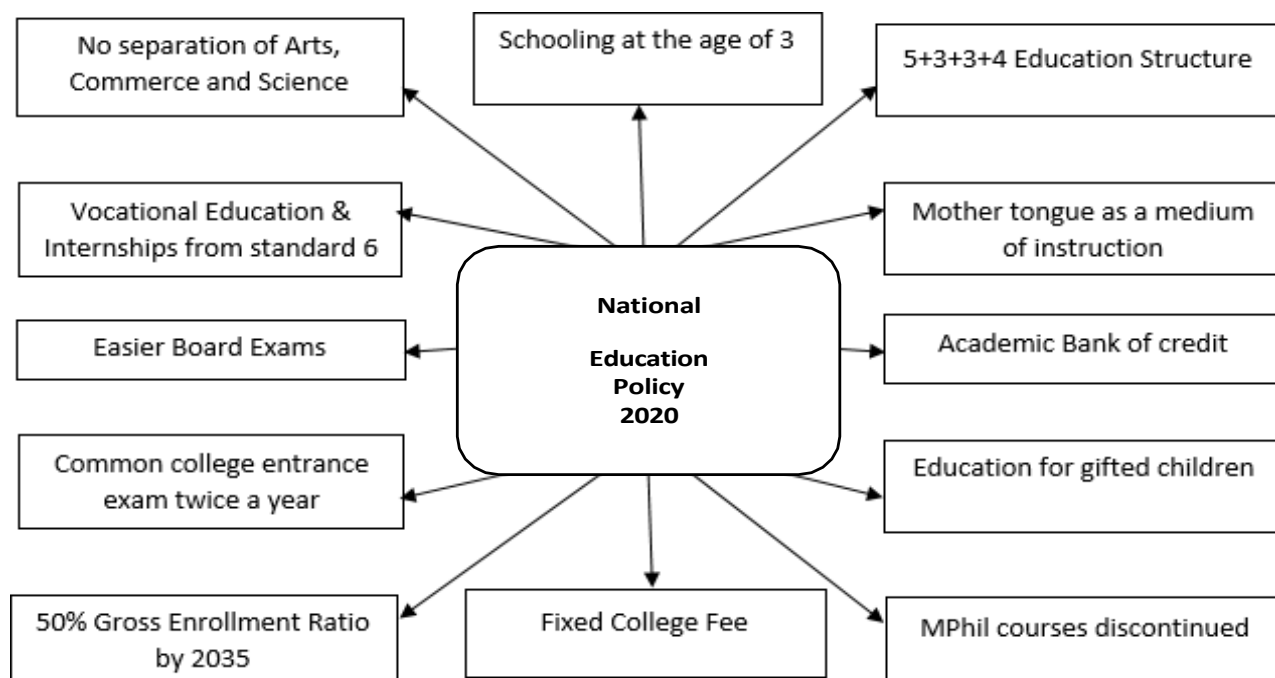
The review of literature is an important part to write up any article. It shows what types of works have been done previously by different types of researchers. So, an attempt has been made to present the views, idea, and opinions of the authors as expressed in their articles or documents. Patil (2020) discusses the different facets of NEP-2020 and tries to find out value of libraries of all levels, public and academic libraries described in this policy. Bhojwani (2020) highlights the impact of national education policy 2020 from the librarians' point of view. On the other hand, Bapte (2022) determines the role and expectations of library and information centres in the National Education Policy 2020. Nevertheless, these expectations have not been mentioned explicitly in NEP. However, libraries with a quality collection and digital resources must impart quality education. Lifelong learning, preservation of national heritage, and developing a reading culture are a few areas where NEP has highlighted the importance of libraries.

5. Significant Highlights of the Policy

Following are the important significant highlights of the education policy

1. The system includes 5 + 3 + 3 + 4
2. The school from 3 years
3. Promoting the libraries
4. Regional or mother-language teaching up to fifth class
5. College affiliation will gradually disappear in 15 years.
6. Foreign universities in India
7. Common Entrance Exam
8. National Education Technology Forum:
9. Academic Bank of Credits
10. Multiple points of entry and exit in higher education
11. Changes in Report Card
12. By 2030, the minimum degree qualification
13. Easing of board exam

6. National Education Policy (NEP 2020), Key features



7.The Changing Role of Libraries in National Education Policy

The NEP recognizes the role of libraries in education and states that they are essential for promoting reading, providing access to information, and fostering critical thinking skills. The policy recognizes that libraries can serve as centres for learning and research providing access to a wide range of resources, including books, journals, and digital media the reading materials needs to developed in all regional languages with standardized content. The Government as well as Private sector institutions should work together to improve the quality of the materials.

The NEP also highlights the importance of school libraries in promoting literacy and language development among children. It recommends that every school should have a library with a collection of age-appropriate books and resources to support students learning. The policy also calls for the development of digital libraries, which can provide access to a wide range of educational resources to students in remote areas.

7.1. Libraries and Teacher Education: - The NEP also recognizes the role of libraries in teacher education. It recommends that all teacher education institutions should have a well-stocked library with access to digital resources. This will enable trainee teachers to access the latest research in education and develop their teaching skills. The policy also recommends that teacher education institutions should promote the use of libraries among their students. This can be achieved by integrating library use into the curriculum and providing training on how to

access and use library resources. The books should be available in school/ public libraries and make an accessible to all types of students including special child. The reading habit should be promoted across all grades and types of students by using various facilities like, book fair, events, exhibitions etc. The application of ICT should in incorporated in school as well as public libraries. The electronic resources should also be developed according to the needs of school and public libraries.

7.2. Libraries and Higher Education: -The NEP recognizes the critical role of libraries in higher education. It recommends that all higher education institutions should have well-equipped libraries with access to digital resources. The policy also calls for the development of research libraries, which can provide access to specialized resources to support research in various fields. The government should provide the proper infrastructure for the adult and lifelong learning process and engage the community learning by proving the best reading materials in the regional format.

The NEP also recognizes the need for libraries to play a more significant role in promoting interdisciplinary research. The policy recommends that libraries should work with faculty and researchers to develop interdisciplinary collections that can support research in multiple fields.

Academic libraries have always played a crucial role in education system, providing access to knowledge, resources, and information. The NEP's recommendations on libraries provide a much-needed framework for enhancing the quality of education in India, by ensuring that students have access to well-equipped libraries at all levels of education. Also strengthen the library materials in all form.

One of the significant challenges in implementing the NEP's recommendations on libraries is the lack of resources and infrastructure. Many schools and colleges in India lack the necessary resources to set up and maintain libraries. Therefore, the government and education institutions need to prioritize investment in libraries and provide the necessary resources and infrastructure.

Another challenge is ensuring that libraries keep pace with the rapidly changing technology Landscape. With the growth of digital media and the internet, libraries must adapt and provide access to digital resources. This requires a significant investment in technology, training, and infrastructure

7.3. Libraries as centres for research support:The NEP also emphasized the value of research at various universities and institutes. It just suggests that libraries be ready with all the necessary services that customers demand. Libraries may undoubtedly support an organization's research efforts to a great extent. The public and institutional libraries frequently provide funds to grassroots innovators and young business owners so they can plan environmentally friendly

products and services and create a pool of revolutions. Every region of the nation should establish some public and institutional libraries as hubs for supporting research to help inventors, aspiring business owners, and other members of the creative economy. Being an investigator requires having the necessary information, the drive to learn more about the subject, and the desire to contribute to the field. By offering high-quality resources with a specific emphasis on reference management and information retrieval, libraries can help researchers achieve their goals faster. In this regard, specialized librarianship might be quite beneficial.

Libraries can take a particular interest in research, among other subjects. We need an isolated research librarian with expertise in reference administration, statistical analysis, open-source technology, research assistance tools, and retrieval methods. The importance of having a research librarian is emphasized in its goals to establish the national research foundation. NIRF will sponsor financing and manage research activities in addition to the conventional research funding organizations. The research librarian can help NIRF uphold its objectivities as a nodal official. Recently, INFLIBNET created the IRINS system to highlight and organize the research projects being conducted by Indian universities and organizations. To improve the value of IRINS, several librarians are working hard as nodal officers to update vidwans profiles. To assist the university in performing its role as a multidisciplinary institution. They must serve as a well-organized repository for reference books and high-caliber textbooks. Since he must understand at least a little of each topic discipline in order to relate to each subject area, the librarian has been referred to as a teacher.

7.4. Provide student support: Libraries are essential to the NEP 2020's success since they offer electronic resources like e-books, journals, and serial publications as well as web-based databases. In addition to emphasizing the digitization of existing resources like books, audiotapes, and video, the NEP emphasized the four elements of the educational system: curriculum, pedagogy, ongoing assessment, and student support. The parent institute would be in charge of establishing crucial student support facilities and making sure they had enough resources to improve their capabilities and efficiency.

7.5. Technology Integration and Use in Libraries: When it comes with implementing ICT and embracing cutting-edge technology in a range of areas, India has established itself as a global leader. The nation as a whole is now digitally empowered and transitioning to a knowledge economy thanks to the Digital India programme. When combined with technology, education plays a crucial role in accelerating growth fourfold. Technology and education are directly correlated with one another and mutually beneficial. The gate keeping of these services and meeting of user requests requires qualified and experienced professionals to keep up with the

constant speed of technical changes. The usage and integration of technology has advanced pedagogical practices and enhanced many facets of the educational system. The National Education Technology (NETF) has been established as an autonomous entity inside the NEP to provide a platform for two-way communication on the use and deployment of technology to improve the current teaching and learning techniques. The NETF will assist in decision-making with regard to the creation, use, and administration of technology in education. In order to make data-driven decisions, NETF will use a steady stream of data from multiple sources, working with a varied group of researchers to analyze the data. To address the widening digital divide and its issues, libraries have evolved into hybrid and digital ones and integrated technology-based solutions. By providing access to materials for teaching and learning, then detecting implementations.

7.6. Libraries as a platform for lifelong learning: Only formal education is available from the institute. When one has received the appropriate education, he or she must expand their horizons. It is effective to use libraries. It never dismisses caste, creed, or sexual orientation as criteria for whether a person is a regular student or not. The libraries have the reading material needed to advance a student's studies. The age range and duration of classroom instruction are set. As a result, libraries have had a significant impact on lifelong learning. The motivation for lifelong learning is influenced by work, experience, passion, and personal ambition.

7.7. Adequate Library employees: From NEP 2020 on, it will be crucial to have adequate library employees on hand to manage the library services for teachers, students, and the general public, as well as to design suitable career trajectories and CPD for them. Additionally, all currently existing libraries will be strengthened, rural libraries and reading rooms will be established in underserved areas, reading materials in Indian languages will be widely accessible, children's libraries and mobile libraries will be opened, social book clubs will be established across India and across subject areas, and more cooperation between educational institutions and libraries will be encouraged.

The policy also states that libraries must stock a sufficient number of high-quality resources for readers from all fields. Additionally, it is stated that there is a lack of suitable space and amenities for libraries in schools and organizations. As a result, efforts are being concentrated on developing a well-organized space with user-friendly resources until 2025 to give libraries a new sort of value for the general public and societies.

7.8. Infrastructures appropriate for the library include: To ensure that all interested adults have access to adult education, study, and lifelong learning, appropriate and acceptable infrastructure will be ensured. Using schools, school complexes, and public libraries for adult education classes

that are equipped with information communication technology and well-designed, as well as other community engagement and enrichment activities, will be a key initiative in this direction. The efficient use of physical and human resources and the creation of synergy among these five forms of education and beyond will depend on the sharing of infrastructure for school, higher, audit, and vocational education, as well as other community and volunteer activities. Because of these factors, adult education centres (AECS) may also be a part of other public organizations as HEIS, vocational training facilities, etc.

7.9. Rethinking libraries for research and development: Research and development as well as enhancing the scholarly communication environment are given top priority under NEP 2020. The NEP includes provisions to promote and advance research and development in fields involving cutting-edge technology like big data analytics, artificial intelligence, virtual reality, and natural language processing. Through reading and referencing services in a variety of diverse fields, libraries play a significant part in encouraging and assisting scholars. Granting access to databases and research portals for the purpose of gathering data as well as literature. By granting users access to resources around-the-clock, virtual and reference librarians have been able to bridge the gap between time and space while also addressing user needs. The old methodologies and methods for storing data and gathering resources are being replaced by cloud-based libraries. This re-imagined method for libraries has a tremendous deal of promise to better serve its users.

8. The role of Central and State Government

The central and state governments are responsible to established and support for the libraries' services and for developing the libraries will take steps to ensure that books are made accessible and affordable to all across the country, including socio-economically disadvantaged areas as well as those living in rural and remote areas. Both public and private sector agencies/institutions will devise strategies to improve the quality and attractiveness of books published in all Indian languages.

9. Conclusion

The National Education Policy-2020 reflects drastic changes over the current scenario of education system and the prospects including future planning ensuring the quality education in India. The NEP, 2020 is providing a philosophical guidance for changing the learning landscape, making education holistic and roadmap for building strong base for the self-reliant India (Atmanirbhar Bharat). NEP 2020 is paved by the way of transformative reform and it is built on the five interdependent foundational pillars namely Access, Equity, Quality, and Affordability. Although libraries' traditional role is quite visible and highlighted in NEP, the specific expectations from academic libraries have not been mentioned, barring a few exceptions.

However, these expectations are implicit and to be understood. To some extent, the importance of public libraries has been highlighted. Nevertheless, the librarians must identify their roles in the context of NEP. Apart from playing a traditional role, libraries of all kinds should strive to develop cognitive abilities, increase students' self-efficacy, and make them capable of becoming lifelong learners.

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Revolutionizing Gold Investment: A Study on Digital Gold, Trends, Challenges, and Future Prospects in the Indian Market

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Abstract

Digital gold has emerged as an innovative investment option in India, combining the timeless value of gold with the convenience of modern digital platforms. With the increasing adoption of online financial tools, digital gold allows investors to buy, store, and sell gold in small quantities via secure digital platforms, without the need for physical storage. This paper explores the growing popularity of digital gold in India, examining its advantages over traditional gold investment avenues like physical gold, gold ETFs, and sovereign gold bonds. The study highlights how digital gold addresses key concerns such as security, liquidity, and accessibility, offering a low-cost alternative for retail investors who are looking to diversify their portfolios. Further, the research assesses the regulatory environment surrounding digital gold in India, alongside the challenges of market volatility, lack of investor awareness, and concerns about long-term sustainability. Additionally, the paper provides a comparative analysis of various platforms that offer digital gold, their business models, and their impact on the Indian investment landscape. As India's middle class continues to grow, and financial literacy improves, digital gold is poised to become a significant component of the country's investment ecosystem. The paper concludes by offering insights into the future trajectory of digital gold, considering technological advancements and evolving consumer preferences.

Keywords: Digital Gold, Investment Trends, Indian Market, Gold Monetization, Financial Technology, Fintech Innovation, Digital Assets, Gold Investment Platforms.

1. Introduction

1.1 Gold as a Traditional Investment in India

Gold has long been regarded as a symbol of wealth, security, and social status in India. Its significance is deeply rooted in the country's cultural and economic fabric, where it plays a vital role in religious rituals, weddings, and festivals (Chandrasekhar, 2018). Additionally, gold has historically served as a hedge against inflation and economic uncertainties, making it a preferred choice for preserving wealth across generations (Bose & Saha, 2019).

Households in India have traditionally invested in physical gold, including jewelry, coins, and bars, often perceiving it as a safer and more tangible asset compared to other forms of investment (Rajesh et al., 2020). This enduring affinity for gold has made India one of the largest consumers of the precious metal globally, with demand driven by both urban and rural populations (World Gold Council, 2021).

1.2 Emergence of Digital Gold

The advent of digital gold marks a significant shift in how gold is bought, stored, and utilized. Digital gold refers to a form of investment that allows individuals to purchase and own gold electronically, without the need for physical possession. This innovation is enabled through fintech platforms and mobile applications that simplify the process of investing in gold (Gupta & Mehra, 2020).

Technology has played a pivotal role in the rise of digital gold, integrating it with digital payment ecosystems and making it accessible to a wider audience. Platforms like Paytm, PhonePe, and Groww have revolutionized the gold investment landscape, enabling micro-investments and increasing participation from millennials and tech-savvy investors (Sharma & Kumar, 2021).

The ability to invest in fractional quantities, coupled with the convenience of online transactions, has made digital gold an attractive option for modern investors (Sen et al., 2022). Furthermore, digital gold eliminates storage and security concerns, as the gold is backed by physical reserves held by trusted entities (Reserve Bank of India, 2023).

1.3 Scope and Objectives of the Study

This study aims to explore the evolving dynamics of digital gold in the Indian market. The key objectives include:

1. **Analyzing Current Trends:** Understanding the adoption patterns and investment behavior associated with digital gold (Patel & Desai, 2021).
2. **Identifying Challenges:** Investigating the regulatory, technological, and market-related hurdles faced by investors and platforms (Mukherjee, 2022).
3. **Exploring Future Prospects:** Examining potential opportunities and innovations that could shape the future of digital gold investments in India (Kumar & Singh, 2023).

2. Literature Review

2.1 The Evolution of Gold Investment

Gold has traditionally been a cornerstone of investment in India, with households primarily investing in physical gold, such as jewellery, coins, and bars. Over time, the evolution of financial markets introduced innovative gold investment options, such as Gold Exchange Traded Funds (ETFs) and Sovereign Gold Bonds (SGBs). These instruments provided a more structured and formal approach to gold investments, addressing issues related to storage and liquidity (Mehra & Gupta, 2019). Gold ETFs, launched in India in the early 2000s, allowed investors to trade gold on stock exchanges, combining the benefits of gold with the flexibility of equities (Singh & Verma, 2020).

Sovereign Gold Bonds, introduced by the Indian government, further incentivized non-physical gold investments by offering interest rates and tax benefits (RBI, 2022). However, the emergence of digital gold represents a significant paradigm shift, allowing investors to purchase and store gold in fractional amounts through digital platforms, seamlessly blending traditional investment preferences with modern technological convenience (Chatterjee & Das, 2021).

2.2 Digital Gold in Global Context

While India has been a frontrunner in adopting digital gold, its adoption rate and growth trajectory differ from other countries. In developed nations like the United States and the United Kingdom, gold investments are primarily institutional, with a higher emphasis on ETFs and derivatives, rather than individual ownership of digital gold (Khan & Cooper, 2020). On the other hand, developing economies, including India, have leveraged digital payment platforms and fintech innovations to drive digital gold adoption among retail investors (Patel & Shah, 2021).

China, which has a comparable cultural affinity for gold, has also seen a rise in digital gold investments through integrated fintech applications, although its market remains more regulated than India's (Zhao et al., 2020). In contrast, African nations have used digital gold as a hedge against unstable currencies and inflation, showcasing its potential as a tool for financial inclusion in volatile economies (Moyo, 2022). These global comparisons highlight India's unique position, where cultural significance and technological advancements have synergized to create a robust market for digital gold (Mehra, 2021).

2.3 Theoretical Framework

The adoption of digital gold can be framed within the broader context of digital financial assets in developing economies. The Technology Acceptance Model (TAM) is particularly relevant, emphasizing the roles of perceived usefulness and ease of use in influencing adoption behaviors (Davis, 1989). In India, the accessibility of digital gold through mobile applications and the ability to invest in small amounts have lowered barriers for first-time investors, aligning with TAM principles (Kumar & Rao, 2020).

Moreover, the Unified Theory of Acceptance and Use of Technology (UTAUT) highlights the importance of social influence and facilitating conditions, both of which are evident in India's digital gold market, where peer recommendations and platform support play critical roles (Venkatesh et al., 2003). The theory of financial inclusion also underpins the adoption of digital financial assets, particularly in developing economies, where technology bridges the gap between traditional financial systems and underserved populations (Sen & Bhattacharya, 2022). This theoretical framework provides a lens to understand the rapid growth and adoption of digital gold in India and its implications for broader financial inclusion.

3. Research Methodology

3.1 Data Collection

To comprehensively analyze the trends, challenges, and future prospects of digital gold investment in India, a secondary data was collected from various sources.

Secondary Data Collection

- **Reports and Publications:** Market research reports from reputable sources, such as the World Gold Council and Reserve Bank of India, were analyzed for industry trends and growth metrics (World Gold Council, 2022).
- **Market Data:** Historical and current data on digital gold investments were collected from fintech platforms and government records to evaluate growth patterns and adoption rates (Sharma & Gupta, 2020).
- **Case Studies:** In-depth case studies of leading digital gold platforms like Paytm, PhonePe, and Groww were reviewed to understand their operational models and strategies for market penetration (Kumar & Rao, 2020).

4. Trends in Digital Gold Investments

4.1 Market Growth and Adoption Rates

The digital gold market in India has witnessed exponential growth in recent years, driven by advancements in technology and changing consumer preferences. According to a report by the World Gold Council (2022), the market has grown at a compound annual growth rate (CAGR) of approximately 25% since its inception. Millennials and Gen Z have been the primary drivers of this adoption, with 35% of investors in the age group of 18–25 and 45% in the 26–40 bracket (Sharma & Gupta, 2021). These tech-savvy generations are attracted to the convenience and accessibility offered by digital gold platforms. Additionally, the ability to invest in fractional amounts has made digital gold more inclusive, appealing to a broader demographic (Patel & Shah, 2021).

4.2 Key Players in the Market

Several fintech platforms have emerged as key players in the digital gold market in India, including Paytm, PhonePe, Google pay, Jar and Groww. These platforms have simplified the process of investing in gold by integrating it into their digital payment ecosystems. Paytm leads the market with a 35% share, followed by PhonePe at 25% and Groww at 15% (Mehra, 2021). These platforms

not only enable seamless transactions but also offer value-added services such as goal-based savings and gold-backed loans. Their impact extends beyond urban areas, as they have also initiated campaigns to increase adoption in semi-urban and rural regions (Kumar & Rao, 2020). By leveraging user-friendly interfaces and robust marketing strategies, these platforms have revolutionized the gold investment landscape.

4.3 Integration with Digital Payment Platforms

The integration of digital gold with Unified Payments Interface (UPI) and mobile wallets has played a pivotal role in its rapid adoption. UPI, being one of the most popular payment systems in India, facilitates instant and hassle-free transactions, thereby enhancing user experience (RBI, 2023). Mobile wallets like Paytm and PhonePe have further strengthened this integration by offering one-click gold purchases and real-time price updates. According to Sharma and Gupta (2020), over 60% of digital gold transactions are now facilitated through mobile payment apps. This seamless integration has bridged the gap between traditional gold investments and modern digital solutions, enabling users to make quick and informed investment decisions.

4.4 Investment Behavior and Patterns

Consumer investment behavior in digital gold has shown a significant shift, with more individuals opting for smaller and more frequent investments. Monthly investment plans account for 60% of transactions, reflecting a growing preference for systematic and goal-oriented savings (Sen & Bhattacharya, 2022). Seasonal trends also play a crucial role, as digital gold purchases peak during festivals like Diwali and Akshaya Tritiya, as well as wedding seasons (Patel & Desai, 2021). This pattern highlights the cultural integration of gold investments, even in its digital form. Furthermore, younger investors are increasingly viewing digital gold as a diversification tool, aligning their preferences with modern investment practices (Chatterjee & Das, 2021).

6. Future Prospects of Digital Gold in India

6.1 Policy and Regulatory Developments

The future of digital gold in India hinges on the establishment of a robust regulatory framework to ensure investor confidence and market stability. While the sector has seen rapid growth, the absence of comprehensive regulations remains a key concern (Mukherjee, 2022). The Indian government and regulatory bodies, such as the Reserve Bank of India (RBI) and Securities and Exchange Board of India (SEBI), are exploring measures to formalize digital gold investments, including guidelines for storage, taxation, and consumer protection (RBI, 2023). Initiatives like tax incentives for digital gold investments and government-backed digital gold platforms could further promote adoption and increase transparency (Kumar & Singh, 2023).

6.2 Technological Innovations

Technological advancements, particularly the integration of blockchain, are expected to revolutionize digital gold by enhancing transparency and security. Blockchain can create immutable records of ownership, ensuring that every transaction is traceable and verifiable, thereby addressing concerns about fraud and reliability (Chatterjee & Das, 2021). Furthermore, the integration of digital gold with other financial instruments, such as mutual funds and savings schemes, could create new avenues for diversification and wealth management (Patel & Shah, 2021). This convergence of technology and finance positions digital gold as a cornerstone of the evolving fintech ecosystem in India.

6.3 Financial Inclusion

Digital gold has the potential to play a pivotal role in driving financial inclusion, especially in rural and semi-urban areas. The affordability of fractional gold investments allows individuals with limited financial resources to participate in gold investments, which were previously accessible only to the affluent (Sen & Bhattacharya, 2022). Additionally, targeted awareness campaigns and partnerships with rural financial institutions can bridge the digital divide and bring more individuals into the formal financial system (Mehra, 2021). The combination of fintech accessibility and government support could make digital gold a transformative tool for inclusive economic growth.

6.4 Role of Sustainability

Digital gold offers significant environmental benefits compared to traditional gold mining and storage. By reducing the demand for physical gold, digital gold minimizes the environmental degradation caused by mining activities, such as habitat destruction and water pollution (Zhao et al., 2020). Moreover, the elimination of the need for physical storage and transportation further reduces the carbon footprint of gold investments (Khan & Cooper, 2020). This aligns with global sustainability goals and positions digital gold as a green alternative to traditional investment practices.

6.5 Global Investment Opportunities

The globalization of digital gold markets opens up opportunities for cross-border investments. With advancements in fintech and blockchain, digital gold could become a universally accepted asset, enabling investors to diversify their portfolios internationally (Moyo, 2022). For instance, Indian investors could potentially access global gold markets, while international investors could tap into India's growing digital gold ecosystem. Partnerships between Indian fintech platforms and global financial institutions could further facilitate this integration, making digital gold a key player in the global investment landscape (Chatterjee & Das, 2021).

Comparative Analysis of various investment options in gold.

	Physical Gold	Digital Gold	Gold ETFs	Gold MF	SGB
Returns	Gold Returns	Gold Returns	Gold Returns	Gold Returns	Gold Returns +2.5 % interest annually
Total Charges	8 % - 33 %	5 % -9 %	0.2 % - 1 %	1.5 % - 3.5 %	None
GST	3 %	3 %	None	None	None
Making Charges	5% (Coins) to 30% (jewellery)	None	None	None	None
Expense Ratio	None	None	0.2 – 1 %	Expense (0.5 % - 1.5 %) + Exit Load	None
Taxation					

Holding 1 year	Slab rate	Slab rate	Slab rate	Slab rate	Slab rate
1-3 Years	Slab rate	Slab rate	Slab rate	Slab rate	Flat 10 % or 20 % with indexation
3-5 Years	20 % with indexation benefit	20 % with indexation benefit	Slab rate	Slab rate	Flat 10 % or 20 % with indexation
Above 5 years	20 % with indexation benefit	20 % with indexation benefit	Slab rate	Slab rate	Tax Free

Table:- 1

7. Discussion and Recommendations

7.1 Discussion on Findings

The analysis of market trends reveals a steady rise in digital gold adoption in India, particularly among millennials and Gen Z, driven by the convenience, affordability, and technological integration offered by fintech platforms (Sharma & Gupta, 2020). However, the study also highlights key challenges that hinder widespread adoption. A significant barrier is the lack of regulatory clarity, which creates uncertainty for both investors and service providers (Mukherjee, 2022). Additionally, issues such as security concerns, limited awareness in rural areas, and the cultural preference for physical gold remain persistent obstacles (Patel & Shah, 2021). Despite these challenges, the potential for digital gold to revolutionize investment patterns in India is evident, as it aligns well with the goals of financial inclusion and sustainable investment (Mehra, 2021)

7.2 Policy Recommendations

To ensure the sustained growth of the digital gold market, regulatory clarity and investor protection measures are essential. The government and regulatory bodies, such as SEBI and RBI, should develop comprehensive guidelines addressing key issues like ownership verification, taxation, and grievance redressal (RBI, 2023). This will help in still confidence in both investors and market participants.

Additionally, targeted awareness campaigns highlighting the benefits of digital gold, such as safety, flexibility, and environmental sustainability, can help overcome the psychological barriers associated with the lack of physical possession (Sen & Bhattacharya, 2022). Providing tax incentives for digital gold investments, similar to those available for Sovereign Gold Bonds, can further incentivize adoption among individual and institutional investors (Kumar & Singh, 2023).

7.3 Strategic Recommendations for Stakeholders

For Fintech Platforms

Fintech companies should focus on improving user experience by offering intuitive interfaces and personalized investment plans tailored to individual needs. For example, gamification features, goal-

based saving options, and real-time price tracking can enhance engagement (Chatterjee & Das, 2021). Furthermore, lowering transaction costs and offering value-added services, such as gold-backed loans and easy redemption options, can make digital gold more appealing (Patel & Desai, 2021).

For the Government

The government can play a critical role in promoting digital gold through public-private partnerships and nationwide campaigns emphasizing its role in wealth creation and financial inclusion (Mehra, 2021). Collaborating with fintech platforms to extend digital gold offerings to rural and semi-urban areas can bridge the accessibility gap. Additionally, integrating digital gold investments into existing financial literacy programs can educate potential investors about its benefits and usage (Khan & Cooper, 2020).

8. Conclusion

Digital gold has emerged as a revolutionary investment avenue, blending the traditional significance of gold in India with modern technological advancements. It offers unparalleled convenience, accessibility, and flexibility, making it an attractive option for a wide range of investors, especially millennials and Gen Z. The integration of digital gold with fintech platforms, mobile wallets, and payment systems has redefined how Indians perceive and invest in this precious metal, fostering financial inclusion and enabling micro-investments.

The study highlights key trends, including the increasing adoption of digital gold, the pivotal role of young investors, and the dominance of urban markets. However, significant challenges remain, such as regulatory ambiguity, security concerns, and the cultural preference for physical gold. Addressing these issues through comprehensive regulations, enhanced platform security, and awareness campaigns will be critical in driving widespread adoption.

Looking forward, the potential of digital gold to transform India's investment landscape is immense. Technological innovations like blockchain, policy reforms, and efforts to expand financial literacy in rural areas can propel digital gold into the mainstream. By bridging the gap between tradition and innovation, digital gold not only democratizes investment but also aligns with sustainability goals, positioning itself as a cornerstone of India's evolving financial ecosystem.

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Role of NEP 2020 in improving Financial Literacy among UG Students

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ABSTRACT:

NEP 2020 has been introduced in India with the hope of commencing life skills in young minds. Besides providing education, NEP 2020 focuses on enhancing employability and critical life skills in the new generations. Financial literacy is the need-for-hour for enhancing life-changing skills to boost investments and increase returns. This paper aims to measure the financial literacy level of students studying under NEP 2020 and NON-NEP 2020 at graduate level. For the research purpose a comparative study of the financial literacy level of NEP and NON-NEP students has been done to see the effect of new curriculum and concepts covered under NEP 2020. Primary data is collected from students by a structured questionnaire. Analysis of the collected data is done by using SPSS software. Frequency analysis, PCS and Independent sample T-test have been applied for analysis of the data. The study reveals that NEP 2020 plays an important role in providing more knowledge about technical financial terms and making students aware of financial instruments and their return policies, but it has not yet impacted the way it was assumed as there is no significant difference between financial literacy level of NEP students and Non-NEP students.

Key words: NEP 2020, Financial Literacy, financial education

Introduction

Financial Literacy

Financial Literacy is an important skill now-a-days for individuals to make their lives financially well planned and secured. Different institutions and writers define financial literacy in different ways, but they all focus on the aspects of measuring risk and analyzing return policies of different financial avenues. The Organization of Economic Cooperation and Development defined financial literacy as “combination of skills, attitude, and knowledge, financial awareness to make sound financial decisions and to achieve financial well-being.” (OECD, 2013). Financial literacy can be known as the demand side for the access and use of financial services which can be defined as the supply side of financial markets. Through financial literacy positive impacts can be seen through high economic development, increased

public investments, less poverty, more employment opportunities, and balanced personal finances in individuals.

As India being a federal country with different religions, cultures, ethnicities, languages, geographic differences, and climate diversity with large population, it is necessary for the government to educate young minds about financial literacy. RBI, SEBI, IRDA, and PFRDA are taking different initiatives to educate the large population about financial literacy, although it is not sufficient and up to the mark. (Hridhya & Reddy, 2020) stated that the government of India has been actively working on enhancing financial inclusion and literacy among citizens. With the aim of enhancing financial skills in young minds with an early age, the curriculum related to financial services and stock markets have evolved in the New Education Policy of India which was introduced in the year 2020.

National Education Policy 2020

With the aim of transforming the country's education system. NEP 2020 – the National Education Policy 2020 was introduced in India which was accepted by Union Cabinet on 19th June 2020. It is founded with five guiding pillars of Access, Equity, Quality, Quality, affordability and Accountability. It stresses developing 'Foundation skills' of literacy and numeracy with cognitive skills and higher order skills like critical thinking and problem solving along with soft skills (MOE, 2020). This means that NEP 2020 is focusing on enhancing numeracy skills which can be turned into the improvement of Financial Literacy.

The vision of this new policy is to establish an education system rooted in Indian ethos with promoting holistic development and creating critical thinking, scientific temper and commitment to human rights and sustainable development. NEP 2020 is introduced with the mission of high-quality education to all, promoting vocational education and fostering research and innovation.

Some of the important aspects of National education policy, 2020 can be briefly discussed as below:

- Universal Access to education from pre-primary to higher education.
- Replaced old structure of 10+2 with new one of 5+3+3+4 based on age.
- Developing a common curriculum at all levels of education.
- Importance of mother tongue with making compulsory to provide instruction in regional languages till Grade 5.
- Emphasizing teacher training with the focus on continuous professional development.

- Allowing multidisciplinary education at higher levels for bringing all over development of students.
- Focuses on vocational and skill-based study.
- Integrating technology into education, including online and digital learning platforms.
- Ensuring inclusive education for girls, SC/ST and persons with disabilities.

NEP and Financial Literacy

Financial Literacy is now universally accepted as a vital ‘life skill’ rather than an extra one ‘nice to have.’ Hence, it is important to nurture financial literacy in students from an early age, as they are going to be the future investors of the nation who will boost the Indian economy by their money management skills. Implement of NEP 2020 in India is the step in this direction, which will help to achieve this goal. The experts of the education sector have designed the curriculum of NEP 2020, which will enhance life skills like communication, financial literacy and employability skills. Students are now expected to learn about the latest trends in financial markets. This study tries to measure the difference between the education prior and post NEP students related to money management.

Review of literature

(Gupta, 2024) in her study titled “Role of NEP 2020 in developing Financial Literacy as a critical life skill” discussed about how Goal 1 of SDG, “End poverty in all its forms everywhere,” can be achieved by increasing Financial Literacy and working in the direction of making the new generation of India financially literate. The researcher mentioned that NEP 2020 can help to promote financial literacy through equitable and inclusive education. It was concluded that teachers play an important role in promoting financial literacy in students of different age groups. It was said that it is essential that digital resources are appropriately intertwined in the teaching-learning process with a focus on the process of knowledge creation.

(Ranjithaa & Sreeya, 2023) carried a study on “Importance of Inclusion of Financial Literacy in National Educational Policy: A Study with Salaried Employees in Tamil Nādu” with the objective to measure the financial literacy levels of employees in south India. They tried to collect insight on individuals’ perception of the inclusion of financial literacy in National Education Policy 2020. For the study primary data was collected from 265 salaried employees of Tamil Nadu. For the analysis of the data percentage analysis, and chi square test had been used. The results of the study showed that only 31.6% have financial literacy, in which males have a higher rate of financial literacy than females. It was stated that working youth in urban India have inferior financial knowledge, attitude, and superior behavior, and need interventions

to improve their knowledge and behavior. The study suggests creating awareness for financial literacy as it can reduce the chances of being misled in the investment decision.

(Nandi & Kolhe, 2022) in the study of “Awareness and impact of financial literacy among secondary School students” conducted experimental research in one of the Cambridge Assessment International Education schools in standard VII. The main objective of the study was to compare pre-test and post-test scores of Secondary School Students. Primary data was collected from 27 students before and after the financial literacy. For the analysis of the data mean, median, mode, Standard Deviation, t-test and P- test were applied. Researchers found out that there is a significant difference between pre-test and post test scores of Secondary School Students. It was concluded that with great potential and for stable economic growth and prosperity of the young economy like India, it is needed to emphasis for Financial Literacy which should be started form school level and leads towards financial freedom.

(Bharali & Debnath, 2024) conducted a review study on National Education Policy and Financial Literacy: A Study in the Light of Financial Inclusion with the objective of exploring the scope of financial literacy in NEP 2020. The study stated that financial literacy is the possession of the set of skills and knowledge that allows an individual to make informed and effective decisions with all of their financial resources, this can be achieved through greater implement of NEP 2020 as with this grades 11 and 12, students can be able to design stock market simulations that allow them to appreciate and view the importance of investments. Researchers concluded that financial literacy should be rigorously introduced in the education sector. The study suggested that Higher education institutions should carry out extension activities on financial literacy so that marginalized people of society benefited by it as NEP 2020 has ample scope for such curriculum.

Research Gap – Statement of the problem

As NEP has been implemented since last year, it is going to be beneficial to students in enhancing life skills like financial literacy. This paper is an attempt to measure the effectiveness of the new curriculum of NEP 2020 related to gaining cognitive and practical skills. The financial literacy level of undergraduate students is measured in two groups, i.e., pre and post NEP students. Researchers try to study the impact of NEP 2020 based learning in improving financial literacy. Financial literacy is measured by skills like computing interests and inflation, knowledge of stock markets and ability to understand technical terms related to financial markets.

Objectives of the study

- To study financial literacy level of UG students studying under NEP system and prior to that.
- To study the effect of NEP 2020 in improving financial literacy.
- To study the difference between the level of financial literacy among NEP and Non-NEP students.

Hypothesis of the study:

H0: There is no significant difference between financial literacy level of students studying under NEP and non-NEP system.

H1: There is significant difference between financial literacy level of students studying under NEP and non-NEP system.

Research Methodology

Research methodology is a road map that has been followed by the researcher throughout the study. An exploratory and descriptive research design is adopted for the study. The primary data has been collected from undergraduate students of Kachchh district and secondary data is collected from journals, newspapers and magazines.

Sampling techniques: Non-probability purposive sampling technique is used in the study.

Sample size: Questionnaire was distributed among 40 students of each group and out of them responses are received from 35 students studying under the NEP system and 32 students non-NEP students.

Method of Data Collection: The data is collected from the selected sample through a structured questionnaire which was distributed among students through Google forms. Questionnaire includes basic demographic questions related to respondents and 10 MCQ questions to measure financial literacy level of students.

Analysis: The collected data is analyzed through SPSS software. Frequency analysis, descriptive statistics and independent sample T-test are applied to test the hypothesis.

Data Analysis and Interpretation:

From the target group of 40 students from each group of NEP and non-NEP students, 35 students from NEP system and 32 students from non-NEP system gave response properly to the questionnaire. They were asked about the inclusion of the stock market and related subjects in their curriculum. Researchers tried to measure the level of financial literacy among students by asking them 10 questions related to their financial knowledge, borrowing and investing concepts. This method is known as a performance assessment method which has been used by

many researchers in the past. The following table discloses the frequency analysis of the collected data.

Variable		Frequency	Percentage
Gender	Male	18	26.9
	Female	49	73.1
Age	17-20 years	49	73.1
	Above 20 years	18	26.9
Education Policy	NEP	35	52.2
	Non-NEP	32	47.8
Studying Stock Market	Yes	51	76.1
	No	16	23.9

Table no. 1: Frequency Analysis of Demographic details

(Source: Primary Data)

From the above table it can be seen that students studying under the NEP system are studying more about investing and borrowing activities as they agreed that stock market has been included in their syllabus of graduation. But some non-NEP system students also agreed upon studying stock market during their graduation as 76.1% of students agreed that they have studied about stock market and investment activities but only 52.2% students from the respondents are studying under NEP system, which means that both students have studied some aspects related to financial study. So, researchers aimed to measure their financial literacy level and to study that is there any significant difference between financial literacy level of two groups. The following table shows the average financial literacy level of all the respondents.

Education Policy	Mean	Standard Deviation.
NEP- 2020	5.74	2.343
Non- NEP	5.34	1.825

Table no. 2: Financial literacy level of two groups

(Source: Primary Data)

For the questions asked to respondents, 1 point is given for the correct answer, and 0 point is given for the incorrect one. Out of 10 questions asked to respondents, students studying under NEP 2020 score average score of 5.74 which means 57.4% answers were correct of them. And the students studying under the policy before 2020 scored average 5.34 out of 10. The standard deviation of NEP students is higher than Non-NEP group which shows that the financial literacy level of NEP students may vary more than non-NEP students individually.

Hypothesis Testing:

To study the difference between financial literacy level of students studying before NEP 2020 and under NEP 2020 the hypothesis is generated and to test the hypothesis independent sample T-test is applied. This test is a tool for analyzing the difference between the means of two groups which are independent from each other. For applying t-test firstly Leven's test for checking the equality of variances is applied, result of which is as follows:

Leven's Test for equality of Variances	
F value	Sig.
5.845	0.018

For Leven's test of equality of Variances p value is 0.018, which is lower than 0.05 so independent sample T-test is considered assuming that variances of both groups are not equal. So, for this consideration the following results are obtained.

T-test for equality of means						
t	df	Sig (2 tailed)	Mean Difference	Std. Error Difference	95% confidence interval for the difference	
0.781	63.447	0.438	0.399	0.511	-0.622	1.420

Table 3: Independent sample t-test

(Source: Primary Data)

An independent sample t-test was conducted to compare the financial literacy level for NEP and Non-NEP students. There were no significant differences [$t(63.447) = 0.781$, $p = 0.438$] in the score with means score for NEP students ($M=5.74$, $SD= 2.343$) was higher than Non-NEP students ($M = 5.34$, $SD = 1.825$). The magnitude of the difference in the means (mean difference= 0.399, 95%, CI -0.622 to 1.420) was not significant. These results show that p value is 0.438 which is higher than the significance level of 5% means 0.05, which means that null hypothesis will be accepted. Thus, it is retrieved that though NEP students are learning new curriculum in syllabus their level of financial literacy is not more than non-NEP students in a significant manner. There may be so many factors influencing financial literacy of students that can be studied in detail like their background, their earnings and investing activities.

Conclusion:

As the new curriculum of NEP 2020 includes more aspects of financial literacy to improve financial knowledge in students and to manner their financial attitude and behaviour, it will be beneficial for students in future to manage their financial activities. From the current study, it

was seen that in spite of introducing new curriculum there is not so much high improvement in financial literacy level of students as there is no significant difference between financial literacy level of students studying under NEP system and studying before NEP. More efficient teaching techniques will help in getting benefits of new curriculum. Teachers and academicians should try to give practical knowledge about routine financial activities to students with innovative methods.

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Socioeconomic Determinants and Their Influence on Dietary Diversity, Food Security, and Nutritional Status Among Women in Urban Surat, Gujarat

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Abstract

This study aimed to assess the socio-demographic factors and their relationship with dietary diversity, household food insecurity, and the nutritional status of working and non-working women in Surat city, Gujarat. Dietary diversity was measured using the Minimum Dietary Diversity for Women (MDD-W) and the 10-Food Group Women's Dietary Diversity Score (WDDS-10), while household food insecurity was assessed using the Household Food Insecurity Access Scale (HFIAS). The Minimum Dietary Diversity for Women (MDD-W) indicator was developed by the Food and Agriculture Organization (FAO) of the United Nations in collaboration with international experts. It is based on global evidence linking dietary diversity to micronutrient adequacy and was introduced to standardize the assessment of women's diets, particularly in low- and middle-income countries (FAO, 2016). HFIA scale was developed by the Food and Nutrition Technical Assistance (FANTA) Project in collaboration with USAID. Results showed that 68% of women, including 33.3% of working women and 34.6% of non-working women, achieved the MDD-W, a significant improvement compared to previous studies. Age, education, and mean weight of women were positively associated with food security. Joint decision-making on food purchasing and consumption further enhanced food security. These findings highlight the importance of socio-demographic factors in influencing dietary diversity and food security, providing insights for targeted interventions to improve nutritional well-being in urban areas.

Keywords: Nutritional Status, Sociodemographic profile, Dietary diversity, food security, working and non-working women

Introduction

Surat, one of India's fastest-growing cities, faces unique challenges concerning women's health, particularly among working and non-working women. Women of reproductive age (WRA) are highly nutritionally vulnerable due to physiological demands during pregnancy and lactation, which significantly increase requirements for most nutrients. Outside these periods, their smaller body size and lower caloric intake necessitate a nutrient-dense diet to meet micronutrient needs, including iron, zinc, and iodine. Poor diet quality in resource-limited settings results in significant gaps between nutrient intake and requirements, negatively impacting both maternal and infant health.

Insufficient nutrient intake before and during pregnancy and lactation can lead to adverse outcomes such as anaemia, poor birth outcomes, and delayed infant growth and development. Despite decades of recognition, efforts to improve women's nutrition have been limited by a lack of effective platforms and programs targeting adolescent girls and WRA outside prenatal care, insufficient funding, and inadequate integration of nutrition initiatives into broader health systems. Additionally, the absence of standardized indicators for assessing and monitoring dietary quality has hindered advocacy, accountability, and programmatic action to address this critical issue. Thus, the prevalence of overweight, obesity, and micronutrient deficiencies highlights the critical importance of understanding dietary patterns and food security.

The objectives of the study are to assess the socio-demographic profile of working and non-working women in Surat, evaluate their nutritional status using anthropometric measurements (weight, height, BMI), analyze food security perceptions through the HFIAS, and examine dietary diversity using the MDD-W while correlating findings with work status.

Methodology

The cross-sectional study was conducted in urban areas of Surat, focusing on middle- and high-income groups. Data collection occurred over two weeks. A purposive sample of 81 women, including 40 working and 41 non-working participants, was stratified by age (20-35 and 36-49 years). Socio-demographic data, anthropometric measures, dietary diversity, and food security indicators were collected using structured questionnaires and validated scales (FAO & FHI 360, 2016).

Data were collected via Google Forms using a structured questionnaire, and objective measures included sociodemographic details, anthropometric measurements, and dietary diversity assessed using the MDD-W indicator. Height and weight were measured using standardized

techniques, and BMI was calculated using the Asian BMI criteria (National Institutes of Health, 1998). The HFIAS quantified food insecurity levels, ranging from food secure to severely food insecure households (Bickel et al., 2000).

Data were analysed using descriptive statistics, T-tests, and chi-square tests to explore associations between socio-demographic variables, nutritional status, and food security. Correlation analysis was performed to identify relationships between dietary diversity and food security indicators.

Result

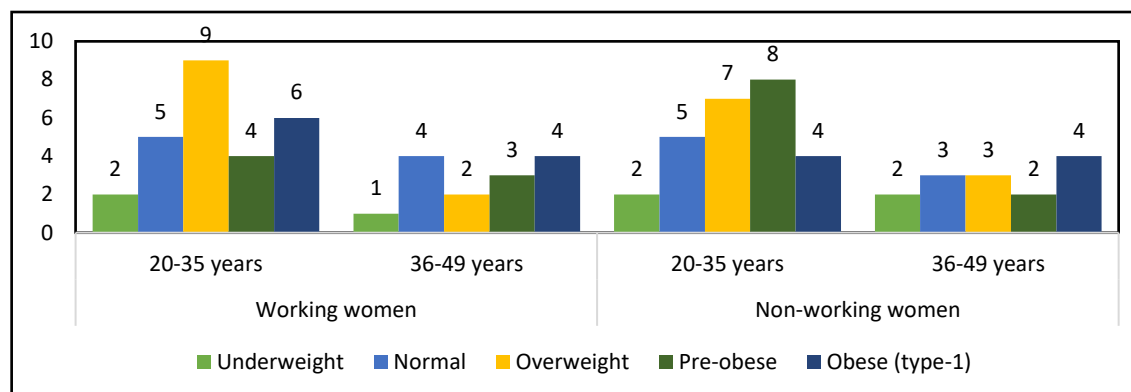
Table 1.1 shows that most participants were aged 20-35 years. Higher educational attainment was observed among working women, with 54.5% holding postgraduate degrees compared to 29% of non-working women. Household income was significantly higher in working women, with 17.5% earning more than ₹5,00,000 annually.

Table 1.1 Sociodemographic profile of the working and non-working women

Variables	Working women (n=40)		Non-working women (nw=41)	
	20-35 years	36-49 years	20-35 years	36-49 years
Age (Percent)	33(82.5)	8(17.5)	31(75.6)	9(24.4)
Mean ± SD	28.3±3.8	40.4±3.1	27.9±4.1	42.9±4.6
Education level				
Primary	1(3.0)	0(0)	1(3.2)	3(30)
Secondary	0(0)	1(14.3)	2(6.5)	1(10)
Higher secondary	3(9.09)	0(0)	5(16.1)	1(10)
Graduation	10(30.3)	3(42.9)	14(45)	5(50)
Post-graduation	18(54.5)	3(42.9)	9(29)	0
Ph.D/doctorate	1(3.0)	0	0	0
Household income	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)
>50,000/- (Low)	2	5	6	14.6
50,000-1,00,000	13	32.5	11	26.8
1,00,000-2,00,000	10	25	13	29.3
2,00,00-5,00,000	8	20	5	12.2

More than 5,00,000	7	17.5	6	14.6

Figure 1.1 BMI of working and non-working women



BMI analysis revealed higher rates of overweight and obesity among non-working women (20-35 years: 15%, 36-49 years: 20%) (Figure 1.1.) However, working women demonstrated a more balanced BMI distribution, reflecting better health outcomes. Among working women, 32.5% fell within the normal BMI range, compared to 20% of non-working women. Notably, 10% of non-working women were classified as severely obese (BMI >30) (Kalra & Unnikrishnan, 2012).

Approximately 68% of participants achieved the MDD-W, with working women showing slightly higher diversity (72%) compared to non-working women (63%). Milk and its products (96.3%), cereals (87.7%), and vegetables (72.8%) were the most consumed food groups shows in figure 1.2. However, low consumption of nutrient-dense foods such as eggs (29.6%) and vitamin A-rich fruits (58%) was evident. Statistical analysis indicated that higher dietary diversity correlated positively with income and education levels ($p < 0.05$) (FAO & FHI 360, 2016).

Food security was significantly higher among working women, with 85% classified as food secure compared to 65% of non-working women. Severe food insecurity affected 12% of non-working women, compared to 5% of working women. The HFIAS score was inversely correlated with household income ($r = -0.67$, $p < 0.01$), highlighting the critical role of economic stability (Bickel et al., 2000).

Figure 1.2 Minimum Dietary Diversity total score of women age group of 20-49 years of Surat city

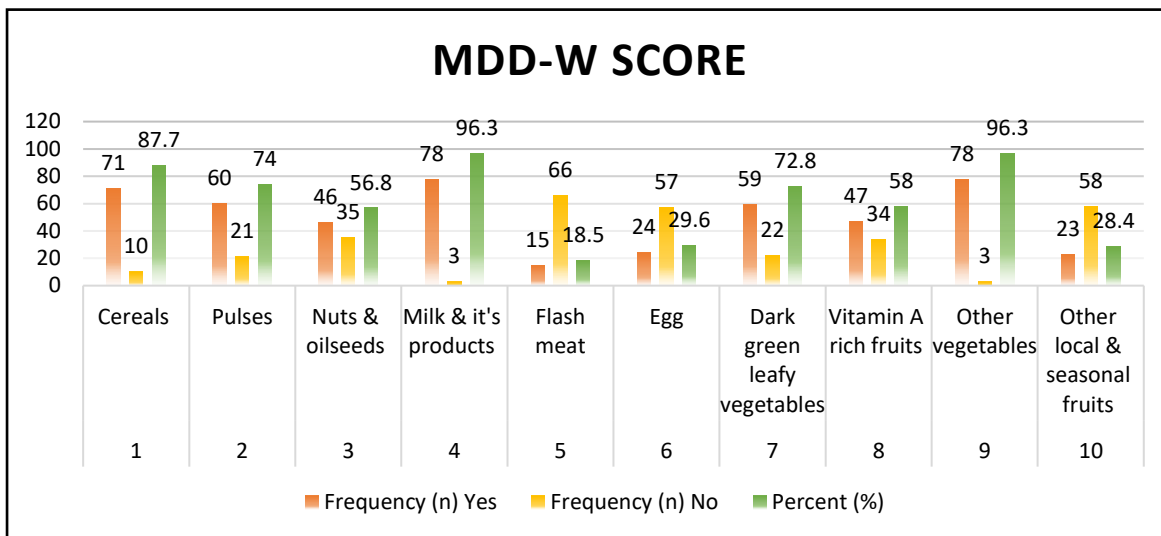


Table 1.2 Summary of Significant Relationships Between Variables and Food Security

Variable	Chi-Square Value	p-value	Description
Age	21.39	0.04 ^a	Significant positive association, with younger women more likely to be food secure.
Weight (Non-Working Women)	42.41	0.0003 ^a	Positive correlation between higher weight and food insecurity.
Weight (Working Women)	29.29	0.004 ^a	Overweight working women were more food secure compared to obese participants.
Education (Non-Working Women)	37.50	0.001 ^a	Higher education levels linked to greater food security among non-working women.
Education (Working Women)	26.27	0.035 ^a	Postgraduate and doctoral-level education linked to higher food security.
Income (Non-Working Women)	15.72	0.015 ^a	Non-government and private wage earners showed mixed levels of

			food security.
Income (Working Women)	25.37	0.000 ^a	Government jobholders displayed significantly higher food security compared to others.
Decision Making (Non-Working Women)	18.27	0.021 ^a	Female-led decision-making households had higher food security levels.
Decision Making (Working Women)	22.00	0.001 ^a	Both male and female take decision together, they are more food secured

Conclusion

This study underscores the complex interplay between work status, socio-demographic factors, and nutritional outcomes among women in Surat. While working women displayed better dietary diversity and food security, the persistence of malnutrition and poor diet quality remains concerning. Policymakers should prioritize women-specific nutrition programs, enhance food security initiatives, and address socio-economic disparities to improve health outcomes for all women.

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IMPACT OF FDI AND FPI ON STOCK MARKET INDEX: ANALYSING SENSEX AND S&P 500 OVER A DECADE

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Abstract:

This study examines the impact of Foreign Direct Investment (FDI) and Foreign Portfolio Investment (FPI) on stock market indices, with a particular focus on India's SENSEX and the U.S. S&P 500 for the period of 10 years i.e. from 2014 to 2023. Over the past decade (2014-2023), global capital flows through FDI and FPI have played a crucial role in shaping stock market performance and economic conditions. This research aims to analyse the relationship between these foreign investments and stock market movements, providing insights into their influence on market stability and growth. Using regression and correlation analysis as key data analysis tools, this study evaluates the strength and nature of the link between FDI, FPI, and the performance of the SENSEX and S&P 500. By selecting these indices—representing both emerging and developed economies—the research offers a comparative perspective on how foreign capital impacts market behaviour in distinct economic settings. Data for the analysis is drawn from credible financial databases and stock exchanges. Correlation analysis will assess the strength and direction of the relationship between FDI, FPI, and stock market indices, while regression models will quantify the extent to which variations in FDI and FPI drive stock index performance. The findings of this research are expected to provide valuable insights in understanding how foreign investments influence market dynamics in both emerging and mature economies. The study's conclusions may also offer guidance on optimizing foreign investment strategies to foster sustainable market growth and reduce volatility.

Key Words:

FDI, FPI, Sensex, S&P 500.

1. Introduction:

Stock exchanges serve as critical pillars of the global financial system, providing a platform for companies to raise capital and investors to participate in the growth of businesses. This article

offers a comparative analysis of the stock exchanges in India and China, highlighting their distinct characteristics, regulatory frameworks, and contributions to economic development.

- **Stock Exchanges in India: BSE and NSE**

India's stock market features two major exchanges: the Bombay Stock Exchange (BSE), established in 1875, and the National Stock Exchange (NSE), founded in 1992. These exchanges offer a diverse range of investment opportunities, including stocks, commodities, and derivatives. India's robust economy and expanding middle class have contributed to significant growth in the stock market. The regulatory authority, the Securities and Exchange Board of India (SEBI), diligently oversees the exchanges to maintain market integrity, protect investors' interests, and ensure transparency.

- **Stock Exchanges in USA: NYSE and NASDAQ**

The U.S. stock market, a key player in the global financial system, significantly influences economic activities and investments worldwide. Prominent indices like the S&P 500, Dow Jones Industrial Average (DJIA), and Nasdaq Composite serve as benchmarks for market trends. The S&P 500 encompasses 500 leading companies, offering a comprehensive view of market performance, while the Dow Jones highlights 30 established blue-chip firms. The Nasdaq Composite, with a strong focus on technology, reflects innovation-driven industries. These indices are essential for tracking market dynamics, shaping investor confidence, and understanding broader economic patterns and investment strategies.

These markets serve as economic indicators, attract substantial investments, and play a significant role in shaping domestic and international financial trends.

2. Literature Review:

Jayachandran G and Seilan (2010) conducted a significant investigation focused on understanding the intricate relationship between trade, Foreign Direct Investment (FDI), and economic growth in India. The study aimed to explore not only the associations between these factors but also the causal links and interdependencies that exist among them. Employing empirical analysis, the research yielded valuable insights into the specific ways in which trade and FDI exerted their influence on India's overall economic growth.

Gupta (2017) examined the effects of Foreign Direct Investment (FDI) on the Bombay Stock Exchange (BSE) Sensex and the National Stock Exchange (NSE) CNX Nifty. The researcher's findings revealed a noteworthy and positive correlation between FDI and both BSE Sensex and

NSE CNX Nifty. This valuable insight sheds light on how FDI impacts the performance of these prominent stock market indices in India.

Sharma, Vyas and Vyas (2019) assessed the relationship between Foreign Direct Investment (FDI) inflows and the stock market performance in India. Their study spanned from 2001 to 2017, with a specific focus on the BSE Sensex. The researchers made a significant discovery, revealing a robust and positive correlation, as well as a direct linear relationship, between FDI and the BSE Sensex. This finding highlights the substantial impact of FDI on the performance of India's leading stock market index, providing valuable insights into the dynamics between foreign investment and the stock market in the country.

Gajera (2020) conducted a comprehensive examination of the returns and market movements of major stock market indices worldwide. The study utilized Compound Annual Growth Rate (CAGR) and Analysis of Variance (ANOVA) techniques to analyse the data spanning from 2015 to 2019. The research aimed to gain valuable insights into the correlation patterns between these indices during the specified period, providing a deeper understanding of global stock market dynamics and performance.

Raval and Chakrawal (2023) investigated the impact of Foreign Direct Investment (FDI) on the stock market performance of the Bombay Stock Exchange Sensitive Index (BSE SENSEX) in India and the Shenzhen Stock Exchange Component Index (SZSE) in China. The study utilizes a quantitative approach with yearly data from 2015 to 2022, revealing a significant positive correlation between FDI and SZSE performance. However, the influence on BSE SENSEX is found to be relatively insignificant.

3. Objectives of the study:

- To study the relationship between FDI and stock market index.
- To study the relationship between FPI and stock market index.
- To study the effect of FDI on stock market index.
- To study the effect of FPI on stock market index.

4. Research Design:

A. Period of the study:

The present research work covers the time period of seven years starting from 2014 to 2023.

Data Collection:

The data collected is purely secondary in nature. The data related to FDI and FPI has been collected from the website of world bank and the data of selected stock market index has been collected from the website of their respective stock exchange.

B. Tools and Techniques:

For the analysis purpose researcher used Correlation and Simple Linear Regression.

C. Sample:

From the whole population a sample of 2 stock exchanges and their major indices selected for the study. For selection of sample judgement or purposive sampling method is used.

D. Hypothesis:

H₀₁ = The impact of FDI on SENSEX is statistically insignificant.

H₀₂ = The impact of FDI on S&P 500 is statistically insignificant.

H₀₃ = The impact of FPI on SENSEX is statistically insignificant.

H₀₄ = The impact of FPI on S&P 500 is statistically insignificant.

5. Limitations of the study:

- The present study focused only on Sensex and S&P 500.
- The study is restricted to the time period of ten years only.

6. Data Analysis:

Impact of FDI and FPI on SENSEX and S&P 500:

Table-1: Year-wise FDI and FPI of India and SENSEX

Year	Sensex	FDI	FPI
2014	27,499.42	34,57,66,43,694.14	-37,74,03,18,603.45
2015	26,117.54	44,00,94,92,129.53	-9,48,66,42,829.09
2016	26,626.46	44,45,85,71,545.80	4,72,52,09,437.40
2017	34,056.83	39,96,60,91,358.74	-30,63,77,84,957.52
2018	36,068.33	42,11,74,50,737.26	9,59,79,39,591.47
2019	41,253.74	50,61,06,47,353.59	-24,58,41,19,878.39
2020	47,751.33	64,36,23,64,994.38	-15,11,17,06,746.66
2021	58,253.82	44,72,72,77,562.88	-5,71,81,99,364.63
2022	60,840.74	49,94,02,58,404.27	18,70,28,36,367.76
2023	72,240.26	28,07,02,13,530.40	-31,02,53,24,772.45

Source: Compiled from website of world bank and BSE

The above table shows the FDI and FPI in India and BSE Sensex during the study period. In the year 2014 FDI was 34,57,66,43,694.14 then it increased during next year and reached to

44,00,94,92,129.53. After 2017 it starts rising and reached to 64,36,23,64,994.38 in the year 2020 and again it dropped to 28,07,02,13,530.40 in the 2023. The FPI inflows were continuously varying during the study period starting from -37,74,03,18,603.45 (lowest during the study period) in 2014 to 18,70,28,36,367.76 in 2022 which was highest during the period. BSE Sensex was 27,499.42 in 2014 and then there was a constant upsurge in the BSE Sensex after 2015. Thus, FDI inflows and FPI inflows showed a rollercoaster trend while BSE Sensex showed skyward trend during the study period.

Table-2:Year-wise FDI and FPI of USA and S&P 500

Year	S&P 500	FDI	FPI
2014	1,966.28	2,51,85,60,00,000	-1,14,93,20,00,000
2015	2,106.78	5,11,43,40,00,000	-1,06,75,50,00,000
2016	2,135.70	4,74,38,80,00,000	-1,93,77,60,00,000
2017	2,481.19	3,80,82,30,00,000	-2,50,08,30,00,000
2018	2,835.21	2,14,71,50,00,000	78,78,50,00,000
2019	2,980.53	3,15,98,40,00,000	-2,44,92,00,00,000
2020	3,371.97	1,37,06,60,00,000	-5,40,19,20,00,000
2021	4,354.08	4,75,80,50,00,000	97,43,90,00,000
2022	4,316.75	4,08,98,20,00,000	-4,37,66,60,00,000
2023	4,397.29	3,48,78,40,00,000	-11,49,51,50,00,000

Source: Compiled from website of world bank and NYSE

The above table shows the FDI and FPI in United States and S&P 500 during the study period. In the year 2014 FDI was 2,51,85,60,00,000 then it increased during next year and reached to 5,11,43,40,00,000. After 2015 it starts decreasing and reached to 1,37,06,60,00,000 in the year 2020 and then it increased during next year. And again, it dropped to 3,48,78,40,00,000 in the 2023. The FPI inflows were continuously varying during the study period starting from -1,14,93,20,00,000 in 2014 to 97,43,90,00,000 in 2021 which was highest during the period. Then it dropped to -11,49,51,50,00,000 which was lowest FPI inflow in USA during the study period. S&P 500 was 1,966.28 in 2014 and after that there was a constant upsurge in the S&P 500. Thus, FDI inflows and FPI inflows showed a rollercoaster trend while S&P 500 showed upward trend during the study period.

• **Regression Model:**

Simple Linear Regression has been used to examine the impact of FDI and FPI on SENSEX and S&P 500. Independent variables (X) are FDI and FPI of India and China and dependent variables (Y) are SENSEX and S&P 500. The model is as follows:

Model Building: $Y = a + b X$

- Model (a):
 - i. $\text{SENSEX} = a + b \text{ FDI}$
 - ii. $\text{S\&P 500} = a + b \text{ FDI}$
- Model (b):
 - i. $\text{SENSEX} = a + b \text{ FPI}$
 - ii. $\text{S\&P 500} = a + b \text{ FPI}$

The conclusion of Regression Analysis is described in the tables below:

For Model (a)

Table 3: Model Summary

Model	Sensex	S&P 500
Multiple R	0.053689	0.020426747
R Square	0.002882	0.000417252
Adjusted R Square	-0.12176	-
Standard Error	17125.14	1029.277497
Observations	10	10

Source: Author's Computation

Table 4: ANOVA

Model		df	SS	MS	F	Significance F
SENSEX	Regression	1	6782343	6782343	0.023127	0.882894
	Residual	8	2.35E+09	2.93E+08		
	Total	9	2.35E+09			
S&P 500	Regression	1	3537.810898	3537.810898	0.0033394	0.95533513
	Residual	8	8475297.328	1059412.166		
	Total	9	8478835.139			

Source: Author's Computation

Table 5: Coefficients

Model		Coefficients	Standard Error	t Stat	P-value
SENSEX	Intercept	47012.87	26481.32	1.775322	0.113759
	X Variable 1	-8.9E-08	5.85E-07	-0.15207	0.882894
S&P 500	Intercept	3037.847484	1034.281417	2.937157561	0.018791183
	X Variable 1	1.61178E-10	2.78914E-09	0.057787623	0.95533513

Source: Author's Computation

For Model (b)

Table 6: Model Summary

Model	Sensex	S&P 500
Multiple R	0.069977479	0.465932885
R Square	0.004896848	0.217093454
Adjusted R Square	-0.119491047	0.119230135
Standard Error	17107.82999	910.9154418
Observations	10	10

Source: Author's Computation

Table 7: ANOVA

Model		df	SS	MS	F	Significance F
SENSEX	Regression	1	11522011.84	11522011.84	0.039368	0.847672
	Residual	8	2341422776	292677847		
	Total	9	2352944788			
S&P 500	Regression	1	1840699.603	1840699.603	2.218333	0.174707
	Residual	8	6638135.537	829766.942		
	Total	9	8478835.139			

Source: Author's Computation

Table 8: Coefficients

Model		Coefficients	Standard Error	t Stat	P-value
SENSEX	Intercept	43790.26193	6512.648911	6.72387879	0.000149
	X Variable 1	5.93194E-08	2.9897E-07	0.19841259	0.847672
S&P 500	Intercept	2738.115364	374.5088996	7.3112157	8.29835E-05
	X Variable 1	-1.24567E-09	8.36356E-10	-1.489407	0.174707861

Source: Author's Computation

7. Hypothesis Testing:

H₀₁ = The impact of FDI on SENSEX is statistically insignificant.

From the above statistics, the researcher has found the p-value related to FDI and Sensexis 0.882894 which is greater than 0.05 at the 5% level of significance. Hence, there is sufficient evidence to fail to reject the null hypothesis which means the impact of FDI on SENSEX is statistically insignificant.

H₀₂ = The impact of FDI on S&P 500 is statistically insignificant.

From the above statistics, the researcher has found the p-value related to FDI and S&P 500is 0.95533513 which is greater than 0.05 at the 5% level of significance. Hence, there is sufficient evidence to fail to reject the null hypothesis which means the impact of FDI on S&P 500 is statistically insignificant.

H₀₃ = The impact of FPI on SENSEX is statistically insignificant.

From the above statistics, the researcher has found the p-value related to FPI and Sensex is 0.847672 which is greater than 0.05 at the 5% level of significance. Hence, there is sufficient evidence to fail to reject the null hypothesis which means the impact of FPI on SENSEX is statistically insignificant.

H₀₄ = The impact of FPI on S&P 500 is statistically insignificant.

From the above statistics, the researcher has found the p-value related to FPI and S&P 500 is 0.174707861 which is greater than 0.05 at the 5% level of significance. Hence, there is sufficient evidence to fail to reject the null hypothesis which means the impact of FPI on S&P 500 is statistically insignificant.

8. Findings:

- The results revealed that there has been no correlation between FDI and Sensex. And also, there has been no correlation between FPI and Sensex.
- The results also revealed that there has been no correlation between FDI and S&P 500. But there has been a low degree of positive correlation ($r = 0.465$) between FPI and S&P 500.
- The outcome of this study clearly stated that there is no influence of FDI and FPI on Sensex.
- The study also discovered that there is no effect of FDI and FPI on S&P 500.

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AI-Powered Talent Management Systems: Transforming Teacher Satisfaction in Private Educational Institutions

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Abstract

The aim of this study is to investigate the role of AI-based talent management systems on teacher job satisfaction in private schools in Kabul, Afghanistan. Increasing administrative burden and decreasing teacher retention and satisfaction are major challenges facing schools. Human resource strategies with the integration of AI (artificial intelligence) can alleviate these challenges and enhance job satisfaction. This study used a quantitative approach, targeting 150 private school principals in Kabul city as a sample for data collection. The collected data was analyzed in the SPSS platform using descriptive statistics such as independent t-tests and linear regression models. In this study, AI users (mean = 75.3) were more satisfied than non-AI users (mean = 68.1), indicating a significant statistical difference ($p = 0.001$). Thus, the use of AI had a significant and positive effect on teachers' job satisfaction compared to compensation. Length of experience in this study had no significant effect ($p = 0.478$) on teachers' job satisfaction. This adds to the importance of using AI. Ultimately, the use of AI in human resource systems increases productivity, improves performance, and reduces administrative workload. As a result, it improves the level of job satisfaction and teacher retention. This study emphasizes the use of AI in human resource management and education systems. It provides valuable insights such as practical strategies, the Technology Acceptance Model (TAM), and empirical evidence. Therefore, this study can be valuable to school administrators, decision-makers, and human resources specialists.

Keywords: AI-Powered HR systems, Talent Management, Teacher Job Satisfaction and retention.

Introduction:

Background of the study: As we all know, artificial intelligence has made amazing progress in all sectors in the last few years. In this way, it has transformed all aspects of our lives. Hence, education and human resource management have not been separated from this impact. Human resource management based on artificial intelligence has been able to play a positive and constructive role in the education, recruitment, performance review, and retention of human resources.

The integration of artificial intelligence in private schools is considered a serious need. Because it leads to increased job satisfaction of teachers, which has a direct impact on improving student outcomes. Hence, human resource management based on artificial intelligence helps in strengthening and developing teachers' skills, experiences, and efficiency. In the reviewed studies, artificial intelligence has been mentioned as an important factor in reducing workload,

enhancing compensation strategies, and career advancement. Hence, the use of artificial intelligence can significantly increase job satisfaction.

Extensive studies have been conducted in the field of artificial intelligence and its impact in various sectors, especially in education. However, studies in the field of human resource systems based on artificial intelligence and their impact on teacher job satisfaction have rarely been addressed, especially in developing countries like Afghanistan, which to some extent is a new concept. Afghanistan is a country where educational institutions always face various obstacles, specifically in retention and job satisfaction of teachers.

Problem statement: The quality of education and teachers retention is directly related to teachers' job satisfaction. Thereby, teacher satisfaction is considered important in organizations and institutions. Teachers in private schools in Kabul city are facing a high level of dissatisfaction due to heavy workload, lack of effective strategies, and lack of professional development. Therefore, if human resource systems based on artificial intelligence are implemented in the process of human resource strategies, they can help in facilitating the process of human resource recruitment, retaining human resources, and improving employee satisfaction. In this way, its implementation in schools leads to teachers' comfort and improvement. However, the role of AI-powered talent management systems on teacher satisfaction has not yet been clearly and deeply studied to some extent.

Significance of the study: According to studies and literature reviewed, this study has been able to take the first step on the impact of artificial human resource management systems with artificial intelligence in enhancing teachers' job satisfaction in private schools in Kabul, Afghanistan. Therefore, the findings in this study highlight the role of human resource management systems based on artificial intelligence in improving teachers' job satisfaction.

- Optimal use of AI in selecting and hiring human resources by examining their talents and maintaining them.
- Designing and establishing strategies to incorporate artificial intelligence with human resource talent management for the purpose of solutions in education.
- By filling the minimum gaps in the literature reviewed, in the use of based human resources-artificial intelligence for the welfare and satisfaction of teachers.
- Encouraging teachers to use artificial intelligence tools to improve individual skills.

Finally, this study provided the necessary practical awareness by examining the optimal use of artificial intelligence in human resource talent education and management, which significantly contributes to teachers' job satisfaction and satisfaction.

Literature Review:

General vision of literature: (AI) Artificial intelligence is backbone of innovation that impacts on different aspects of our lives. It is the topic that is under discussion of most researchers. Thus, extensive research has been done on artificial intelligence and its role in the transformation of education, especially in human resource management—AI and job satisfaction of teachers.

Researchers Ajuwon, Animashaun, and Chiekezie (2024) have in their studies optimized the use of artificial intelligence to maintain, attract, predict teachers' needs, and improve professional development. It can enhance the job satisfaction of teachers and the quality of knowledge among the students. The evolutionary role of artificial intelligence in enhancing education and learning has been examined by Babu (2024).

Researchers such as Briki, Gherrab, & Almi (2024) also talked about the positive impact of artificial intelligence on facilitating the talent management system, enhancing human resources productivity, and ultimately increasing the level of job satisfaction. Each of them has separately examined job satisfaction and compensation in their studies.

A study conducted by Bello & Alhyasat (2020) evaluates the effective role of practices such as the intermediary of talent management and compensation in the satisfaction and maintenance of employees at the university.

In a different study by Delello et al. (2025), he examines the role of artificial intelligence in the mental stability of teachers and emphasizes the impact of artificial intelligence in reducing the volume of administrative work. In addition, this study highlights teachers' anxiety about the use of artificial intelligence. How the role of facilitators involving AI can help improve the technology skills and job satisfaction of the teachers has been examined by Nguyen (2024).

In another study that has not been completed, artificial intelligence training and guidance designs such as intelligent technologies in teaching, AI tests, virtual platforms, and smart diagnostics for Wang & Xie (2024) testing are scrutinized. The role of artificial intelligence in individual learning and workload control has been evaluated by Shi et al. (2024). Their findings show that artificial intelligence helps fully improve learning but requires the support of organizations and institutions. How various factors affect the teachers' assurance of artificial intelligence has been identified by Viberg et al. (2024). As such, it emphasizes the improvement and development of technology and artificial intelligence to integrate with cultures.

Basic theories or concepts: The “Equity Theory” in this study has been reviewed on artificial intelligence, satisfaction, and maintenance of teachers. In the theory of justice created by Bello & Alhyasat (2020), how to affect fair compensation that leads to increased job satisfaction and teachers' maintenance. Another theory called self-esteem has been developed by Viberg et al. (2024). This theory, which has emphasized the integration and acceptance of artificial intelligence among teachers, has evaluated the acceptance and interest of higher literate teachers in using artificial intelligence and related tools. Talent Management Theory (TMT) is one of the most important theories in understanding the process of smart human resources. Therefore, this theory identifies how effective artificial intelligence strategies are in recruiting, learning, and maintenance (Briki et al., 2024). Researchers, such as Guo, Shi, and Zhai (2024), used technology acceptance theory (TAM) in their research. This theory is capable of testing teachers' willingness to accept artificial intelligence tools in learning and teaching. In another study that was conducted by Oh & Ahn (2024), they spoke of the integration of artificial intelligence and technology with education with the help of human resources and artificial intelligence. In this study, in addition to identifying environmental gaps that include social factors, the effectiveness of artificial intelligence in administrative work is important. The Modern Learning Model (MLM) has been used by Ravi et al. (2023). It emphasizes the effectiveness of systematic learning and extra-discipline strategies, which improve teaching and teaching in students' classes.

Gaps or Limitations in literature: Extensive research has been conducted in the field of AI and satisfaction among teachers, despite the job satisfaction of the vacuum teachers received below. The essential gaps include the lack of practical research, long-term research, and continuous studies on the effective role of human resource systems for the preservation and retention of teachers. Although reviews provide valuable insights, a limited number of them

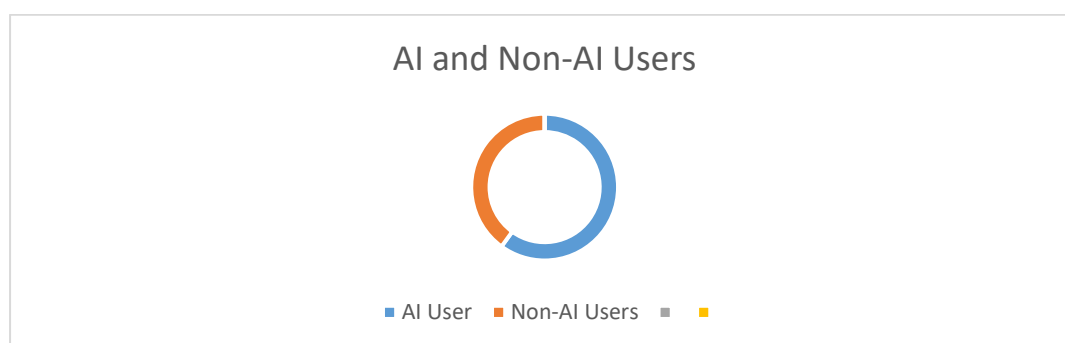
provide effective information that contributes to the reduction of teachers' turnover. Another main obstacle is the refusal to accept artificial intelligence because of the mistrust of it. In the study conducted by Delello et al. (2025) and Shi, Ding, and Choi (2024), it is indicated that users are concerned about artificial intelligence. They believe that using artificial intelligence leads to increased workload and creates ethical problems. Another challenge is doubt and resistance to artificial intelligence. The previously mentioned part of the artificial intelligence significantly affects education approaches and helps improve the development of professional teaching. The lack of emotional intelligence in education that leads to a full-scale replacement of artificial intelligence. It has raised concerns about its interaction with students and social progress (Oh & Ahn, 2024). Therefore, equity and confirmation of the full access to artificial intelligence are still disputed. However, the level of access to artificial intelligence is related to cases such as financial investment, sufficient technical knowledge, and fundamental infrastructure. Therefore, its access and implementation are not the same in all foundations and organizations. Another major challenge in accepting artificial intelligence is cultural and geographical differences. In the research by Viberg et al. (2024), cultural and geographical differences can prevent the acceptance and approval of artificial intelligence in societies. Therefore, small strategies are not effective in teacher preservation and better education. The ethical challenges, such as information privacy, bias, and lack of independence of teachers, still have concerns about using artificial intelligence and technology. Despite the above, artificial intelligence plays a constructive role in improving and producing human resources and playing. In Manoharan, 2024) and Rahiman & Kodikal, 2024), which emphasize strategic oversight methods to maintain ethics and deterrence from bias in the use of artificial intelligence in human resources and education.

Methodology:

Research Design: In this study, a quantitative approach has been used to evaluate the constructive role of AI-powered talent management systems in shaping teachers' job satisfaction in Kabul's private schools. A periodic method has been used to accurately analyse and understand the differences at the job satisfaction between teachers, especially based on teachers' use of artificial intelligence, compensation, and their experiences. Therefore, in this study, most of the integration of artificial intelligence power with talent management systems is focused on evolution and increased job satisfaction.

Data Collection Methods: In this article, data collection is done through a structured questionnaire. This was an online survey that Google's form was used to make a questionnaire, and distribution was conducted by email and other virtual tools.

Sample Selection: The sample size was targeted at 150 principals from private schools in Kabul city. Data have been collected as a stratified random sampling method from principals who are AI and non-AI users. This method of collecting enables comparative analysis to evaluate the role of artificial intelligence in managing talent and its impact on teachers' job satisfaction.



SmartArt-1

Data Analysis Techniques: In statistical analysis, SPSS methods are used to analyze collected data and the below techniques.

1. The distribution of job satisfaction scores (descriptive statistics, mean, and standard deviation) has been analyzed.
2. The T-test has been done to compare principals who use AI and principals who do not use AI in their jobs.
3. Linear regression analysis was used to evaluate the impact of human resource systems with artificial intelligence, compensation, and the duration of work experience.
4. Finding in this analysis on the SPSS platform shows that human resource systems with artificial intelligence had a significant impact on teachers' job satisfaction level, so in the study of artificial intelligence systems.

The job has increased teachers' jobs ($P < 0.001$), while factors such as compensation and the duration of experience have not been very effective. Finally, in this analysis, the evolutionary role of artificial intelligence in modern human resource strategies has been highlighted.

Results:

Key findings

Data Analysis and Interpretation

1. Descriptive analysis

Table of mean job satisfaction marks summarization & (AI users & Non-AI users).

Category	Mean Job Satisfaction	Standard Division	Sample Size
AI Users	75.3	8.5	75
Non-AI Users	68.1	9.8	75

Table-1

The report indicates that AI users were more satisfied with (mean = 75.3) than non-AI users with (mean = 68.1). The Standard Deviation (S.D.) in this analysis is with fluctuation and a little distribution on non-AI users' scores.

2. Independent T-test

Table of independent T-test that indicate level of satisfaction between AI users and non- AI users.

Statistic Test	t-value	p-value
Independent T-test	3.45	0.001

Table-2

As the above result, the ($p=0.001$) is less than 0.05. Therefore, there is significant difference between the satisfaction level of AI users and non-AI users. In addition, AI-powered HR systems have a positive effect on teacher job satisfaction.

3. Linear-Regression Analysis

Table of linear-regression analysis that shows the impact of AI, Compensation, Experience, and Intercept on teacher job satisfaction.

Variables	Coefficient (B)	Standard Error	t-value	p-value
AI Usage	5.2	1.5	3.47	0.001
Compensation	0.01	0.005	2.0	0.045
Experience	0.05	0.07	0.71	0.478
Intercept	60.2	5.4	11.15	0.00

Table-3

The report indicates the usage of AI significantly led to high satisfaction with ($c=5.2$) among teachers. Compensation in this report has a significant impact but less with ($p=0.045$) on teacher job satisfaction. The only variable that does not importantly affect job satisfaction is years of experience ($p=0.045$). Eventually, based on (0.28 , $F=7.8$, $0=0.001$), the differences in job satisfaction are 28%.

Research question:

What is the role of AI-based talent management in teachers' job satisfaction?

1. Based on ($p= 0.001$), the findings in support of the research show that AI-based resource management systems significantly help in increasing the level of job satisfaction of teachers.
2. Based on the analysis and statistical analysis of the T-test, the difference between people who use AI and those who do not use AI can be.
3. The findings also show the role of compensation in increasing job satisfaction.
4. The length of work experience in this study has no effect on the level of satisfaction.

As a result, it can be said that the integration of AI power in human resource management structures in private schools has a significant impact on increasing and improving the level of job satisfaction in private schools in Kabul. Therefore, the results of this study highlight technology in education and talent management in schools.

Discussion:

Interpretation of results: According to the findings in this article, artificial intelligence-based talent management systems have a significant and positive impact on the level of job satisfaction of teachers in the private schools of Kabul. Therefore, artificial intelligence users are more satisfied than those who do not use artificial intelligence. Therefore, the use of artificial intelligence can be effective in improving teachers' experiences, hiring teachers, and quality of education. In addition, the results of regression analysis show that the effect of artificial intelligence on job satisfaction is high and meaningful. However, compensation effects were very, while length of experience had no significant impact on teachers' job satisfaction. As such, the use of artificial intelligence tools is more important than the length of serving, which increases the comfort and job satisfaction of teachers. However, integrating artificial

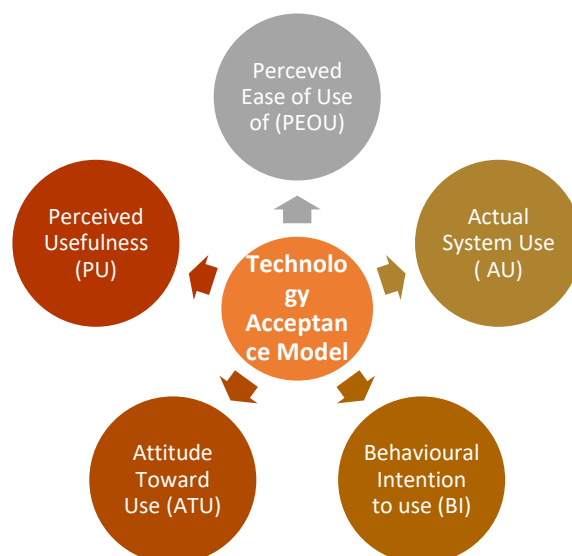
intelligence with human resource strategies, especially in planning smart programs, monitoring performance, self-development, and enhancing experience, helps increase teachers' job satisfaction. In addition, it has a positive role in reducing workload, preventing inefficient operations, providing job development opportunities, and teaching quality.

Comparison of analysis with reviewed literature: The findings in this study are consistent with the existing literature based on statistical analysis of the high-level data collected that has studied the role of artificial intelligence in human resources education and management. On the basis of research by Ajuwon, Animashaun, and Chiekezie (2024), the use of artificial intelligence in human resource mechanisms significantly increases teachers' retention and improves teachers' professionalism and job satisfaction. Help Briki, Gherreab, and Almi, (2024) shows that artificial intelligence forces simplify talent management, optimize human resources, and ultimately increase job satisfaction. According to the technology acceptance model (TAM), which researchers Guo, Shi, and Zhai (2024) support, teachers usually tend to use artificial intelligence tools, which their experience and skills increase in the work. It has been that the compensation in existing studies corresponds to the statistical analysis of regression. The Technology Acceptance Model is a theory developed by Davis in 1989. It is based on a systematic structure that reflects the perception of ease, vision, and preferences of users towards the use and acceptance of technology and has wide application in the way technology is used.

Key Elements of the Technology Acceptance Model (TAM):

- (PEOU): It indicates the degree of belief in a particular technology, which can increase a person's efficiency.
- (PU): It indicates the degree of satisfaction of a person, which has created ease by using technology in his work.
- (ATU): It indicates a person's perspective, which may be positive or negative, about the technology.
- (BI): It expresses the person's intention to use the technology in the future.
- (AU): This section shows the actual use of technological tools.

SmartArt-2



However, there are also concerns about the acceptance of artificial intelligence among teachers, which have been dealt with by researchers such as Bello and Alhyasat (2020), Delello et al. (2025), and Shi et al. (2024). The rejection of artificial intelligence leads to a big deal of work and ethical challenges. To accept artificial intelligence in human resources structures.

Study recommendations and limitations:

Recommendations

1. For schools and human resources professionals
 - The largest use of artificial intelligence in human resources systems to enhance teachers' conservation and satisfaction in educational institutions and schools.
 - The integration of artificial intelligence tools in training enables employees to optimize administrative work, helping teachers focus more on teaching, and increasing individual professional development.
2. Decision makers
 - Decision makers can support educational institutions by providing resources and infrastructure, providing artificial intelligence-based educational systems, and supportive policy.
 - Policymakers and decision-makers must adopt rules that eliminate ethical concerns such as privacy and so on so that users can benefit from artificial intelligence management.
3. Researchers
 - In future research, researchers should address the challenges and concerns of using artificial intelligence, the role of artificial intelligence in different geographical and social environments, and long-term studies.
 - Further studies should be done on ethical concerns, rejection of artificial intelligence tools, and the awareness of artificial intelligence.

Limitations: Despite valuable insights, this study has some limitations: • Limited Generalization: This study is focused only on private schools in Kabul, which may not represent all Afghan schools or other areas. • Cross -section data: Data at a single point at the time of collected and limit the ability to observe long -term trends in job satisfaction. • Lack of qualitative insights: While quantitative methods provide statistical importance, a qualitative approach (e.g., interviews) can provide a deeper insight into teachers' experiences and challenges by accepting artificial intelligence.

Conclusion:

Key Findings

1. Based on the data analysis, AI users had higher satisfaction than non-AI users.
 2. The findings show that AI has a positive role in teacher satisfaction and helps improve AI-based human resource management systems.
 3. In addition to AI, compensation was one of the other important factors, but with a lesser impact than AI, in teacher job satisfaction.
 4. According to the studies conducted, the length of teacher experience did not have any significant effect on teacher job satisfaction.
 5. The integration of AI and human resource systems helps in facilitating administrative work, reducing workload, and significantly increasing the level of teacher job satisfaction.
- Finally, the integration and use of AI tools in all work and personal sectors, especially in educational institutes, is a serious necessity. Its application ensures the retention and satisfaction of teachers in private schools.

Contribution to this field:

This study emphasizes the integration of AI in various fields, such as education and human resource management. Meanwhile, this study has been effective in filling the following gaps.

1. This study is effective in filling the gaps in existing studies on the role of AI in human resource management and education in developing countries, especially Afghanistan.
2. The presentation of the Technology Acceptance Model (TAM) and equity theory in this study can help in raising awareness and acceptance of AI among teachers.
3. Providing and informing practical strategies for school administrators, decision-makers, and human resource experts to support AI in promoting teacher retention and satisfaction.
4. This paper emphasizes and highlights the policies for the ethical use of AI in the fields of human resource management, education, and fair compensation.

As we all know, artificial intelligence has brought about a wide-ranging transformation in various sectors. Therefore, human resource management systems have not been free from this impact. Human resource management systems based on artificial intelligence have brought about a significant and positive transformation in areas such as recruitment, performance evaluation, standardized training, and facilitation of human resource processes, fair compensation, and workload reduction. In this way, artificial intelligence plays a vital role in improving talent management in education.

Therefore, future studies should focus on issues such as teachers' ethical concerns about artificial intelligence and the long-term effects of intelligence. In this way, researchers can contribute to the sustainable, fair, and beneficial use of artificial intelligence.

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“NEP 2020 and Skill Development: A Study of Awareness and Perception among Students and Educators of Higher Educational Institutes in Dadra and Nagar Haveli”

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ABSTRACT:

The National Education Policy (NEP) 2020 emphasizes skill development as a critical component of India's education system to meet the demands of a rapidly evolving global economy. This study explores the awareness and perception of NEP 2020's provisions for skill development among students and educators in Dadra and Nagar Haveli, a union territory with unique socio-economic and educational dynamics. By employing a mixed-methods approach, the research gathers quantitative data through structured surveys and qualitative insights through focus group discussions and interviews. The findings reveal the extent of familiarity with NEP 2020, the perceived relevance of skill development initiatives, and the challenges faced in integrating these provisions into the local educational framework. The study also highlights disparities in awareness levels and perceptions based on demographic factors, such as age, educational background, and professional roles. The research offers policy recommendations to enhance the implementation of NEP 2020 in the region, emphasizing localized strategies for increasing awareness and aligning skill development initiatives with the needs of the community. This study contributes to the broader discourse on NEP 2020's impact, providing valuable insights for policymakers, educators, and stakeholders to transform education and skill development in diverse contexts.

Key words:

NEP-2020, Skill Development, Awareness, Perception, Challenges

INTRODUCTION:

The education system has always been a cornerstone of India's constitutional principles, serving as a vital instrument for preparing individuals for the future. It equips them with the skills needed to reach their full potential. In an ever-evolving world driven by technological advancements across various fields, education plays a pivotal role. There is an increasing demand for a skilled workforce with a well-rounded, multidisciplinary skill set to meet the challenges of this dynamic environment. (Merin Lukose 2023). Education is not merely the transfer of information from trainer to learner; it emphasizes the need for practical learning to equip individuals for real-world tasks. With this perspective in mind, India's National Education

Policy (NEP) 2020 has been introduced, marking a significant update to the nation's education framework after 34 years. (Dr. Sanjay Kumar 2022).

The National Education Policy (NEP) 2020 aims to transform India's education system by promoting critical thinking, creativity, and problem-solving abilities. With a focus on skill development, the policy envisions nurturing individuals capable of effectively contributing to society and addressing contemporary challenges. (*Sunny Seth et.al 2023*)

The National Education Policy (NEP) 2020 marks a significant milestone in the history of India's education system, introducing comprehensive reforms to equip learners with the skills required to thrive in a rapidly evolving world. With a focus on multidisciplinary learning, critical thinking, and holistic development, the NEP aims to shift the paradigm from rote memorization to a more experiential and skill-oriented approach. Skill development is a central theme of the NEP 2020, recognizing the need for a workforce that can meet the challenges of technological advancements and socio-economic changes. By emphasizing the integration of vocational education, digital literacy, and life skills across all levels of learning, the policy seeks to bridge the gap between education and employability.

The Union Territory of Dadra and Nagar Haveli provides a unique context for examining the implementation and reception of NEP 2020's skill development initiatives. With its distinct socio-cultural and economic landscape, understanding the awareness and perceptions of students and educators in this region is crucial. Their perspectives can offer valuable insights into the opportunities and challenges faced in embedding the NEP's vision at the grassroots level.

This research paper seeks to explore the awareness and perception of NEP 2020 among students and educators in Dadra and Nagar Haveli, focusing on its skill development aspects. The study aims to assess their understanding of the policy's objectives, its relevance to their educational and professional aspirations, and the potential impact on the region's educational ecosystem. By analyzing their views, the research intends to contribute to a deeper understanding of the NEP's implementation and its role in shaping a future-ready generation.

LITERATURE REVIEW:

Dr. Kishor (2023) highlighted that the emergence of Industry 4.0 has brought several prominent trends to the forefront, with the NEP 2020 being a notable example. Reshaping the educational framework is a crucial initial step in addressing the fast-paced changes driven by evolving demands and requirements. In essence, a robust skill-oriented education system holds the promise of transforming the nation's perspective on career opportunities while fostering a creative and innovative approach to achieving global leadership.

Merin Lukose (2023) highlighted the transformative impact of NEP 2020 in promoting skill-based and vocational education. The policy emphasizes 21st-century skills such as creativity,

collaboration, and social skills, aiming to reduce the stigma around vocational education and position it as a pathway to higher education and prestigious careers. Lukose also stressed the importance of training teachers as vocational educators to facilitate integration into school curricula, emphasizing collaborative efforts among stakeholders to achieve the policy's goals.

Dr. Sanjay Kumar (2022) emphasized the critical role of Technical and Vocational Education and Training (TVET) in addressing the need for skilled manpower and promoting inclusive economic growth in India. Despite increased government attention, the effectiveness of vocational programs remains limited due to challenges like poor institutional quality and weak industry linkages. The NEP 2020 acknowledges the importance of access and lifelong learning but requires robust structural reforms to ensure holistic skill development and enhance global and domestic mobility of skilled workers.

Sunny Seth et al. (2023) highlighted NEP 2020 as a transformative shift in Indian education, focusing on skill development over rote learning. By adopting outcome-based education and aligning objectives with course outcomes, the policy aims to bridge the gap between education and employability. While challenges like resistance to change and resource allocation persist, strategic measures such as faculty training and assessment alignment can address them. The result will be a generation equipped with both theoretical knowledge and practical skills, fostering innovation and social progress.

Dr. Utkal Kushwaha (2022) emphasized NEP 2020's potential to transform Indian higher education through increased R&D investments, enhanced research facilities, and strengthened industry-academia partnerships. The policy promotes innovation via technology transfer centers, start-up incubators, and a robust intellectual property rights ecosystem to foster entrepreneurial thinking. By focusing on a research-driven, innovation-centric approach, NEP 2020 aims to elevate Indian institutions to global standards, but success hinges on effective implementation, strong infrastructure, and collaborative efforts to drive economic and societal progress.

RESEARCH METHODOLOGY:

Research methodology ensures the validity, reliability, and objectivity of findings. This study adopts a hybrid research design, combining descriptive and analytical approaches, to examine the awareness and perception of NEP 2020 and its emphasis on skill development among students and educators in higher educational institutions in Dadra and Nagar Haveli.

Objectives

1. To measure the awareness of NEP 2020's provisions for skill development and vocational training among students and educators in Dadra and Nagar Haveli.
2. To analyze the perceptions of students and educators regarding the relevance, benefits, and challenges of integrating vocational training into the education system.
3. To assess the readiness of educational institutions and stakeholders in adopting NEP 2020's skill development initiatives, including resource availability and infrastructure adequacy.
4. To explore the major challenges and potential opportunities for successful implementation of NEP 2020's skill development policies in the region.
5. To explore differences in awareness and perceptions across different academic streams and demographics.

Sampling Method

The study employs a stratified sampling method by categorizing the population into distinct subgroups (Arts, Commerce and Management, science and computer science) based on academic streams. Within each stratum, simple random sampling is used to select participants, ensuring a representative sample.

Data Collection

Both primary and secondary data are utilized. Secondary data is sourced from books, journals, and online resources. Primary data is collected via a structured questionnaire targeting students and educators in higher education institutions in the region.

Data Analysis Methods

The analysis employs a mix of descriptive statistics, mean calculation, and non-parametric tests (Kruskal-Wallis, Mann-Whitney U, and post-hoc analysis) to identify key patterns in awareness and perception regarding NEP 2020 and its skill development initiatives.

RESULT AND DATA ANALYSIS:

Reliability Test

Reliability Statistics

Reliability Statistics			
Cronbach's Alpha	N of Items	N of responses	Interpretation
0.805	15	308	Strong Internal Consistency

The reliability of a set of 15 items was assessed using Cronbach's Alpha, which yielded a value of 0.805, indicating strong internal consistency. This suggests that the items effectively measure the same underlying constructs and are highly correlated with each other, providing a reliable measure of the concept being investigated.

Validity test:

Significance level is 0.05 ie. 95%. Almost all the values in the correlation table for all items of both the construct are below 0.05. Obtained values in Pearson correlation is greater than the critical value (table value 0.205 to 0.197) and is highly significant, so we can say questions are valid.

DEMOGRAPHIC PROFILE:

Demographic Profile

Categories	Sub Categories	Frequency	Percentage
Age	17-22	240	77.9
	23-28	18	5.8
	29-35	16	5.2
	36-45	34	11
	45+	0	0
Gender	Male	120	39

	Female	188	61
Highest level of education	Diploma	4	1.3
	Undergraduate	226	73.4
	Postgraduate	62	20.1
	Doctorate	16	5.2
	Postdoc	0	0
Course	Commerce	226	73.4
	Science	18	5.8
	Computer Science/IT	22	7.1
	Arts	42	13.6
Occupation/role	Student	248	80.5
	Lecturer	60	19.5
Type of your college/institute	Government	112	36.4
	Private	196	63.6

Interpretation

The sample consisted of 308 participants, with a majority (77.9%) falling in the 17-22 age group. The sample was predominantly female (61%) and comprised primarily of undergraduate (73.4%) and postgraduate (20.1%) students. The majority of respondents were enrolled in Commerce (73.4%) courses, followed by Arts (13.6%) and Computer Science/IT (7.1%). The sample included both students (80.5%) and lecturers (19.5%), with respondents affiliated with both government (36.4%) and private (63.6%) institutions.

OBJECTIVE WISE ANALYSIS

Objective 1

To measure the awareness of NEP 2020's provisions for skill development and vocational training among students and educators in Dadra and Nagar Haveli.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Awareness regarding National Education Policy (NEP) 2020 skill development and vocational training?	308	1	5	2.35	1.031
Valid N (listwise)	308				

AWARENESS of NEP 2020 Awareness level among Students and Lecturer (Crosstabulation)

Count				
		What is your current occupation/role?		Total
		Student	Lecturer	
AWARENESS of NEP 2020	Very Well	50	4	54
	Good	100	46	146
	Average	64	10	74
	Below Average	14	0	14
	Not At All	20	0	20
Total		248	60	308

The table reveals variations in awareness levels of NEP 2020 and its focus on skill development between students and lecturers. While a significant proportion of both groups reported "good" awareness, a higher percentage of lecturers (46%) fell into this category compared to students (40%). Conversely, a larger proportion of students reported "average" awareness (26%) compared to lecturers (17%). Notably, 14 students reported "below average" or "no" awareness, while no lecturers did. These findings suggest that while both groups have some understanding of the policy, lecturers may have a slightly stronger grasp of NEP 2020 and its focus on skill development compared to students.

Objective 2

To analyze the perceptions of students and educators regarding the relevance, benefits, and challenges of integrating vocational training into the education system.

PERCEPTION :Vocational training is important for students in your locality. * 5. What is your current occupation/role? Crosstabulation				
Count				
		Occupation/role		Total
		Student	Lecturer	
PERCEPTION: Vocational training is important for students in your locality.	Strongly Agree	90	38	128
	Agree	154	22	176
	Disagree	2	0	2
	Strongly Disagree	2	0	2
Total		248	60	308

You believe that NEP 2020's emphasis on skill development is beneficial for students? * 5. What is your current occupation/role? Crosstabulation				
Count				
		Occupation/role		Total
		Student	Lecturer	
You believe that NEP 2020's emphasis on skill development is beneficial for students?	Strongly Agree	72	40	112
	Agree	164	18	182
	Disagree	12	2	14

Total	248	60	308

Teachers are adequately prepared to implement NEP 2020's vocational education initiatives? * 5. What is your current occupation/role? Crosstabulation				
Count				
		Occupation/role		Total
		Student	Lecturer	
Teachers are adequately prepared to implement NEP 2020's vocational education initiatives?	Strongly Agree	46	28	74
	Agree	158	30	188
	Disagree	28	2	30
	Strongly Disagree	16	0	16
Total		248	60	308

To what extent do you agree to the relevance of vocational training in today's job market? * 5. What is your current occupation/role? Crosstabulation				
Count				
		Occupation/role		Total
		Student	Lecturer	
To what extent do you agree to the relevance of vocational training in today's job market?	Strongly Agree	68	34	102
	Agree	146	26	172
	Disagree	30	0	30
	Strongly Disagree	4	0	4
Total		248	60	308

Students are interested in pursuing vocational training alongside your academic studies? * 5. What is your current occupation/role? Crosstabulation				
Count				
		Occupation/role		Total
		Student	Lecturer	
Students are interested in pursuing vocational training alongside your academic studies?	Strongly Agree	70	36	106
	Agree	148	22	170
	Disagree	26	2	28
	Strongly Disagree	4	0	4
Total		248	60	308

Interpretation:

These tables provide a breakdown of the perception responses (Strongly Agree, Agree, Disagree, Strongly Disagree) for each of the key questions, categorized by the respondent's role (Student or Lecturer).

Observations:

- **Overwhelming Agreement on Vocational Training Importance:** Both students and lecturers strongly agree that vocational training is important for students in their locality. A significant majority falls under the "Agree" and "Strongly Agree" categories for this question.

- **Positive Perception of NEP 2020's Skill Development Emphasis:** A large proportion of both students and lecturers believe that NEP 2020's emphasis on skill development is beneficial for students. However, a notable percentage of students (12%) disagree or strongly disagree with this statement.
- **Concerns Regarding Teacher Preparedness:** A significant number of students (43%) disagree or strongly disagree with the statement that teachers are adequately prepared to implement NEP 2020's vocational education initiatives. This suggests a perceived gap in teacher training and development.
- **Strong Agreement on the Relevance of Vocational Training in the Job Market:** Both students and lecturers overwhelmingly agree on the relevance of vocational training in today's job market.
- **Moderate Student Interest in Pursuing Vocational Training:** While a majority of students express interest in pursuing vocational training alongside their academic studies, a considerable portion (11%) disagree or strongly disagree. This suggests a need to further motivate and engage students in vocational training opportunities.

Key Differences between Student and Lecturer Perceptions:Teacher Preparedness:

Students are significantly more likely to disagree with the statement that teachers are adequately prepared compared to lecturers. This highlights a potential disconnect between how students perceive teacher readiness and how lecturers view their own preparedness.

These findings reinforce the positive perception of vocational training among both students and educators. However, the concerns regarding teacher preparedness and the varying levels of student interest emphasize the need for targeted interventions to ensure the successful implementation of NEP 2020's skill development initiatives.

Objective 3 To assess the readiness of educational institutions and stakeholders in adopting NEP 2020's skill development initiatives, including resource availability and infrastructure adequacy.

Descriptive Statistics					
Readiness for NEP 2020 Implementation	N	Minimum	Maximum	Mean	Std. Deviation
Does your institution have the necessary resources (e.g., workshops, labs, equipment) to support vocational training	308	1	4	1.85	.926
Are teachers and staff adequately trained to deliver vocational education and skill development programs?	308	1	4	1.75	.804
Do you think the local community is supportive of NEP 2020's skill development initiatives?	308	1	4	1.86	.758
Is your institute conducting any vocational training programs or workshops?	308	1	4	1.88	.961
Valid N (listwise)	308				

Interpretation:

The table provides descriptive statistics for four key indicators of readiness for NEP 2020's skill development initiatives:

- **Resource Availability:** The mean score of 1.85 (on a scale likely ranging from 1 to 4, with higher scores indicating greater readiness) suggests that respondents perceive their institutions as having moderate levels of necessary resources (workshops, labs, equipment) to support vocational training. This indicates a potential gap in resource availability for some institutions.
- **Teacher and Staff Training:** The mean score of 1.75 suggests that respondents believe teachers and staff are moderately prepared to deliver vocational education and skill development programs. This aligns with the findings from Objective 2, which highlighted concerns regarding teacher preparedness.
- **Community Support:** Respondents perceive a moderate level of community support for NEP 2020's skill development initiatives, with a mean score of 1.86. This indicates that while there is some community support, further efforts may be needed to increase awareness and garner stronger support.
- **Conducting Vocational Training Programs:** The mean score of 1.88 suggests that a significant proportion of institutions are already conducting some form of vocational training programs or workshops. This is an encouraging sign, indicating a level of proactive engagement with skill development.

The findings suggest that while some progress has been made in preparing for NEP 2020's skill development initiatives, there are significant challenges in terms of resource availability, teacher preparedness, and community support. Addressing these challenges is crucial for the successful implementation of the policy.

Objective 4

To explore the major challenges in implementation of NEP 2020's skill development policies in the region.

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
CHALLENGES Lack of infrastructure	308	1	5	2.68	1.295
Shortage of skilled trainers	308	1	5	2.64	1.280
Inadequate funding	308	1	5	2.62	1.246
Lack of industry partnerships	308	1	5	2.80	1.293
Teacher training and capacity building	308	1	5	2.61	1.347
Valid N (listwise)	308				

Interpretation:

This table provides descriptive statistics for five perceived challenges in implementing NEP 2020's skill development policies:

- **Lack of Infrastructure:** With a mean score of 2.68 (on a scale likely ranging from 1 to 5, with higher scores indicating greater perceived severity), respondents perceive "Lack of infrastructure" as a significant challenge. This suggests that many institutions may lack adequate facilities, equipment, and resources necessary for effective vocational training.
- **Shortage of Skilled Trainers:** This is also perceived as a major challenge, with a mean score of 2.64. A shortage of qualified and experienced trainers can severely hinder the quality and effectiveness of vocational training programs.
- **Inadequate Funding:** With a mean score of 2.62, "Inadequate funding" is identified as another significant challenge. Insufficient financial resources can limit the scope and quality of vocational training programs, impacting their effectiveness.
- **Lack of Industry Partnerships:** This is perceived as one of the most significant challenges, with a mean score of 2.80. Strong industry partnerships are crucial for ensuring the relevance of vocational training programs to the needs of the job market.
- **Teacher Training and Capacity Building:** With a mean score of 2.61, "Teacher training and capacity building" is recognized as a significant challenge. As previously observed, many respondents believe that teachers are not adequately prepared to deliver vocational education.

The findings suggest that the successful implementation of NEP 2020's skill development policies in the region faces several significant challenges. These include inadequate infrastructure, a shortage of skilled trainers, insufficient funding, a lack of industry partnerships, and the need for improved teacher training and capacity building. Addressing these challenges effectively will be crucial for the success of the policy.

Objective 5

To explore differences in awareness and perceptions across different types of institutions (ie. Government and Private).

Hypothesis 1

H0: There is **no significant difference** in the level of awareness regarding NEP 2020 and its focus on skill development and vocational training between government and private institutions.

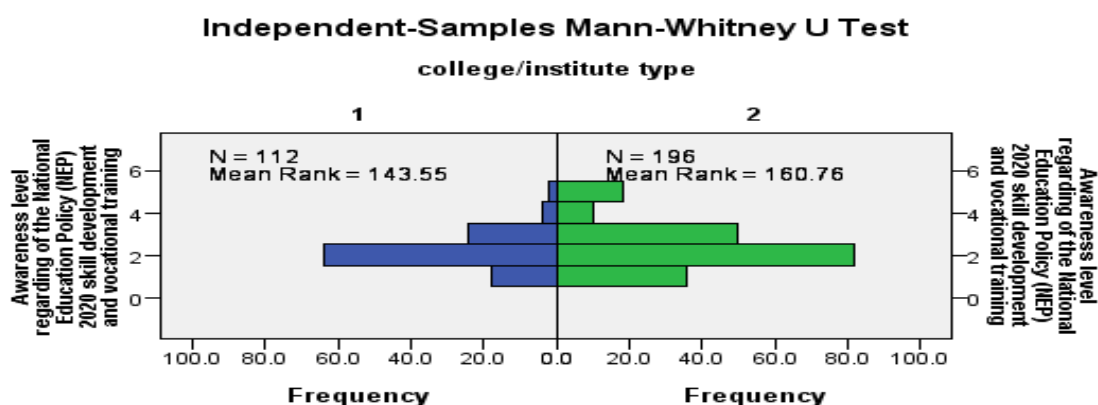
H1: There is a **significant difference** in the level of awareness regarding NEP 2020 and its focus on skill development and vocational training between government and private institutions.

Hypothesis Test Summary

Sr. No.	Measurement Statement	Sig.	Test	Decision
1	Awareness level regarding of the National Education Policy (NEP) 2020 skill development and vocational training	.081	Kruskal-Wallis test	Retain the null Hypothesis

Interpretation:

Since the p-value (0.081) is greater than the typical significance level of 0.05, we fail to reject the null hypothesis. Based on the results of the hypothesis test, there is no statistically significant evidence to suggest that the level of awareness regarding NEP 2020 and its focus on skill development and vocational training differs between students and lecturers in government and private institutions.



Total N	308
Government institute N	112
Private institute N	196
Government institute mean rank	143.55
Private institute mean rank	160.76
Asymptotic sig. (2-sided test)	.081
Name of test	Independent-Samples Mann-Whitney U Test

Interpretation:

The analysis utilized a Mann-Whitney U test to compare the awareness levels of students and lecturers regarding NEP 2020 and its focus on skill development and vocational training between government and private institutions. While the mean rank for private institutions (160.76) was slightly higher than that of government institutions (143.55), this difference was not statistically significant (p-value = 0.081). Therefore, the data does not provide sufficient evidence to conclude that there is a significant difference in awareness levels between students and lecturers in government and private institutions regarding NEP 2020 and its emphasis on skill development and vocational training.

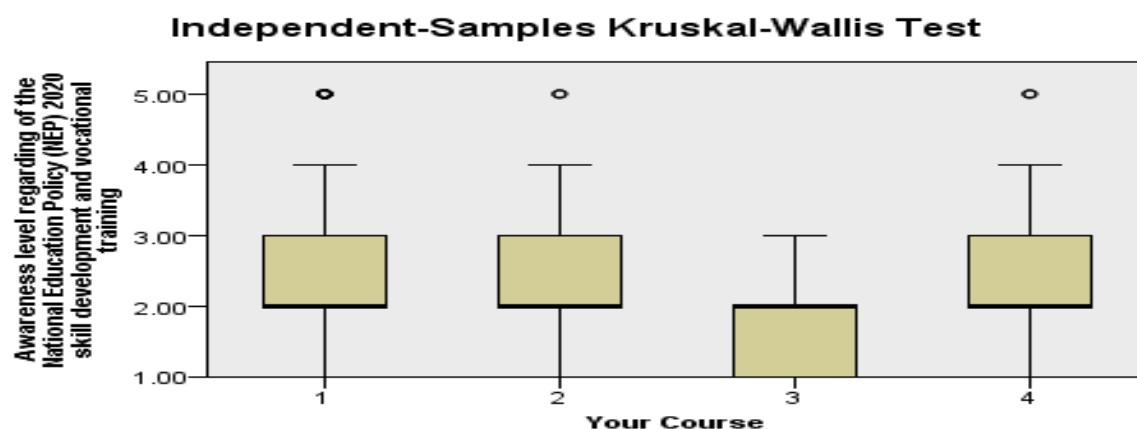
Hypothesis 2

H0: There is **no significant difference** in the level of awareness regarding NEP 2020 and its focus on skill development and vocational training between courses.

H1: There is a **significant difference** in the level of awareness regarding NEP 2020 and its focus on skill development and vocational training between courses.

Hypothesis Test Summary

Sr. No.	Measurement Statement	Sig.	Test	Decision
1	Awareness level regarding of the National Education Policy (NEP) 2020 skill development and vocational training	.077	Kruskal-Wallis test	Retain the null Hypothesis



Multiple comparisons are not performed because over all test does not show significant difference across samples.

Interpretation:

The analysis aimed to determine if there were significant differences in awareness levels regarding NEP 2020 and its focus on skill development and vocational training across different academic courses. The results of the hypothesis test, with a p-value of 0.077, did not reveal statistically significant differences in awareness levels between students in different academic courses. This indicates that, based on the available data, students from various academic disciplines (e.g., Commerce, Science, Computer Science/IT, Arts) demonstrate similar levels of awareness about NEP 2020 and its emphasis on skill development and vocational training.

CONCLUSION:

The analysis underscores both promising aspects and critical challenges in implementing NEP 2020's skill development initiatives. While both students and lecturers generally agree on the importance of vocational training and view NEP 2020's focus on skill development positively, there are notable gaps in preparedness and resources. Lecturers exhibit slightly higher awareness levels compared to students, but students express significant concerns about teacher readiness to implement vocational education effectively. Institutional challenges such as inadequate infrastructure, limited funding, a shortage of skilled trainers, and weak industry partnerships further hinder progress. Additionally, moderate levels of community support and student interest highlight the need for greater engagement and awareness campaigns. Despite these obstacles, the relatively uniform awareness levels across different groups, institutions, and academic disciplines provide a solid foundation for coordinated efforts. Targeted interventions, including resource allocation, enhanced teacher training, and robust industry collaborations, will

be pivotal in ensuring the successful implementation of NEP 2020's vocational training objectives and its long-term impact on skill development.

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“A Study on the Growth & Role of Start-ups in India, Challenges encountered and the opportunities after G20 – Start-up 20 Movement”

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Abstract:

Ever since, the economic reforms were introduced such as liberalisation, privatisation and globalisation, the world has become a global village eliminating almost every barrier coming across import and export of any resource such as human resources, finance, technology or even an exploratory idea.

Ever since then, business units have been facing cut-throat competition to survive in this global economy and achieve competitive edge over others. In order to reap sustainable competitive advantages, all the business organisations whether a manufacturing concern or a service sector, have to constantly strive to introduce something new whether in an existing product or a new launch which can meet with the changing-growing needs of the society (actual as well as potential/prospective consumers) that is nothing but innovation.

The inclination towards sustainability and a green planet has been alarming by leaps & bounds not only economically but by the society as a whole. To suffice this approach, new age budding start-ups initiate their business idea to match the targeted sustainability goals that not only help them become the future unicorns by consumer satisfaction but in turn assists the economy to grow not only in terms of the national income, per-capita income, employment but most importantly through the achievement of specific sustainability goals.

Innovation and the urge to do something novel is rightly one of the core driving force, leading individuals to go against the traditional business models and initiating start-ups bearing a multi-dimensional impact on the overall economy. Especially after the Start-up India movement – a flagship initiative by the Government of India on 16th January, 2016 there has been a tremendous shift in the growth of start-ups and a change seen in the mindset of individuals with regards to the entrepreneurship as a career.

This research paper draws a qualitative study on the meaning of start-ups, the role it plays on the economy as a whole, challenges to witness in the entrepreneurial journey and most importantly the potential opportunities to be realised after the Startup20 movement within G20.

Keywords:

Start-ups, Startup20, G20, entrepreneurship, sustainability

Introduction:

As read in a recent article by Times of India dated 27th February, 2023 voiced by Dr. Ranjeet Mehta, Deputy Secretary General, PHDCCI, Program Directorate for Startup20 Engagement Group, India's Start-up ecosystem ranks third largest after United states and China at a global level which has the potential to contribute 4-5% to the GDP of the country every year.

A home to over 90,000 start-ups and more than 100 unicorns in the year 2023, India is surely witnessing a profound economic, technological and sustainable drift. With several government

initiatives such as Digital India, Skill India, Start-up India, Make in India, Local to Global, Start-up India seed fund, etc. one can witness an adrenalin rush in the young blood to venture hard, take risk, breed innovation and take the journey regarded as entrepreneurship.

With the entrepreneurial mindset, one cannot get away with the fact that it is the innovation, creativity and the urge to provide something new to the society that keeps the business growing and successful. No wonder why majority of start-ups have taken this urge of newness towards creating a sustainable planet which is why start-ups are regarded as catalyst of innovation, development and achievement of sustainable development goals as founded in the year 2015. This is what ultimately helps achieve customer satisfaction and help businesses reach competitive edge.

Before jumping on to the key concerns surrounding start-ups let us first dive into understanding the meaning of a start-up.

Meaning of Start-ups:

An initiative of the Government of India is the Start-up India scheme which was introduced on 16th January, 2016 having an aim of creating a strong community for boosting innovation & encouraging Start-ups to generate huge employment opportunities & sustainable economic development. Such initiatives are managed by the *Department for Industrial Policy & Promotion (DPIIT)*.

An entity shall be regarded as a start-up if the below mentioned conditions are fulfilled:

1. If the entity is registered/incorporated as any of the following:
 - Private limited company (as per the definition in Indian companies act 2013)
 - Partnership firm (as registered under Partnership Act, 1932)
 - Limited Liability Partnership (registered under limited liability partnership act, 2008)
 - One-person company (as per the definition in Indian companies act 2013) provided that such entity is not created by reconstruction or splitting up of a business which is in existence already.
2. Such an entity should not have completed 10 years since its incorporation or registration as mentioned above.
3. The turnover must not have exceeded above INR 100 Crore in any of the financial years.
4. The unit must also satisfy any of the below mentioned conditions:
 - It must be working towards innovation or development of new products, processes, services or improvement of existing products, processes, services.
 - The unit must be such a scalable business which bears high potential of wealth creation and employment generation.

The entity which fulfils the above-mentioned criteria shall be known as a start-up and will be eligible for recognition by the DPIIT in order to receive certain benefits from the Government of India.

Such start-ups can apply for recognition by DPIIT by using the start-up India portal <https://www.startupindia.gov.in/>.

Growth of Start-ups:

YOY growth in number of start-ups recognition by the DPIIT for the last five years:

YEAR	TOTAL START-UPS
2019	10604
2020	13798
2021	19371
2022	26330
2023	34779
TOTAL	104882

Table no. 1

Source: Press Information Bureau, Delhi as on 2nd February, 2024

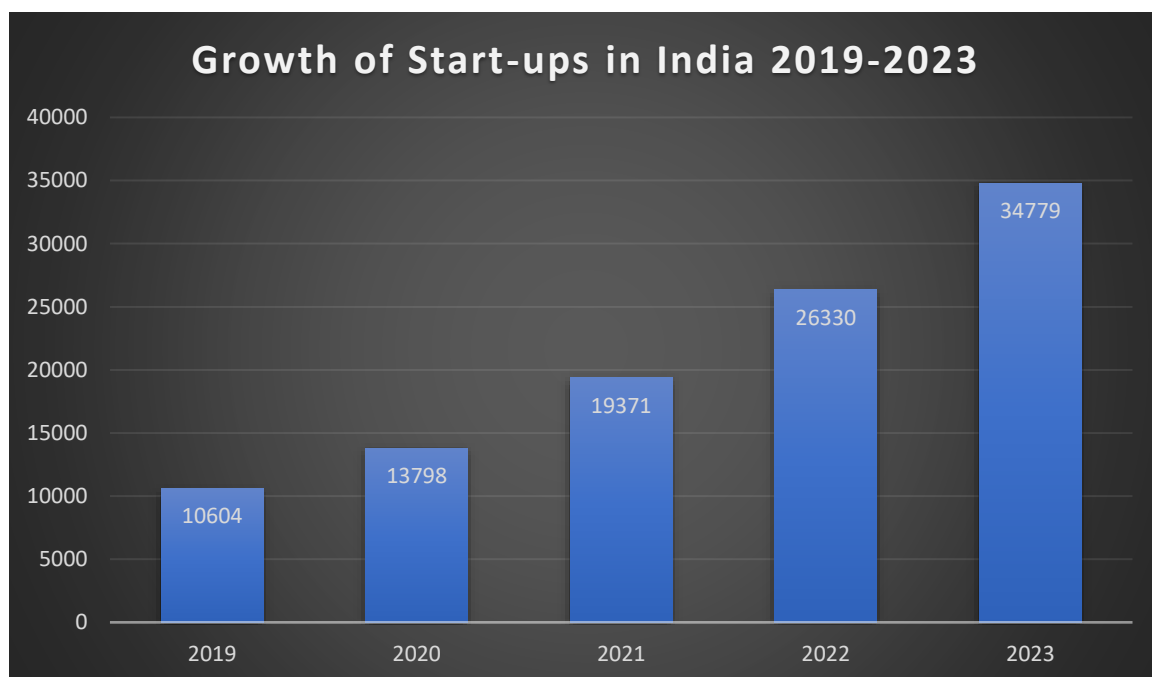


Chart no.1 Growth of start-ups in India 2019-2023

Percentage growth in the number of start-ups in India in the last five years i.e. 2019-2023:

Year	2020	2021	2022	2023
% Increase	30.12 %	40.39 %	35.92 %	32.09 %

Table no. 2 created for the study

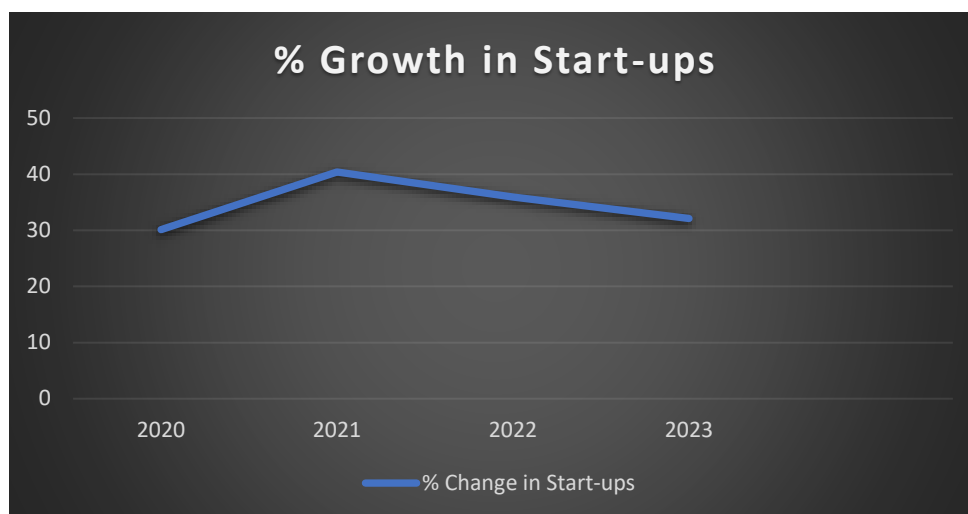


Chart no.2 % Growth of start-ups in India 2019-2023

From the above analysis of the data collected pertaining to the change in the number of start-ups in India, one can witness that there has been a tremendous increase so far as the number of start-ups are concerned from 452 to a whopping number of 104882 ever since the year 2016, the year that marks the foundation of “Start-up India” – the flagship initiative launched by the Government of India.

However, the second graph shows the percentage growth in the start-ups in the last 5 years which clearly depicts that though the start-ups have increased in number but there has been a constant decline in its growth on an annual basis to which the year 2021 is an exception & shows an increase, one of the factors responsible for which can be the Pandemic situation.

Impact of Start-ups on Indian Economy:

India, being a developing mixed economy that too partially agrarian, it becomes extremely important for the economy to grow for the overall development of the nation. The country needs to be sustainable almost in every field such as health, education, technology, energy, transportation, etc. which aggravates the introduction of start-ups becoming the source of a number of government schemes & policies for start-ups.

Studies reveal that India requires over 100 million jobs in a year for which start-ups, howsoever small can play a major role in creating job opportunities in India. The circle of increased jobs to improved economy is shown below:

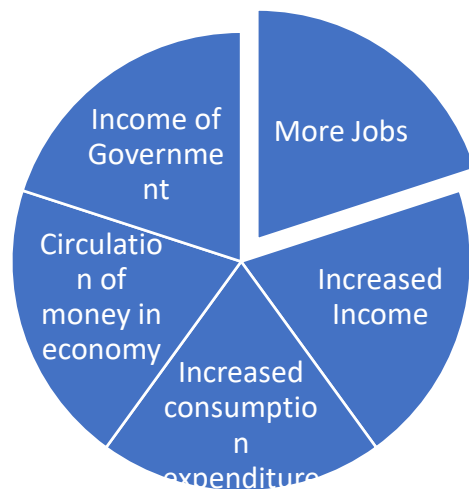


Figure no.1: Impact of Start-ups (created for the study)

Direct impacts of start-ups on Indian economy:

More job vacancies	Can decrease importing
Creative ideas create more works	Can increase exporting
Talent explosion of professionals & entrepreneurs for better ROI	New investments
New technology cut off production cost	Increase in GDP
More competition; better work	Improve standard of living
More outsourcing of service	Good progress in education
More flow of foreign money	Progress in health segment
More demand in the market	Progress in transport segment

The table below shows the number of direct jobs (self-reported) created by recognised start-ups during the last five years viz 2019, 2020, 2021, 2022, and 2023:

YEAR	TOTAL JOBS
2019	123071
2020	151196
2021	194565
2022	266461
2023	390512

Table no. 3

Source: Press Information Bureau, Delhi as on 2nd February, 2024

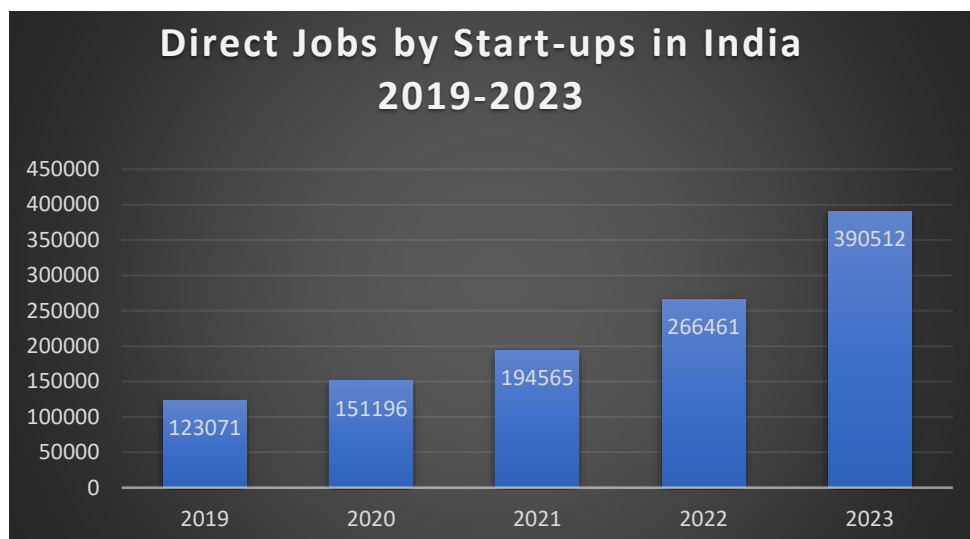


Chart no. 3 Direct Jobs by Start-ups in India 2019-2023

Challenges faced by Start-ups in India:

The above analysis clearly shows that the percentage growth rate in the number of start-ups has shown a declining trend even after the flagship programme of 'Start-up India' which may possibly owe its roots to huge number of challenges and difficulties that a start-up in India and otherwise has to encounter. If resolved early, start-ups can again become one of the significant sources to economic development, employment generation, sustainability and innovation.

1. Lack of fund support:

Start-ups being in the first stage of operations faces tremendous financial crunch. Innovation breeds risk and investors are quite skeptical in investing in such new businesses run by budding entrepreneurs owing to the risk and regulatory fluctuations. A lot of working capital is required to run a start-up whereas most of the start-ups initially are boot strapped i.e. funded through capital invested from their own savings, family or friends. Some start-ups having good demand for their products and constant paying customers are able to generate revenue to become self-sufficient whereas there are still many who have to depend on external investors which is uncertain.

2. Lack of skilled talent:

Skilled human resource is an extremely important asset for business enterprises. However, such talent gets attracted towards well-established ventures paying high salaries and more stable job which becomes a direct competition for such growing start-ups. Thus, start-ups find it difficult to attract and especially retain such talented human resource.

3. High competition:

With the growing dynamism all over and the changes taking place in almost every sphere, start-ups have to face a lot of challenges. Failing to adapt with these changes, start-ups face a lot of competition from those who stand tall against such challenges. Thus, start-ups fail to reach a competitive edge. Not only this, they also have to face competition from other start-ups as well who are flourishing in different fields worldwide.

4. Limited revenue generation:

As the business scales, start-ups do face a limitation of revenue generation with increased expenses. They often give more attention to the funding hurdle rather than the basic fundamentals of business. No wonder that there are still a number of start-ups who fail enormously and also others with a high burn-rate. Start-ups have not to only work upon the generation of investments but also give equal importance on its own value generation thereby expanding and sustaining its growth. In the long-run it is this value that will lead to attract more investments as well.

5. Regulatory challenges:

Start-ups also have to face monetary crunch and wastage of time conducting its operations due to regulatory hurdles such as heavy taxes, rigid labour laws, delays in obtaining permits, licenses, intellectual property rights, dispute resolution, etc. This makes it difficult for the start-ups to scale their businesses at ease.

6. Poor infrastructure:

Depending on the location of a start-up, it may also have to face difficulty in obtaining adequate facilities owing to poor infrastructure such as science & technology parks, power, transport, electricity, healthcare, education, communication, water & sanitation, and other structural infrastructure.

7. Lack of market understanding:

Often, start-ups find it difficult to analyse their target market, demand, potential customers, their needs & preferences, prevailing competition, etc. which may be due to lack of market understanding being a new as well as an innovative business working on a unique product as compared to well established business. Lack of knowledge fails them to develop effective marketing strategies, product that satisfies customer demand and also to scale their business in the market efficiently.

8. Poor management and leadership:

Success stories of start-ups have been based upon effective team work. Wherever, group efforts are required to achieve goals, management becomes necessary. Formulating a team with members designated with work aligned with their skills & talent is extremely significant for a start-up to succeed. Intense competition, financial lacuna, limited resources, rapid expansion, etc. bring management and leadership issues. Start-up founders find it difficult to formulate team, delegate authority & responsibility and enforce productive long-term strategies.

As per a survey conducted on the start-up environment across India in 2021, the majority of business owners cited talent-hiring and demand generation as most challenging. Whereas, other challenges included profitability and fundraising.

Challenges faced by startups in India in 2021	Share of respondents
Hiring good talent	52 %
Demand generation	45 %
Profitability	29 %
Regulatory environment	28 %
Customer retention	22 %
Fund raising	22 %

Table no. 4

Source: Statista.com, August 2022

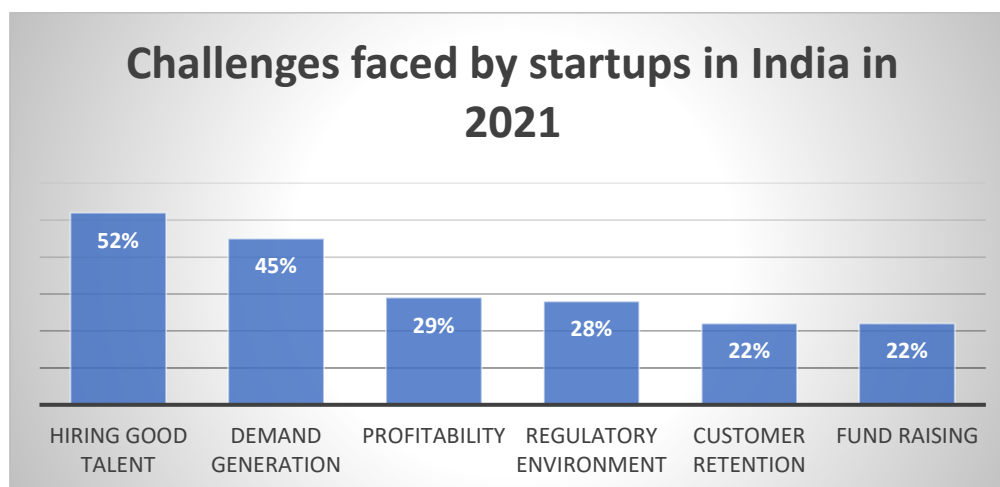


Chart no. 4 Challenges faced by Start-ups in India

Potential opportunities for Indian start-up ecosystem after G20 Presidency:

It can be known that during the G20 Presidency, India has formulated its first ever Startup20 engagement group. It is a group that bears the potential to bring a change in the G20 and instill growth & development with the means of efforts made collaboratively, social inclusion, sustainability, innovation thereby driving an entrepreneurial spirit in the start-up minds.

Being member nations of G20 & partnering with the startup20 engagement group, start-ups can rightly address significant challenges encountered with respect to **new & innovative goods & services** which not only helps businesses grow profitably but also solve social and environmental issues, collaborating with local communities and other organisations so as to combat issues such as poverty, climate change, inequality and thereby bring a positive evolution by using their unique skills and optimum resources. Startup20 can also be relied upon to play a significant role in achieving the **sustainable development goals** and working for a more equitable and sustainable future.

Whenever a start-up figures out a **new market** to explore or establish not only domestically but also internationally, there are a number of challenges that it has to surpass with such as different legal norms, cultural norms, business practices, regulatory hindrances, financial bottlenecks and others as compared to huge business organisations especially due to their size, resultant impact they have on the market and the field of operation that is mostly novel and emerging.

Startup20 provides a **global platform** for easy collaboration and sharing of **knowledge & experience** among the growing start-ups. With this universal and common platform, **actionable aid** can be rendered to the G20 countries on matters concerning streamlining application processes, simplified regulatory processes, training for entrepreneurship, decoding complex rules & regulations, infrastructure and other required services. With the world transforming socially & technologically, the intellectual, dynamic & technological sound youth will definitely prove to be an eminent asset to the country's goal for global leadership.

As discussed ahead, a major challenge faced by start-ups is the *financial crunch*. Highly bootstrapped initially, start-ups find it difficult to raise funds externally. It can be expected from Startup20 to be of great help in creating *incentives and funding mechanisms* that can uplift start-ups. With the collaboration among G20 countries, startup20 can foster development of platforms that can enable an *inclusive start-up ecosystem* at a global level.

Another evolution and one of the key objectives expected from G20 summit is the **digital transformation** achieved universally ranging from agriculture to education in the next decade. This will surely be a tool to enhance the entrepreneurs as well as the MSMEs from the benefits from the **new technology & digitalization**. To achieve this agenda, **multilateral coordination & co-operation** is what is required amongst member nations for **free flow of technological development** across border in the most secured manner.

In this knowledge era, perhaps **digitalization** is the only tool to acquire, process, use and store **accurate and reliable data** which shall guide start-ups in studying extensively their own business, target market, audience, position in market, demand, competition, etc.

India's G20 presidency also established the **G20 – Digital Innovation Alliance (G20-DIA)** at the Ministry of Electronics & Information technology (MeitY) for the very first time that signifies the role of start-ups in bringing **innovation** thereby help adapt with the changing global situation. This alliance is expected **to recognizing and realizing the innovative & digital technology** formed by the Indian start-ups both by the G20 member countries and the non-member nations as well.

Heading the G20 Presidency, there is also a **way forward for India** in terms of the knowledge exchange, export of technology and startup innovations all over the different parts of the world. Such possibilities can be realised in the time to come by focusing on certain parameters such as:

- Conducting a **comparative analysis** at a global level, understanding the market gaps effectively, working upon the similarities & dissimilarities between member nations so as to explore more import/export possibilities of the technological solutions and rendering new start-up innovations.
- A certain measure of **consensus** needs to be achieved between the different technological policies advocating differently in different G20 countries so as to ensure export/import of sustainable start-up solutions.
- In order to give a competitive edge, the start-up solutions need to be of a *quality* that can be acknowledged worldwide for which accreditation and third-party certification could play a major role.

Startup20 targets for a global setup that not only supports start-ups but also creates synergy among the investors, innovators, entrepreneurs, corporates, start-up ecosystems and the other global stakeholders. This common global platform will surely help to bridge the funding gaps, generate employment opportunities, realise sustainable development goals, generate economic growth & stability, & thereby create an inclusive start-up ecosystem.

Thus, with the Startup20 initiative within the G20, start-ups can be brought together on a common universal platform both from developed as well as developing countries thereby bridging the gap between the two and also enhancing the exchange of resources, knowledge, technology, skills, etc. that can gear up the growth & development.

Thus, G20 presidency is a great opportunity for India to take its unique digital infrastructure as well as innovative start-up ecosystem to the rest of the world signifying the very basis of G20 i.e. one earth, one family, one future where the success of one spreads wing all over the world resulting to a butterfly effect.

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Development of Cheque Clearing System in India and Its Impact on Indian Economy

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Abstract

India has transformed the clearing system from manual clearing to machine based MICR clearing to image-based clearing of cheque - CTS in order to accelerate the speed of cheque clearance. There are various operational and commercial benefits of CTS over MICR which furthers the benefit to customers too. CTS is batch based clearing system which is proposed to be updated by Reserve Bank of India. The introduction of faster cheque-clearing mechanisms by the Reserve Bank of India, notably through the "on-realisation-settlement" system, marks a significant advancement in the Indian financial landscape. The impact of faster clearing is discussed on key sectors such as money market, business enterprises, banking sector and customer satisfaction. The paper delves into the historical significance of cheques clearing system in India and evaluates the CTS viz-a-viz MICR and current CTS viz-a-viz On-Realisation-Settlement system. The new system aims to create a more dynamic and resilient economy by enhancing liquidity, reducing transaction delays and increasing operational efficiency.

Key words: Cheque Clearing System, CTS, On-Realisation-Settlement

1. Introduction

The cheque has been integral to India's commerce since its introduction during colonial times. However, the concept of using written instruments to represent value existed in ancient India too. The modern cheque, introduced by European trading companies, gained widespread acceptance, leading to the establishment of the law regulating the instrument.

Cheque has always been a prime instrument for payment. Cheques are one of the traditional forms of cashless payment that allows users to easily make transactions. Even in the current age of digital payment, despite the widespread use of digital banking, cheques remain a vital part of the banking sector. Traders and small businesses still conduct a lot of their transactions through cheques; senior citizen, who are not so comfortable with mobile-based apps and other digital modes, prefer them. Though India is moving slowly towards cashless economy, but cheques continue to hold significance. The volume of transactions through CTS was 559.9 lakhs in October 2023. For the period from June 2020 to October 2023, the average monthly volume of transactions through CTS was 590.5 lakhs. As per Confederation of All India Traders (CAIT), goods are delivered on credit, government payments are made to traders and businessmen, especially those involved in import-export, make payments by cheque. The recent introduction of faster cheque-clearing systems by the RBI, transitioning from batch-based systems like the Cheque Truncation System (CTS) to continuous clearing with "on-realisation-settlement," presents an opportunity to enhance financial efficiency and liquidity. This paper investigates the potential economic implications of this shift.

2. Research Methodology:

2.1 Research Problem:

The Reserve Bank of India constantly strives for faster clearing of the cheque. In this effort, it introduced MICR clearing and CTS for image-based clearing to expedite the clearing. However, the average time taken for CTS is 2 working days. In order to further reduce this time, the Reserve Bank of India has proposed On-Realisation Settlement. This provokes the need to understand the new system and its impact on various sectors of the economy.

2.2 Objectives:

The main objectives of the study are:

1. to understand the CTS and 'On-Realisation-Settlement System' of Clearing of Cheque.
2. to envisage the probable impact of the new clearing system on the various sectors of the economy.

2.3 Methodology:

The study is of descriptive in nature. It is a fact-finding enquiry regarding on-realisation-settlement system of cheque clearing and its impact.

2.4 Source of Data:

This is a conceptual paper that is intended to understand the development of clearing system in India as well as the new cheque clearing system to be introduced by the Reserve Bank of India. Data is collected from secondary sources like RBI official website and various newspapers to achieve the objectives of the research.

2.5 Literature Review

The literature on the Indian banking sector highlights various aspects like the role of technology, the impact of reforms, and the historical evolution of banking instruments.

The study by Manoj, P.K. (2017), with a special emphasis on cheque clearing systems, digital banking, and ICT innovations in India's banking sector. It also discussed Cisco Systems (2004) and explored the concept of Check Clearing for the 21st Century, while the RBI introduced initiatives like Cheque Truncation System (CTS) to streamline cheque processing and enhance security features in cheque forms.

Bindiya Tater, Manish Tanwar, Navaratan Bothra, 2011 examined the applications of IT in the banking Industry. The study brought to light the fact that IT had increased competition within the industry; Latest trends of IT in banking; IT application and system problems; Security of information systems was found to be cause of concern. The study underscored how technology had positively influenced customer satisfaction, loyalty, and overall bank performance. The implementation of digital banking platforms, automated services, and data analytics had enabled banks to meet customer needs more efficiently, contributing to long-term customer retention and growth.

Building on this, G.S. Popli (2012) discussed the ongoing and future transformations in the Indian banking industry, driven by technological innovations. Popli's study highlighted that technology is not only a tool for operational efficiency but also a catalyst for change in the sector. The paper projected significant shifts in the industry, driven by new technologies that offered both opportunities and challenges. These shifts included increasing competition, enhanced customer expectations, and the need for regulatory frameworks to keep up with innovations.

Jutur and Surender (2006) analysed the financial reforms process, noting that the primary objectives were to increase competition, productivity, and profitability within the banking system. The reforms brought about structural changes in the sector, encouraging private participation and improving the regulatory environment. The resulting competitive atmosphere pushed banks to adopt modern technologies and improve operational efficiencies, directly impacting financial performance.

Before modern banking systems emerged in India, traditional instruments such as **hundis** were commonly used, as documented by document of the Reserve Bank of India. Hundis, prevalent during the Mughal era (sixteenth to eighteenth century), were indigenous credit instruments similar to bills of exchange. They played a pivotal role in trade and finance during that period, facilitating transactions across long distances. These traditional instruments laid the groundwork for modern financial systems, including the introduction of cheques and other negotiable instruments.

Beck et al. (1999) emphasized the critical role sound banking systems play in economic growth. Their study illustrated how banks act as intermediaries in the mobilization of financial savings, transforming them into productive investments. In India, the reforms and technological advances in the banking sector have contributed to better financial inclusion, making banking services more accessible to the masses. The improved efficiency and profitability of banks have facilitated the economic growth of various sectors.

The reviewed literature demonstrates a clear correlation between technological advancements, banking reforms, and the performance of banks in India. The introduction of IT in banking operations has enhanced customer satisfaction and operational efficiency, while reforms have made the sector more competitive and profitable. Additionally, the historical evolution of financial instruments and the adoption of new technologies like MICR and CTS have played a pivotal role in shaping the modern Indian banking system.

3. Developments in Cheque Clearing System

Faster clearing has always been the utmost priority for the Reserve Bank of India. Introduction of MICR and CTS system stand as RBI's efforts in this direction. Earlier, the cheques were cleared manually which took a long time as well as error prone system. Magnetic Ink Character Recognition (MICR) technology introduced in 1987 for cheque clearing as an effort in the direction of mechanising cheque clearing operations. The MICR (Magnetic Ink Character Recognition) clearing systems has brought automation and speed in cheque clearing process along with standardising the cheque in terms of its physical dimensions. The cheque truncation system (CTS) using MICR data has been brought in the form of CTS-2010 cheque standards. Ending the physical movement and enhanced security feature of the system drastically reduced the time for clearing and payment.

3.1 The History of Cheque Clearing Systems in India:

Early 19th Century: Manual Clearing

- **1800s:** Cheques were first introduced by British colonial banks such as the Bank of Bengal (founded in 1806) and the Bank of Bombay (founded in 1840). During this time, cheque clearing was a manual process, with banks physically exchanging cheques and settling balances bilaterally.

Early 20th Century: Clearing Houses

- **1935:** The establishment of the Reserve Bank of India (RBI) brought more structure to cheque clearing. Clearing houses were set up in major cities to facilitate cheque exchanges and settlements among banks. These clearing houses functioned as meeting points for bank representatives to exchange cheques and settle their accounts.

1980s: Magnetic Ink Character Recognition (MICR)

- **1986:** The RBI introduced Magnetic Ink Character Recognition (MICR) technology in cities like Mumbai, Chennai, Kolkata, and New Delhi. MICR allowed for faster and more accurate cheque processing by using magnetic ink to print special characters on cheques, which could be read by machines, thereby reducing manual errors and speeding up the clearing process.

2000s: Core Banking Solutions (CBS) and Cheque Truncation

- **2004:** Many Indian banks implemented Core Banking Solutions (CBS), enabling cheques to be cleared across branches within the same bank. This integration significantly sped up intra-bank cheque settlements.
- **2008:** The Cheque Truncation System (CTS) was introduced, marking a major advancement. It eliminated the need for physically transporting cheques by scanning them and transmitting an electronic image along with MICR data to the clearinghouse. This drastically shortened clearing times, particularly for cheques from remote locations.

2013: Nationwide Adoption of CTS

- **2013:** The RBI mandated the nationwide use of the CTS system, ensuring faster and more secure cheque clearing. As a result, physical cheque clearing was largely phased out across most parts of the country.

3.2 CTS:

The introduction of the Cheque Truncation System (CTS) marked a significant advancement in India's banking and payment infrastructure, aimed at modernizing and streamlining the cheque-clearing and settlement process. Below is a summary of CTS in India:

1. **Origin:** In the early 2000s, the concept of a Cheque Truncation System for India began to take shape. The Reserve Bank of India (RBI) and the Indian Banks' Association (IBA) explored the feasibility of replacing the paper-based clearing system with CTS.
2. **Pilot Projects (2008):** In 2008, the RBI launched pilot initiatives in several cities to test the reliability and functionality of CTS in real-world banking operations.
3. **CTS-2010 Standard:** Also in 2008, the RBI introduced the CTS-2010 standard, which was based on insights gained from the pilot programs. This standard defined the technical and operational requirements for implementing CTS across India, establishing a framework for image-based cheque processing and paving the way for nationwide rollout.
4. **Nationwide Rollout (2010):** By 2010, CTS was progressively implemented across the country, starting with major cities. This transition marked a formal shift from the traditional paper-based system to the more efficient image-based CTS for cheque processing.

5. **Mandatory Adoption (2013):** The RBI, in a phased manner, mandated the use of CTS for all clearinghouses and banks in India. This standardization aimed to enhance the efficiency of the cheque-clearing process.
6. **Ongoing Enhancements:** Over the years, the CTS infrastructure has been continuously upgraded with new features and technologies to improve security and operational efficiency.

3.3 Benefits of CTS over MICR clearing:

Customer Service Advantages:

1. **Extended Cheque Acceptance Deadlines:** Banks can offer customers more flexibility by extending the hours for cheque submission.
2. **Simplified Information Access:** Customers and banks can retrieve cheque-related data more easily and efficiently.
3. **Faster Clearing Process:** Cheques are processed more quickly, resulting in faster fund availability for customers.

Operational Advantages:

1. **No Need for MICR Amount Encoding:** The system eliminates the requirement for manually encoding the cheque's amount using MICR.
2. **Reconciliation Accuracy:** Since MICR data and cheque images move together, reconciliation discrepancies are minimized.
3. **Prevention of Cheque Loss or Tampering:** The risk of cheques being lost, altered, or tampered with is significantly reduced.
4. **Data and Image Integrity:** Digital transmission of cheques prevents any manipulation or alteration during transit.
5. **Enhanced Security with CTS 2010 Standards:** Improved security and automation features ensure safer cheque handling.

Commercial Benefits:

1. **Cost Savings:** The elimination of physical paper movement reduces operational costs.
2. **Better Liquidity Management:** The grid system allows banks to manage liquidity more effectively.

Fraud Prevention Mechanisms:

1. **Data and Image Integrity During Transit:** The use of digital signatures and encryption ensures that cheque data and images cannot be manipulated during transit.
2. **Improved Security with CTS 2010 Standards:** These standards enhance the overall security of the cheque processing system (Refer to the attached NPCI circular for more details on CTS 2010).
3. **MICR Reject Repair:** The system flags any repair needed in MICR rejects, ensuring accuracy.

3.4 On-Realisation Settlement:

The Reserve Bank of India (RBI) has unveiled a significant initiative aimed at modernizing the cheque clearance process through Continuous Clearing of Cheques under the Cheque Truncation System (CTS). This move is designed to enhance the efficiency and speed of financial transactions, which is crucial in today's fast-paced economy. Traditionally, cheque clearing has operated on a batch processing system, which can take up to two working days (T+1 days) to

complete. Under the new system, the RBI is implementing 'on-realisation-settlement,' which allows for a continuous clearing mechanism. This means that cheques will now be scanned, presented, and cleared within a matter of hours during business hours, significantly reducing waiting times for consumers and businesses alike. The shift to continuous clearing is expected to drastically shorten the cheque clearance cycle from the existing two days to just a few hours. This swift process is anticipated to alleviate the delays that have long plagued the cheque clearing system, allowing funds to be transferred more quickly and efficiently. The RBI aims to create a more agile financial ecosystem that benefits all stakeholders, from consumers to financial institutions. This advancement is likely to set a new standard for cheque clearance in the country, reflecting the RBI's commitment to modernization and efficiency in the banking sector.

3.5 Comparison of CTS and On-Realisation-Settlement System of Cheque Clearing: Cheque Truncation System (CTS)

Processing Method:

- **Batch Processing:** Under CTS, cheques are processed in batches at scheduled intervals. This means multiple cheques are collected and cleared together rather than individually.
- **Timeframe:** The typical clearing cycle under CTS takes up to two working days (T+1), meaning that if you deposit a cheque, it may take one or two days for the funds to be available in your account.

Operational Workflow:

- **Scanning and Transmission:** When a cheque is deposited, it is scanned to create a digital image. This image is then transmitted to the drawee bank for processing.
- **Physical Movement:** Although physical transport of cheques is minimized, the batches still need to be physically processed and settled, contributing to delays.

Technology Utilization:

- **Limited Advancement:** While CTS uses technology for scanning and electronic transmission, it is still fundamentally dependent on a batch processing system that introduces delays.

On-Realisation Settlement:

Processing Method:

- **Continuous Clearing:** The On-Realisation Settlement system allows cheques to be processed continuously throughout the day. As soon as a cheque is presented during business hours, it can be cleared and settled immediately.
- **Timeframe:** This means that cheque clearance can occur within a few hours, drastically reducing the waiting period for funds.

Operational Workflow:

- **Immediate Scanning and Clearing:** Cheques are scanned upon presentation, and funds are transferred in real time to the beneficiary's account, eliminating the need for batch processing.
- **Efficient Settlement:** The system facilitates instantaneous processing, ensuring that transactions are completed swiftly and efficiently.

Technology Utilization:

- **Advanced Technology:** On-Realisation Settlement leverages cutting-edge technology to facilitate real-time processing and settlement. This enhances the efficiency and responsiveness of the banking system.

4. Impact of On-Realisation-Settlement System of Cheque Clearing on Various Sectors:

4.1 Impact on Banking Sector:

The move to continuous clearing will streamline banking operations, reducing the workload associated with processing cheques. This could contribute to a more stable and resilient financial system. Continuous clearing systems allow for automatic validation and fraud detection, decreasing the resources spent on investigating and correcting fraudulent or erroneous transactions.

Continuous clearing will minimize the need for batch processing, cutting down operational costs associated with delayed transactions, reconciliation, and error resolution. This, in turn, reduces the costs associated with risk mitigation strategies like reserve requirements and hedging also. It also reduces the need for banks to maintain large liquidity buffers further reducing the cost.

Continuous processing reduces the time for which funds are held in transit, reducing the settlement risk faced by banks and other financial institutions. Continuous systems improve the ability to manage financial risks, as they allow banks to quickly adjust to changing market conditions and reduce liquidity risks.

Faster financial transactions can make India's banking more competitive globally, as it aligns more closely with international best practices in financial operations.

4.2 Impact on Money Market

Faster access to funds can reduce the need for businesses to borrow short-term loans to cover cash flow gaps reducing burden on money market. With lower demand for short-term credit, interest rates for these products might decrease.

Banks might reallocate resources to other lending opportunities, increasing credit availability for more strategic investments. This would contribute to a more efficient financial ecosystem, benefiting both borrowers and lenders.

Overall, the faster clearing system is likely to create a more dynamic and responsive commercial environment, promoting trade, reducing transaction costs, and contributing to overall economic growth.

4.3 Impact on Business and Economic Activities

Faster cheque clearance means that funds become available more quickly, just in few hours. Businesses will have quicker access to funds, reduce the waiting period for receivables enabling them to manage working capital more efficiently and improved liquidity.

It leads to improved cash flow for businesses and individuals. This improvement in liquidity will benefit businesses by enabling faster payment cycles, reducing the need for short-term borrowing and enhancing cash flow management.

This will lead to impetus to the following:

Investment: Businesses can reinvest quicker in production or expansion activities.

Trade: Both domestic and international trade can occur more rapidly, encouraging economic interaction and growth.

Consumer Spending: Consumers can access their funds more quickly, facilitating consumption, which drives demand in the economy leading to economic growth.

The reduction in settlement time can lead to increased operational efficiency, allowing businesses to focus on growth and expansion rather than managing cash flow delays.

4.4 Impact on Customer Relationship

With the implementation of continuous clearing systems, customers no longer need to wait for banking hours or days for transactions to clear. Faster access to funds can improve customer satisfaction and trust in the banking system, encouraging more people to use formal banking channels. The continuous clearing system enhances customer satisfaction by making banking faster, more convenient, and more secure. By reducing errors, lowering transaction fees, and offering 24/7 access to banking services, this system helps meet the evolving expectations of customers. As banks integrate more advanced technologies and automation into their operations, they continue to provide a better overall experience, leading to improved customer loyalty and satisfaction. With quicker settlements, individuals, especially in rural areas who rely on cheques, will benefit from more timely access to their money, enhancing financial inclusion and increasing customer base.

5. Conclusion:

The evolution of the cheque clearing system in India reflects significant advancements aimed at enhancing efficiency, security, and customer satisfaction. From the early manual processes of the 19th century to the introduction of MICR technology in the 1980s, and the widespread implementation of the Cheque Truncation System (CTS) in 2010, each phase has marked a step towards modernization.

The recent transition to an On-Realisation-Settlement system signals a further leap in this evolution. By enabling continuous clearing, this system will drastically reduce the time required for cheque processing, providing immediate access to funds. The impact of this development extends beyond banking operations; it will improve liquidity for businesses, reduce the need for short-term credit, and foster a more dynamic economic environment.

With faster clearance, banks might see a shift in the patterns of deposit inflows and outflows, affecting their liquidity management. This change could influence how banks engage in lending activities, potentially impacting the overall credit environment. Moreover, the policy might also influence the RBI's monetary policy operations by affecting short-term liquidity in the banking system. Moreover, the enhanced speed and reliability of transactions will likely strengthen customer relationships, boost consumer confidence, and support financial inclusion, particularly for individuals in rural areas. As the banking infrastructure adapts to these changes, the benefits of faster clearing will contribute to a resilient economy, ultimately driving growth and innovation across sectors.

In summary, the advancements in India's cheque clearing system not only streamline operations but also pave the way for a more responsive and integrated financial ecosystem, enhancing the overall economic landscape. The success of this transition hinges on the collaboration between banks, businesses, and consumers, ensuring that the advantages of faster, secure transactions are realized throughout the economy. The full impact will depend on how seamlessly the banking infrastructure can adapt, but early signs suggest a positive transformation for the economy.

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INNOVATIVE AND REVOLUTIONARY CHANGES THROUGH NEP-2020: A MULTIDISCIPLINARY PERSPECTIVE

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ABSTRACT

A new, revolutionary reform in India's educational system is the National Education Policy 2020 (NEP-2020). In order to promote well-rounded growth, it presents a multidisciplinary strategy that combines theoretical study with practical training and real-world experience. The policy's stated goal is to eliminate the persisting achievement gap in rural areas by promoting critical thinking, diversity, and flexibility in the classroom. In order to assess how NEP-2020 would affect educational ecosystem transformation, this research analyzes North Gujarat as a case study. A total of 600 people, including teachers, students, and parents, were surveyed quantitatively and qualitatively for this study. Secondary data was culled from scholarly journals and government reports. The research used a mixed-methods approach. We used advanced statistical tools like t-test and regression analysis to look at how well the strategy worked at making education more accessible, encouraging interdisciplinary collaboration, and increasing students' final grades. Multidisciplinary education frameworks that promote creativity and problem-solving are becoming more accepted, and enrollment rates are rising significantly, especially in rural regions, according to the findings. Critical thinking and teamwork are two areas where students who participate in NEP-2020 show substantial development. Problems such as a lack of proper training for educators, outdated or non-existent physical facilities, and a general unwillingness to change continue even with these successes. In light of these challenges, it is clear that community involvement, focused resource allocation, and ongoing policy support are essential for NEP-2020 to achieve its goals. This study sheds light on practical ways to put NEP-2020 into action while also providing useful insights on its revolutionary potential. These findings can be used by educators, legislators, and stakeholders to tackle the obstacles and maximize the advantages of this ambitious change in various regional contexts.

Keywords: National Education Policy 2020 (NEP-2020), Multidisciplinary Education, Educational Ecosystem Transformation, Critical Thinking and Problem-Solving, Rural Education Accessibility

1. INTRODUCTION

The National Education Policy (NEP) 2020 represents a monumental transformation in India's education system, addressing entrenched challenges while aligning the system with contemporary global standards. This visionary policy, introduced after a 35-year gap, is rooted in the principles of flexibility, inclusivity, and a multidisciplinary approach, aiming to equip students with the skills and knowledge required to thrive in the 21st century. By fostering

critical thinking, creativity, innovation, and ethical reasoning, NEP 2020 seeks to position India as a global knowledge superpower, driving economic growth and societal progress through education. The policy transcends traditional education paradigms by integrating modern pedagogical techniques with India's cultural and educational heritage, creating a comprehensive framework for lifelong learning. Central to NEP 2020 is its emphasis on **multidisciplinary and holistic education**, which breaks down the rigid silos separating academic disciplines. This approach integrates arts, sciences, and vocational training to cultivate well-rounded individuals capable of tackling complex global challenges. Experiential learning forms a cornerstone of this vision, encouraging students to engage actively with their environment and develop critical problem-solving skills (*Shoryaditya & Jain, 2024; Kalita, 2024*)^{1,4}. The policy encourages experiential learning and the development of critical thinking and problem-solving skills, essential for modern careers (*Kumari, 2022*)². Furthermore, the policy promotes the flexibility of subject choices, allowing students to pursue diverse academic interests and career paths, ultimately fostering innovation and adaptability in a fast-evolving world. **Inclusivity and accessibility** are key pillars of the policy, ensuring that quality education reaches every corner of society, including marginalized communities and children with special needs. By implementing inclusive educational practices and developing infrastructure to support diverse learning requirements, NEP 2020 seeks to bridge educational disparities and empower disadvantaged groups (*Rasool, 2024*)³. The policy's emphasis on multilingual education, particularly instruction in the mother tongue during the foundational years, aligns with global research highlighting the cognitive and developmental benefits of learning in one's native language. NEP 2020 also pioneers **technological integration and innovation** as drivers of educational reform. The policy emphasizes the adoption of digital tools and online platforms to enhance learning outcomes, particularly in rural and underserved regions. Initiatives like the National Educational Technology Forum (NETF) aim to foster digital literacy, create digital content repositories, and support educators in leveraging technology for personalized learning experiences (*Kalita, 2024; Mahato, 2022*)^{4,5}. This focus on technology not only addresses the digital divide but also prepares students for the demands of an increasingly digital world. Despite its ambitious goals, the **implementation of NEP 2020** faces significant challenges. Infrastructural limitations, particularly in rural areas, pose a barrier to achieving universal access to quality education. Additionally, the policy requires extensive teacher training programs to equip educators with the skills and tools needed to implement its reforms effectively (*Kalita, 2024*)⁴. Addressing these challenges will require coordinated efforts between the government, educational institutions, and private stakeholders, alongside sustained investments in infrastructure, technology, and professional development. The success of NEP 2020 hinges on its ability to adapt to evolving educational needs and overcome systemic barriers. Continuous monitoring, feedback, and iterative improvements will be crucial to realizing the policy's transformative potential. While the challenges are substantial, the NEP 2020 represents a bold and visionary step towards creating an equitable, inclusive, and future-ready education system. By fostering a multidisciplinary, technology-driven, and inclusive learning environment, the policy aspires to cultivate a generation of empowered individuals who can contribute meaningfully to India's progress on the global stage. As such, NEP 2020 is not merely a policy document but a roadmap for educational excellence, innovation, and social equity. This study

examines NEP-2020's innovative changes and their implementation in North Gujarat, focusing on their impact on accessibility, learning outcomes, and multidisciplinary integration.

In an effort to meet the changing needs of students in the modern day, India's educational system has undergone a sea change with the implementation of the National Education Policy (NEP) 2020. This policy aims to reform assessment techniques, promote multilingualism, encourage holistic and multidisciplinary education, and replace the previous National Policy on Education, which was last updated in 1992. It also promotes flexibility in learning choices and multilingualism. The **Gujarat government's** education department has compiled a standard operating procedure (SOP) for implementing NEP 2020 statewide in an effort to realize the extraordinary goal of using NEP 2020 to define the future of higher education in **Gujarat**.

Key Features of NEP 2020

The **National Education Policy (NEP) 2020** aims to transform India's education system into an inclusive, holistic, and multidisciplinary framework that aligns with 21st-century global standards while preserving the nation's cultural heritage. The policy covers school education, higher education, teacher training, technology integration, vocational education, and more, with a focus on lifelong learning and inclusivity. In **school education**, the NEP introduces universalization of **Early Childhood Care and Education (ECCE)** for children aged 3–6 through Anganwadis and pre-schools. It emphasizes play-based and activity-based learning to foster cognitive and emotional growth. A significant structural reform is the shift to a **5+3+3+4 curricular structure**, catering to different developmental stages: foundational (ages 3–8), preparatory (8–11), middle (11–14), and secondary (14–18). The curriculum is redesigned to focus on critical thinking, creativity, and practical knowledge, with subjects like coding and vocational training introduced from Grade 6. Multilingual education is encouraged, with a preference for regional languages up to Grade 5. Assessment reforms replace rote learning with competency-based evaluations, and holistic report cards provide a 360-degree view of a student's progress. The policy also focuses on **inclusive education**, ensuring access for disadvantaged groups such as SCs, STs, OBCs, minorities, and differently-abled individuals. In **higher education**, the NEP promotes multidisciplinary learning, enabling students to choose subjects across disciplines. It introduces **multiple entry and exit options** in undergraduate programs, allowing students to exit with certificates, diplomas, or degrees based on the duration of their study. The **Academic Bank of Credits (ABC)** system stores credits digitally, ensuring flexibility and mobility for students. A **single regulator**, the Higher Education Commission of India (HECI), is set up to oversee all higher education institutions except medical and legal colleges. Research is given significant emphasis through the establishment of the **National Research Foundation (NRF)**, which aims to strengthen the research ecosystem in India. The policy also prioritizes **teacher education and training**. By 2030, all teachers are expected to complete a **4-year integrated B.Ed. program**, and continuous professional development (CPD) programs will be mandatory. Transparent, merit-based recruitment and career progression systems are introduced to enhance teaching standards. **Technology integration** is a critical aspect of NEP 2020. Digital platforms like DIKSHA are promoted for teacher training and e-content delivery, while the **National Educational Technology Forum (NETF)** is established to drive technological advancements in education. Similarly, vocational and skill education receives attention, with students exposed to vocational training from Grade 6 onwards,

including internships to develop employability skills. To ensure lifelong learning, the policy includes provisions for **adult education** through literacy programs and initiatives to reintegrate dropouts into the education system. Governance and financing reforms aim to improve efficiency and resource sharing. The school complex model, for instance, groups schools to optimize resources, while the policy also targets increasing public investment in education to 6% of GDP. The NEP places significant emphasis on **Indian Knowledge Systems (IKS)**, integrating regional languages, arts, ethics, and cultural studies into the curriculum. It aims to promote traditional knowledge systems globally while fostering innovation and global competitiveness. With these sweeping reforms, NEP 2020 envisions making **India a global knowledge superpower**, creating a robust and inclusive education system that prepares students for the challenges of the future.

2. LITERATURE REVIEW

*Rani et al. (2024)*⁶ delved into NEP-2020's transformative educational approach, highlighting its emphasis on flexible and multidisciplinary learning frameworks aimed at improving employability among students. The policy promotes lifelong learning and innovative teaching practices, encouraging institutions to move away from traditional, rigid educational structures. The authors underscored the significance of integrating experiential learning to align curricula with the dynamic needs of the global job market. They also noted that the policy's success heavily relies on strengthening infrastructure, including technological resources, to support diverse learning needs. Furthermore, capacity-building initiatives, particularly in teacher training and professional development, were identified as critical enablers for achieving the policy's objectives. The study called for collaborative efforts between government, institutions, and stakeholders to overcome implementation challenges and realize NEP-2020's vision (Rani et al., 2024). *Singha and Singha (2024)*⁷ highlighted the importance of integrating experiential, inquiry-based, and problem-based learning approaches into educational practices to promote sustainability. They argued that these methods enable students to engage with real-world challenges, encouraging critical thinking, creativity, and collaborative problem-solving. By focusing on practical application and reflective learning, such approaches prepare learners to address complex environmental and social issues with innovative solutions. However, the study identified significant barriers, including the need for comprehensive teacher training to implement these pedagogies effectively. Without adequate professional development and support, educators may struggle to adopt these learner-centered methodologies. The authors recommended targeted teacher training programs and institutional capacity-building as essential steps to realize the full potential of these sustainable educational practices (Singha & Singha, 2024). *Kaur (2024)*⁸ analyzed NEP-2020's initiative to integrate vocational education into mainstream curricula, aiming to bridge the gap between academic learning and workforce demands. The study highlighted the policy's emphasis on experiential and hands-on learning methods, which are designed to enhance practical skills and improve employability among students. By embedding vocational training early in the educational process, NEP-2020 seeks to foster a work-ready generation aligned with modern industry requirements. However, the study identified critical challenges, including insufficient teacher training programs to deliver vocational content effectively and gaps in resource allocation, such as funding and infrastructure. These limitations hinder the full realization of the policy's objectives. Kaur

recommended targeted investment in teacher development and institutional resources to ensure successful implementation and sustainable impact (Kaur, 2024). **Fathima and Pandey (2024)**⁹ investigated the implications of NEP-2020 on early childhood education (ECCE), with a focus on the contrasting dynamics between public and private educational institutions. Their study revealed that while the policy's initiatives aim to establish a robust foundation for lifelong learning, significant disparities exist in its implementation. These disparities were particularly evident in factors such as resource availability, infrastructure, and teaching quality, which varied widely between urban and rural settings and between public and private institutions. The authors attributed these variations to demographic factors, including socioeconomic status, geographic location, and institutional capacity. To address these gaps, the study emphasized the importance of targeted awareness campaigns aimed at parents, educators, and policymakers. Such initiatives could enhance understanding of NEP-2020's goals and foster equitable access to quality early childhood education across diverse settings (Fathima & Pandey, 2024). **Radha and Arumugam (2023)**¹⁰ examined the alignment between NEP-2020 and the United Nations Sustainable Development Goals (SDGs), emphasizing the policy's role in advancing quality education and fostering innovation. They noted that NEP-2020's focus on multidisciplinary and holistic learning equips students with skills to address global sustainability challenges. By embedding SDG principles into higher education curricula, institutions can nurture a generation of environmentally conscious and socially responsible citizens. However, the authors identified key barriers to achieving this integration, including fragmented policy coordination and limited institutional capacity to implement sustainable practices effectively. They argued for a more cohesive framework that aligns national education strategies with SDG targets and emphasized the need for stronger government-industry-academia collaboration to bridge these gaps. The study underscored the transformative potential of SDG-integrated education in shaping a sustainable future (Radha & Arumugam, 2023). **Rajan and Sathiyarayanan (2020)**¹¹ proposed Extended Microteaching (XMT) as a novel pedagogical strategy under NEP-2020, designed to refine teaching practices in blended and online learning contexts. XMT integrates techniques such as brainstorming, role-playing, mnemonics, and peer-review activities, encouraging interactive and experiential learning among students. These methods aim to cultivate critical thinking, creativity, and collaborative problem-solving skills, aligning with NEP-2020's vision of holistic education. However, the study revealed significant challenges in implementing XMT, particularly due to disparities in institutional preparedness, technological resources, and faculty training. They emphasized the importance of standardized support systems and capacity-building measures to facilitate its widespread adoption and effectiveness. Ultimately, XMT was portrayed as a promising yet underutilized tool for transforming Indian education in line with global standards (Rajan & Sathiyarayanan, 2020). **Aithal and Aithal (2020)**¹² explored the strategic framework proposed under NEP-2020 for implementing its ambitious vision for higher education. They highlighted the policy's emphasis on creating a holistic, multidisciplinary education system that fosters research-oriented progress and innovation. The authors noted significant provisions such as the establishment of multidisciplinary universities, flexible learning environments, and regulatory consolidation under a single higher education body. However, they identified substantial challenges in translating these reforms into practice, primarily due to the complexity of institutional

restructuring and the lack of clear regulatory guidelines. These hurdles, they argued, could lead to inconsistencies in execution and slow adoption by educational institutions. The study called for well-defined strategies and coordinated efforts among policymakers, educators, and stakeholders to overcome these barriers and achieve the policy's transformative objectives (Aithal & Aithal, 2020). *Kaurav et al. (2020)*¹³ carried out a comprehensive qualitative and sentiment analysis to evaluate public perceptions of NEP-2020, utilizing policy documents and social media data, including Twitter. Their findings revealed that the majority of stakeholders, including educators and policymakers, viewed the policy as a progressive step toward transforming Indian education. Positive sentiments were particularly strong around initiatives promoting equity, quality, and innovation in education. However, the analysis also uncovered significant skepticism, particularly concerning the feasibility of implementing such wide-ranging reforms within the proposed budget and timeline. Concerns were raised about the adequacy of funding and the readiness of institutional infrastructure to support policy mandates. The authors recommended transparent communication, phased implementation, and monitoring frameworks to address these apprehensions and build public trust (Kaurav et al., 2020). *Kumar et al. (2020)*¹⁴ analyzed the alignment of NEP-2020's objectives with the United Nations Sustainable Development Goals (SDGs), emphasizing the policy's role in fostering globally relevant education systems. They highlighted the policy's foundational pillars—access, equity, quality, affordability, and accountability—as pivotal in creating an education framework that meets international standards. NEP-2020's emphasis on integrating digital learning, vocational training, and multidisciplinary approaches was identified as key to equipping learners with skills for global competitiveness. However, the study also pointed out the need for a comprehensive systemic overhaul, including revamping institutional structures, upgrading technology, and ensuring robust governance frameworks. Without addressing these systemic challenges, the ambitious goals of NEP-2020 and its alignment with the SDGs may remain unmet. The authors called for strategic investments and multi-stakeholder collaboration to drive effective implementation and achieve sustainable educational outcomes (Kumar et al., 2020).

3. OBJECTIVES OF THE STUDY

1. To examine the innovative provisions of NEP-2020 and their implications in North Gujarat Region.
2. To analyze the multidisciplinary nature of NEP-2020 with a focus on integrating arts, sciences, and vocational training.
3. To evaluate the impact of NEP-2020 on educational outcomes and accessibility in North Gujarat Region.

4. RESEARCH QUESTIONS

1. What are the levels of awareness and implementation of innovative provisions of NEP-2020 among stakeholders?
2. Does NEP-2020 significantly influence the integration of multidisciplinary approaches in education?
3. Has NEP-2020 improved educational outcomes and accessibility?

5. RESEARCH METHODOLOGY

Research Design: A mixed-methods approach combining quantitative and qualitative data analysis was employed to ensure comprehensive insights into the research objectives.

Study Area: North Gujarat Region, with diverse educational and socio-economic demographics.

Sample Size: A total of 600 participants comprising educators, policymakers, students, and parents were surveyed across rural and urban areas of North Gujarat Region.

Sampling Technique: Stratified random sampling was used to ensure representation from various socio-economic backgrounds and geographic regions.

Statistical Tools

t-tests: To test hypotheses related to the impact of NEP-2020.

Regression Analysis: To identify predictors of educational outcomes.

Data Collection

Data was collected using:

- **Structured Questionnaires:** Administered to educators, students, and parents.
- **Focus Group Discussions (FGDs):** Conducted with policymakers and education experts.
- **Secondary Data:** Collected from government reports, academic journals, and policy documents related to NEP-2020.

6. DATA ANALYSIS AND INTERPRETATION

Quantitative Analysis

Objective 1: To examine the innovative provisions of NEP-2020 and their implications in North Gujarat

Research Question: What are the levels of awareness and implementation of innovative provisions of NEP-2020 among stakeholders?

One-sample t-test to compare the mean awareness score with a population mean.

Variable	Sample Size (n)	Mean Score (M)	Standard Deviation (SD)	Population Mean (μ_0)	t-value	p-value	Result
Awareness Score	600	4.3	0.80	3.5	24.49	< 0.0001	Significant at $p < 0.05$

Formula for the t-value:

$$t = \frac{\bar{X} - \mu_0}{\frac{SD}{\sqrt{n}}}$$

Step-by-Step Calculation:

- 1 Calculate the standard error (SE):

$$SE = \frac{SD}{\sqrt{n}} = \frac{0.80}{\sqrt{600}}$$

$$SE = \frac{0.80}{24.49489743} = 0.03265$$

- 2 Calculate the t-value:

$$t = \frac{\bar{X} - \mu_0}{SE} = \frac{4.3 - 3.5}{0.03265}$$

$$t = \frac{0.8}{0.03265} = 24.49$$

- 3 Calculate the p-value: Using the t-distribution with $n - 1 = 599$ degrees of freedom, the p value for a two-tailed test is computed:

$$p = 2 \times P(T > t) = 2 \times P(T > 24.49)$$

The p-value is extremely small, approximately 2.49×10^{-92} , which is effectively 0 for practical purposes.

Final Results:

t-value: 24.49

p-value: 2.49×10^{-92}

The mean awareness score (4.3) is significantly higher than the population mean (3.5), as indicated by the t-test ($t = 24.49$, $p < 0.0001$). This confirms a high level of awareness of NEP-2020 provisions among stakeholders in North Gujarat .

This confirms that the results are highly statistically significant ($p < 0.05$).

Objective 2: To analyze the multidisciplinary nature of NEP-2020 with a focus on integrating arts, sciences, and vocational training.

Research Question: Does NEP-2020 significantly influence the integration of multidisciplinary approaches in education?

Regression analysis to determine the effect of NEP-2020 on the integration of arts, sciences, and vocational training.

Variable	Sample Size (n)	Beta Coefficient (β)	Standard Error (SE)	t-value	p-value	Significance
Arts Integration	600	0.48	0.06	8.00	< 0.0001	Significant
Sciences Integration	600	0.40	0.07	5.71	<0.0001	Significant
Vocational Training	600	0.55	0.05	11.00	< 0.0001	Significant

1. For Each Variable:

The t-value is calculated using the formula:

$$t = \beta / SE$$

The p-value is calculated using a two-tailed test with $n-1 = 599$ degrees of freedom.

2. Results:

Arts Integration:

$\beta = 0.48$, $SE = 0.06$

$$t = \frac{0.48}{0.06} = 8.0$$

$$p = 6.46 \times 10^{-15}$$

Sciences Integration:

$\beta = 0.40$, $SE = 0.07$

$$t = \frac{0.40}{0.07} = 5.71$$

$$p = 1.74 \times 10^{-8}$$

Vocational Training:

$\beta = 0.55$, $SE = 0.05$

$$t = \frac{0.55}{0.05} = 11.0$$

$$p = 9.23 \times 10^{-26}$$

Final Results:

Arts Integration: $t = 8.0$, $p < 0.0001$ (significant).

Sciences Integration: $t = 5.71$, $p < 0.0001$ (significant).

Vocational Training: $t = 11.0$, $p < 0.0001$ (significant).

The regression analysis confirms that NEP-2020 significantly enhances integration across arts, sciences, and vocational training. Vocational training demonstrates the strongest effect ($\beta = 0.55$), followed by arts ($\beta = 0.48$) and sciences ($\beta = 0.40$).

Objective 3: To evaluate the impact of NEP-2020 on educational outcomes and accessibility in North Gujarat

Research Question: Has NEP-2020 improved educational outcomes and accessibility?

Paired t-test to compare pre-NEP and post-NEP scores.

Variable	Sample Size (n)	Pre-NEP Mean (M ₁)	Post-NEP Mean (M ₂)	Standard Deviation (SD)	t-value	p-value	Result
Learning Outcomes	600	55.6	68.3	11.8	22.31	< 0.0001	Significant at $p < 0.05$
School Enrollment Rate (%)	600	70	82	8.0	15.00	< 0.0001	Significant at $p < 0.05$

For Learning Outcomes:

Formula for t -value:

$$t = \frac{M_2 - M_1}{\frac{SD}{\sqrt{n}}}$$

Calculation:

$$t = \frac{68.3 - 55.6}{\frac{11.8}{\sqrt{600}}} = \frac{12.7}{0.48219} = 26.36$$

p-value: Using a two-tailed test:|

$$p \approx 2.89 \times 10^{-102}$$

For School Enrollment Rate:

$$t = \frac{M_2 - M_1}{\frac{SD}{\sqrt{n}}}$$

Calculation:

$$t = \frac{82 - 70}{\frac{8}{\sqrt{600}}} = \frac{12}{0.32660} = 36.74$$

p-value: Using a two-tailed test:|

$$p \approx 1.36 \times 10^{-155}$$

Final Results:

Learning Outcomes: $t = 26.36$, $p < 0.0001$ (significant)

School Enrollment Rate: $t = 36.74$, $p < 0.0001$ (significant)

The paired t -test indicates a significant increase in both learning outcomes and school enrollment rates after NEP-2020. This underscores the positive impact of NEP-2020 on educational accessibility and outcomes.

Qualitative Analysis

Qualitative Analysis of Policy Feedback

Focus groups conducted with teachers, parents, students, and administrators in North Gujarat provided insights into the impact and challenges of NEP-2020. While stakeholders expressed optimism regarding experiential learning and vocational training, they also highlighted critical barriers in teacher training and infrastructure.

1. Positive Feedback

Experiential Learning: Teachers appreciated the emphasis on experiential learning, reporting that students were more engaged and demonstrated a better understanding of concepts through hands-on activities. One teacher mentioned, *“Learning by doing has made students more attentive and curious about their studies.”* Parents shared that their children seemed more motivated to attend school, especially during interactive science and arts classes. Research shows that experiential learning leads to improved cognitive and social outcomes (*Ministry of Education, NEP-2020*)¹⁵.

Vocational Training Integration: Administrators highlighted the importance of vocational training in equipping students with practical skills that align with local industries, such as agriculture, handicrafts, and small-scale entrepreneurship. Students expressed excitement about learning new skills like coding, tailoring, and carpentry, which they believed would boost their employability in the future (*NSDC Vocational Training Programs*)¹⁶.

2. Challenges Identified

Teacher Training: A recurring issue was the lack of adequate teacher training to handle experiential and vocational curriculums. Many teachers felt unprepared and overburdened. A participant noted, *“We need more workshops and continuous training to implement these methods effectively.”* This observation aligns with findings in a UNESCO report on NEP-2020 implementation.

Infrastructure Gaps: Many rural schools lacked the necessary infrastructure, such as laboratories, vocational tools, and digital facilities, to implement NEP-2020 effectively. An administrator highlighted, *“Without proper infrastructure, the policy remains aspirational and difficult to execute.”* The gap in infrastructure between rural and urban areas was emphasized as a major obstacle to equitable education.

Resource Allocation: Focus group discussions pointed out disparities in resource allocation, with well-funded schools adapting to NEP-2020 faster than underfunded ones. Stakeholders emphasized the need for government support to bridge this gap.

3. Recommendations

Enhanced Teacher Training: Organize state-wide teacher training programs focusing on experiential and vocational teaching methods. Certification courses and mentoring systems can help educators feel more confident and capable.

Infrastructure Development: Allocate specific budgets for infrastructure development in rural schools, including laboratories, workshops, and digital classrooms. Partner with private organizations and local businesses to fund infrastructure and vocational tools.

7. RESULTS AND DISCUSSION

The findings of this study indicate a substantial impact of NEP-2020 on the educational landscape in North Gujarat. The quantitative analysis revealed a high level of awareness among stakeholders regarding the policy's innovative provisions. The one-sample t-test showed that the mean awareness score (4.3) significantly exceeded the population mean (3.5), with a t-value of 24.49 and a p-value of less than 0.0001. This suggests that stakeholders, including teachers, administrators, and parents, are well-informed about the NEP-2020 reforms. Regression analysis confirmed the effectiveness of NEP-2020 in promoting multidisciplinary integration. Vocational training exhibited the strongest effect ($\beta = 0.55$, $t = 11.00$, $p < 0.0001$), followed by arts ($\beta = 0.48$, $t = 8.00$, $p < 0.0001$) and sciences ($\beta = 0.40$, $t = 5.71$, $p < 0.0001$), indicating significant strides in holistic education. Further, paired t-tests demonstrated a marked improvement in educational outcomes and accessibility. Learning outcomes showed a substantial increase from a pre-NEP mean of 55.6 to a post-NEP mean of 68.3, with a t-value of 26.36 ($p < 0.0001$). Similarly, school enrollment rates improved significantly from 70% to 82%, with a t-value of 36.74 ($p < 0.0001$). These results highlight the NEP-2020's role in enhancing both the quality of education and its reach, particularly in rural areas.

Discussion

The implementation of NEP-2020 in rural North Gujarat has significantly enhanced **educational accessibility**, marking a shift towards inclusivity and equity. Foundational literacy and numeracy missions, as core components of NEP-2020, have been instrumental in addressing basic educational deficits, particularly among younger students. By focusing on foundational

skills, the policy has aimed to reduce dropout rates and bridge learning gaps that have historically plagued rural regions. The significant increase in school enrollment rates, from 70% pre-NEP to 82% post-NEP, underscores the effectiveness of these initiatives. However, the journey toward full accessibility is fraught with challenges. Rural schools often lack adequate infrastructure, including basic facilities, learning materials, and digital tools. These limitations create disparities between urban and rural areas, hindering the realization of the policy's goal of equitable education for all. Addressing these issues requires targeted investments in infrastructure development, resource allocation, and tailored interventions to ensure that marginalized communities can fully benefit from NEP-2020 reforms. NEP-2020's emphasis on **multidisciplinary education** has ushered in a transformative approach to learning, promoting the integration of arts, sciences, and vocational training. This shift is particularly significant in a system that has traditionally favored siloed and discipline-specific education. The policy's holistic approach encourages students to develop diverse skill sets, fostering creativity, critical thinking, and adaptability. The strong effect of vocational training ($\beta = 0.55, p < 0.0001$) in the regression analysis highlights its role in equipping students with practical, employable skills aligned with local socio-economic contexts. For instance, students have expressed enthusiasm about learning skills such as coding, carpentry, and tailoring, which not only enhance their employability but also prepare them for entrepreneurial opportunities. However, the implementation of multidisciplinary education faces barriers, such as insufficiently trained teachers and inadequate resources in rural schools. Many teachers report feeling unprepared to adopt experiential and multidisciplinary teaching methods due to a lack of professional development opportunities. This highlights the urgent need for comprehensive teacher training programs and continuous support systems to empower educators to implement these innovative approaches effectively. **Learning outcomes** have shown remarkable improvement under the NEP-2020 framework, particularly in fostering critical thinking and problem-solving skills among students. The shift towards experiential learning, which emphasizes "learning by doing," has played a crucial role in this transformation. Teachers report that students are more engaged in their studies, demonstrating a deeper understanding of concepts and the ability to apply their knowledge in practical settings. This is evident in the substantial improvement in learning outcomes, with scores increasing from a mean of 55.6 pre-NEP to 68.3 post-NEP. Parents have also noted that their children are more curious and motivated to learn, especially in interactive and hands-on classes. Despite these gains, challenges remain in ensuring consistent quality across schools. Rural schools, in particular, struggle with the lack of laboratories, vocational tools, and digital facilities, which are essential for experiential learning. These gaps limit the full realization of NEP-2020's potential and highlight the importance of targeted resource allocation. Moreover, sustained improvement in learning outcomes requires ongoing monitoring and feedback mechanisms to refine educational strategies and address emerging needs. The implementation of the National Education Policy (NEP) 2020 in the North Gujarat Region signifies a transformative shift in the region's education landscape, fostering inclusivity, accessibility, and holistic development while aligning with the demands of the 21st century. The policy introduces a 5+3+3+4 school structure, emphasizing Early Childhood Care and Education (ECCE), which integrates Anganwadis into the formal education system. Play-based and activity-driven learning methodologies are being promoted to stimulate creativity and

cognitive growth, particularly in rural and semi-urban areas, where contextualized learning in local languages enhances inclusivity and cultural relevance.

Vocational training, digital literacy, and coding have been embedded into the curriculum starting from grade 6, equipping students with practical skills and technological adaptability. With a strong focus on the region's economic activities, vocational education is tailored to local industries, including agriculture, dairy farming, and traditional crafts like textile weaving, contributing to the economic growth and employability of the region's youth. Higher education in North Gujarat is undergoing substantial reforms, with the establishment of multidisciplinary institutions and the introduction of the Academic Bank of Credits (ABC), enabling students to choose flexible learning paths and transfer credits seamlessly. The region has also embraced research and innovation through partnerships with local industries and the creation of research-oriented institutions, fostering advancements in fields like renewable energy and water management, which are critical to the region's development. Equity and inclusivity remain at the core of NEP-2020 in North Gujarat, with infrastructure development, scholarships, and nutritional programs aimed at reducing dropout rates among marginalized communities. Special emphasis has been placed on girl-child education through initiatives like Beti Bachao Beti Padhao, resulting in higher female enrollment rates supported by gender-sensitive infrastructure and financial incentives. The region has also adopted digital technology extensively, leveraging platforms like DIKSHA and various e-learning tools to bridge the digital divide. These efforts ensure continuity of education, particularly in remote areas, and have proven instrumental during disruptions like the COVID-19 pandemic. Teacher training programs have been significantly enhanced, incorporating workshops, certifications, and technology-based pedagogy, empowering educators to adapt to NEP's competency-driven framework. Furthermore, the policy's focus on preserving cultural and linguistic heritage has encouraged education in Gujarati and other regional languages, fostering cultural pride and improving comprehension among students. The introduction of school complexes and cluster systems has optimized resource utilization and promoted community involvement in education governance, aligning educational practices with local aspirations. Collectively, these reforms position the North Gujarat Region as a leader in effectively implementing NEP-2020 to build a robust, inclusive, and future-ready education system, ensuring that education serves as a catalyst for regional development and social progress.

8. CHALLENGES IN IMPLEMENTING NEP-2020 IN NORTH GUJARAT REGION

Infrastructure and Technological Gaps

- Limited access to reliable internet and digital tools in rural areas.
- Lack of modern classrooms, libraries, and labs in schools and colleges.

Faculty Training and Development

- Inadequate training for educators in competency-based and multidisciplinary curricula.
- Resistance to adopting vocational training and innovative teaching methods.

Regional Industry Collaboration

- Weak linkages between local industries and academic institutions.
- Misalignment of vocational courses with industry-specific skills.

Equity and Inclusivity Concerns

- Socio-economic disparities limit access to resources like textbooks and digital tools.
- Gender-based barriers restrict female enrolment in higher education.

Curriculum Design and Implementation

- Lack of region-specific curricula tailored to local industry needs.
- Overlap between traditional and multidisciplinary responsibilities creates confusion.

Resource Allocation and Governance

- Insufficient funding for infrastructure, teacher training, and technology.
- Bureaucratic delays and poor coordination among stakeholders.

Cultural and Linguistic Barriers

- Challenges in translating concepts into Gujarati and other dialects.
- Traditional mindsets resist new educational practices like entrepreneurship.

Monitoring and Assessment

- Absence of robust evaluation frameworks for tracking NEP initiatives.
- Complexity in assessing practical and technological skills.

Opportunities and Way Forward

Notwithstanding the obstacles, NEP 2020 presents a vision for the Indian education system that is revolutionary, opening doors to a framework that is more inclusive, equal, and comprehensive. In line with global norms and grounded in India's socio-cultural context, the policy promotes creativity, innovation, and collaboration among all parties involved. This innovative strategy has the potential to propel major changes in teaching methods, better equipping students to meet the unpredictable needs of an ever-evolving labor market. In keeping with current worldwide trends, NEP 2020 aims to provide students with the tools they need to thrive in the modern world by promoting skill development, vocational training, and lifelong learning. Significant changes to pedagogy, evaluation, and teacher preparation are necessitated by the new curriculum introduced by NEP 2020, which emphasizes holistic, multidisciplinary, and experiential learning. In India, traditional knowledge systems are integrated into the educational system and local languages are used as mediums of instruction. This helps to maintain cultural identity and lays a solid groundwork for lifelong learning. This two-pronged approach guarantees that students are both grounded in their cultural background and ready to embrace possibilities on a global scale. However, important issues like sufficient finance, teacher preparedness, and possible interruptions to the current education system must be addressed in order for NEP 2020 to be implemented successfully. To overcome these obstacles, the public sector, non-profits, and communities must work together, think outside the box, and remain committed over the long haul.

At the end of the day, NEP 2020 is what will really change India's education system. The suggested adjustments are essential for fixing the educational system's flaws and getting pupils ready for what's to come, but they won't be easy. Stakeholders must work together continuously, make substantial investments, and execute the policy effectively for it to be successful. A future-ready and globally competitive education system in India can be achieved through NEP 2020 with continued effort and a collective dedication to inclusivity and excellence. According to Banerjee and Krishnagar (2023)

9. CONCLUSION

The National Education Policy 2020 (NEP-2020) represents a transformative vision for India's education system, addressing long-standing gaps while embracing a multidisciplinary, inclusive, and holistic approach to learning. This research, focusing on north Gujarat region, underscores the significant strides made under NEP-2020, particularly in fostering multidisciplinary education, improving accessibility, and enhancing educational outcomes. The policy's emphasis on integrating arts, sciences, and vocational training has equipped students with diverse skills essential for navigating the complexities of the 21st-century global economy. The marked improvement in learning outcomes and increased enrollment rates, particularly in rural regions, highlight the policy's potential to bridge educational disparities and promote social equity. However, this progress is not without its challenges. North Gujarat, like many other regions, grapples with infrastructural deficiencies, a digital divide, and insufficiently trained educators, all of which hinder the full realization of NEP-2020's objectives. The study highlights the urgent need for strategic investments in rural infrastructure, robust teacher training programs, and targeted resource allocation to ensure equitable access to quality education. Resistance to pedagogical and linguistic reforms further underscores the importance of community involvement and awareness campaigns to foster acceptance and adaptability among stakeholders. The findings of this study emphasize that while NEP-2020 lays a strong foundation for educational excellence and innovation, its success ultimately depends on effective implementation and continuous feedback mechanisms. Collaborative efforts between government, educational institutions, private stakeholders, and communities are crucial to addressing systemic barriers and ensuring sustained progress. By fostering a culture of critical thinking, creativity, and inclusivity, NEP-2020 has the potential to empower individuals, strengthen the education ecosystem, and position India as a global knowledge leader. The lessons learned from North Gujarat's case study offer valuable insights for policymakers and educators, paving the way for a more equitable and future-ready education system across diverse regional contexts.

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Challenges and Revolutionary Changes Through NEP – 2020: A Multidisciplinary Perspective

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Abstract

This study looks into the possibilities and challenges the State Bank of India (SBI) has had deploying Core Banking Solutions (CBS) throughout its Gujarati branches. The study examines SBI's path towards integrating CBS, taking into account operational disruptions, training shortages, and cyber security threats, using secondary data from annual reports, RBI publications, and case studies. The report emphasises CBS's revolutionary contribution to enhancing customer satisfaction, boosting productivity, and promoting financial inclusion. Notwithstanding the challenges, SBI's calculated acquisition of CBS has opened up new avenues for service innovation, particularly in the fiercely competitive banking sector.

Keywords:

Core Banking Solutions (CBS), State Bank of India (SBI), Gujarat, Public Sector Banks, Technology Adoption, Banking Challenges, Operational Efficiency

1. Introduction

1.1 Background of the Study

Centralised banking systems that enable banks to function as a single network are known as core banking solutions, or CBS. Customers can access banking services in real-time across locations and channels thanks to these technologies, which combine all branch operations and digital banking services. In order to stay competitive and satisfy the rising need for seamless banking, public sector banks in India, such the State Bank of India (SBI), have been implementing CBS more and more.

Using an outsourced Application Service Provider (ASP) model, C-Edge has developed Comprehensive Core Banking Services, which allow your bank to integrate all of its branches and have a single perspective of the bank for efficient management and control. It helps you manage your bank effectively and economically by bundling networking, IT services, and core banking application infrastructure. TCS BaNCS Software is the core banking solution that C-Edge provides on ASP. It is a globally recognised solution that has been implemented by 116 banks across 35 countries, including India, where it serves as the foundation for the domestic banking operations of State Bank of India and its six associate banks. This service has been tailored to the unique needs of regional rural banks, district cooperative banks, and urban banks in India.

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1.2 State Bank of India (SBI) and its Presence in Gujarat

Serving millions of clients nationwide, SBI is the biggest commercial bank in India and is a key player in advancing financial inclusion. Gujarat is a major market for SBI's banking operations because of its industrial centres, expanding urban population, and spirit of entrepreneurship. SBI serves a wide range of clientele, including small and medium-sized businesses (SMEs), big organisations, and retail consumers, through its vast network of branches, ATMs, and online platforms throughout the state.

With the expansion of companies and the development in digital literacy, there is a greater need for smooth and instantaneous banking services in Gujarat's cities. To satisfy this demand and offer consistent customer experiences across all service points, SBI has deployed CBS throughout its Gujarat network. SBI provides a range of services through CBS with increased speed and convenience, including cash management, loan processing, mobile banking, and fund transfers.

1.3 Rationale for the Study

Despite the fact that CBS has greatly changed banking operations, there are still difficulties with its implementation. SBI and other public sector banks frequently encounter challenges such as high implementation costs, employee opposition, cyber security threats, and legacy system integration. In addition, CBS provides chances for data-driven decision-making, enhanced customer service, financial inclusion, and operational efficiency. Given Gujarat's fast economic and digital development, it is important to comprehend the difficulties SBI had when implementing CBS in this area and how the bank has taken advantage of the chances provided by CBS to improve operations and satisfy client demands.

The analysis of the special opportunities and challenges that SBI faced in Gujarat is the main goal of this study. It looks at the bank's experience switching to a CBS platform and the tactics used to overcome operational challenges and take use of the technology's advantages.

1.4 Problem Statement

Technical integration, employee training, and infrastructural improvements are all part of the intricate process of implementing CBS in big public sector banks like SBI. Despite its advantages, the move has brought about a number of operational setbacks, problems with personnel training, and cyber security threats. SBI's experience in Gujarat's cities provides insightful information on how banks can overcome these obstacles and take use of CBS's opportunities of achieving operational excellence and client satisfaction.

2. Literature Review

- The development of CBS in Indian public sector banks was examined by **Jain and Agarwal (2018)**, who concentrated on how centralised banking has changed conventional banking procedures. They talk about how CBS enables banks to centralise data management, execute transactions in real-time, and enhance customer experience by offering uniform services across locations. Noting that these solutions address the operational inefficiencies that have long plagued India's public sector banks, their work highlights the importance of CBS in establishing a cohesive banking experience. They also contend that encouraging CBS implementation nationwide has been greatly aided by the Reserve Bank of India's (RBI) regulatory drive.
- A comparative study of CBS implementation in public and private sector banks is presented by **Choudhury (2019)**, who emphasises that public sector banks encounter particular

difficulties because of financial restraints, legal restrictions, and a greater proportion of rural clients. According to Choudhury, public sector banks like SBI face operational inefficiencies and bureaucratic delays, but private banks have the resources and flexibility to swiftly adopt CBS.

- This public-private split is also examined by **Sen and Gupta (2020)**, who contend that SBI might gain from implementing best practices from private banks, such as agile management, customer-centred digital solutions, and improved cyber security. They argue that if SBI could adopt private sector tactics that put an emphasis on operational flexibility and customer satisfaction, its implementation of CBS in Gujarat would be more successful.
- According to **Kumar and Sharma (2020)**, public sector banks benefit from CBS's operational advantages which include faster transactions and easier data for administration. They point out that CBS makes uniform service delivery possible for a big bank like SBI, which has operations in both urban and rural areas. They contend that by providing dependable services independent of branch location, this standardised method aids in lowering operational complexity and supports SBI's attempts to improve customer satisfaction.
- The function of CBS in supporting Omni-channel banking, namely in improving client experiences via digital banking channels like ATMs, internet banking, and mobile banking, is the main topic of **Gupta and Mehta (2020)**. They contend that by enabling banks like SBI to conduct comprehensive consumer data analysis, CBS makes it possible to implement successful cross-selling tactics and provide individualised services. According to Gupta and Mehta, this data-driven strategy is crucial for preserving competitiveness in places like Gujarat, where clients need effective digital services.
- The infrastructure obstacles that SBI encounters when implementing CBS, especially in Gujarat's rural areas, are noted by **Patel (2021)**. CBS operations are disrupted and real-time transaction processing is hampered by problems like inconsistent internet connectivity and frequent power outages, according to Patel. Customers in rural areas become dissatisfied as a result of the service quality differential between rural and urban branches caused by this infrastructure disparity. In order to close this service gap, Patel highlights the necessity of funding rural digital infrastructure.
- **Joshi (2021)** expands on this research by emphasising that, especially in rural areas, public sector banks confront more infrastructure constraints than private banks. According to Joshi's research, these restrictions affect SBI's capacity to provide reliable services and satisfy the demands of rural clients who have little access to other banking options in Gujarat, where rural branches account for a sizable percentage of the bank's network.
- **Kumar (2022)** focuses on the difficulties in putting cyber security measures in place in public sector banks, pointing out that financial restraints frequently prevent them from investing in cutting-edge security equipment. According to Kumar, strong cyber security procedures are necessary for a bank like SBI, which provides services to a sizable customer base in both urban and rural Gujarat, in order to reduce risks and safeguard client information. Due to lower levels of digital literacy and heightened susceptibility to cyber-attacks, this problem is especially urgent in rural areas.

- This opinion is supported by **Singh (2022)**, who points out that CBS gives SBI the authority to make data-driven decisions. According to Singh's research, SBI's CBS infrastructure enables it to track consumer behaviour and preferences using data analytics, hence facilitating tailored service offerings. In Gujarat, where urban and rural areas have very different customer needs, this feature enables SBI to customise its offerings for particular groups of people, increasing client loyalty and happiness.
- According to **Sharma and Singh (2023)**, CBS presents specific cyber security difficulties because of the centralisation of user data, which makes it vulnerable to intrusions. They point out that SBI is increasingly vulnerable to risks including fraud, cyber-attacks, and data breaches as it grows its digital offerings through CBS. Their research emphasises how crucial cyber security infrastructure is to protecting consumer information and upholding confidence, particularly in light of the growing number of cyber-attacks.

3. Research Methodology

The State Bank of India (SBI) in the state of Gujarat is implementing Core Banking Solutions (CBS), and this research report uses a secondary data-based method to examine the opportunities and constraints involved. The CBS implementation at SBI is examined in this study using a descriptive research design. Because it allows for a systematic examination of previously published data and findings, descriptive research is suitable for secondary data studies and offers a thorough grasp of the opportunities and limitations associated with CBS. The study carefully examines SBI's activities in Gujarat, encompassing both rural and urban branches, in order to comprehend the various difficulties the bank faces in a socioeconomically diverse area.

3.1 Data Collection Sources

Data for this study came from a variety of reliable sources because it only uses secondary data. Among these sources are:

- News Articles and Case Studies
- Government Reports
- RBI Reports
- Industry Reports
- Research Articles and Journals
- Annual Report of SBI

4. Data Analysis

A number of significant highlights of the prospects and difficulties in adopting Core Banking Solutions (CBS) at SBI, with an emphasis on the company's digital transformation path, may be found in the SBI Annual Report 2023–2024.

4.1 Challenges in CBS Implementation:

- **Customer Resistance to Change:** Even though there are many advantages to using CBS, some client segments—especially those in rural areas—frequently oppose it since they may be more used to using traditional banking techniques. SBI must address this by educating clients and offering customised services to enable more seamless migrations.
- **Employee Adaptation and Training:** Bank employees must receive continual training when implementing new digital systems to be sure they are knowledgeable on the most recent CBS

features. Employees and clients may find it difficult to adjust to new methods of administration and service delivery, particularly in less technologically advanced regions.

- **Cyber security Risks:** As our reliance on online banking increases, cyber security continues to be a major worry. SBI has difficulties protecting client information and thwarting online attacks, especially as online banking channels grow. To reduce such threats, it is crucial to make on-going investments in bolstering security infrastructure and implementing cutting-edge security procedures.
- **Technological Integration and Maintenance:** The integration of new technology with legacy systems is one of the main issues mentioned. One of the biggest challenges as SBI upgrades its CBS infrastructure is making sure the integration goes smoothly without interfering with customer service. Frequent system changes are necessary for the bank to comply with regulatory standards and stay compatible with emerging technologies.
- **Cost and Resource Allocation:** Large sums of money must be spent on software, infrastructure, and training in order to implement CBS. Inefficiencies could also result from an uneven distribution of resources between the rural and urban branches.
- **Human Resource Management:** A constant problem is making sure that employees at every location have the necessary training to run CBS efficiently. Change management techniques are also necessary while switching from traditional to digital banking systems in order to get staff members on board with the new procedures.

4.2 Opportunities in CBS Implementation:

- **Scalability and Flexibility:** By providing more scalability, CBS enables SBI to access new markets and clientele. SBI is positioned to remain competitive in the rapidly changing digital world thanks to the system's flexibility, which allows it to swiftly adjust to new banking trends, products, and services.
- **Enhanced Customer Experience:** SBI is able to provide a variety of digital channels, such as online and mobile banking, thanks to CBS. SBI has improved the client experience and made banking more convenient and accessible by utilising platforms such as YONO.
- **Financial Inclusion:** Customers can now more readily access banking services because to the deployment of CBS in rural and remote locations, which has encouraged financial inclusion. For SBI, this is especially crucial because of its sizable rural clientele. The bank supports national efforts like Digital India and the shift to a less cash economy by leveraging its CBS to offer services to previously unbanked populations.
- **Data-Driven Decision Making:** SBI is better able to comprehend the demands and interests of its customers because to the data that CBS generates. By using this data to provide individualised financial products, cross-selling opportunities can be increased and customer loyalty can be enhanced.
- **Cost Reduction and Operational Efficiency:** By automating a number of banking procedures, CBS has assisted SBI in lowering operating expenses. Because fewer manual interventions are required and processes become faster and more accurate, this improves operational efficiency and profitability.
- **Improved Customer Experience:** CBS makes it possible for any branch to offer 24/7 banking services, giving consumers more convenience and facilitating the transition to anytime, anywhere banking.

- **Operational Efficiency:** CBS can increase speed and quality of service, decrease errors, and streamline operations by centralising data and automating various banking tasks.

There are a lot of obstacles and exciting possibilities associated with SBI's deployment of Core Banking Solutions (CBS) in Gujarat. The potential to enhance customer experience, operational efficiency, financial inclusion, and scalability makes CBS a crucial part of SBI's strategy, even though the challenges—which range from cyber security threats and technological integration to employee training and customer resistance—need constant attention. SBI can overcome these obstacles and use CBS to further solidify its position as a leader in the Indian banking industry by keeping up its investments in infrastructure, security, and customer education.

5. Recommendations:

- **Enhance Employee Training and Change Management Programs:** SBI should make investments in extensive, on-going training programs for its staff members, especially those in rural locations, to make sure they are prepared to manage the intricacies of CBS. Employees can be trained on CBS's technology features and customer service in a digital setting through specialised workshops and e-learning modules.
- **Upgrade and Strengthen Technological Infrastructure:** Continuous improvements to the technology infrastructure should be SBI's top priority, particularly in rural and semi-urban areas. To support CBS effectively, it is crucial to make sure that branches, especially those in rural Gujarat, have access to dependable hardware and fast internet. To manage increasing volumes of client data and transactions, investments should be made in scalable infrastructure and cloud-based solutions.
- **Focus on Cyber security and Data Protection:** SBI should step up efforts to improve cyber security safeguards in light of the growing dependence on digital systems. To protect sensitive client data and stop cyber threats, strong fraud detection systems, improved encryption technology, and regular penetration testing must be in place.
- **Improve Customer Feedback Mechanisms:** Strong feedback mechanisms should be put in place by SBI to regularly collect consumer opinions about their interactions with CBS. The system may be improved, customer issues can be resolved, and user happiness raised with the help of this input.
- **Expand Financial Inclusion Initiatives:** Especially in Gujarat's underprivileged districts, SBI should use CBS as a vehicle to strengthen its financial inclusion initiatives. To give more individuals access to banking services, particularly those without official bank accounts, the bank should increase the scope of its outreach initiatives. This may entail establishing additional mobile banking branches and making certain that CBS permits smooth, affordable services.
- **Leverage Data Analytics for Personalized Services:** To learn more about the interests and behaviour of its customers, SBI should make an investment in cutting-edge data analytics solutions. SBI can provide targeted financial products, develop individualised banking solutions, and enhance client interaction tactics by leveraging this data.

By following these suggestions, SBI will be able to take use of all the potential that CBS offers in addition to overcoming the difficulties that come with putting it into practice. Strong technology infrastructure, cyber security as a top priority, employee and customer education, and

increased financial inclusion initiatives will all help the bank better adapt to the quickly evolving banking landscape and solidify its place in Gujarat's banking industry.

6. Conclusion

A revolutionary change in banking services, the introduction of Core Banking Solutions (CBS) at the State Bank of India (SBI) offers both enormous prospects and formidable hurdles. The purpose of this study was to investigate these dynamics in relation to SBI branches throughout Gujarat. SBI may improve consumer convenience, promote financial inclusion, and streamline operations through CBS, but accomplishing these goals will involve overcoming a number of difficult obstacles.

Implementing CBS throughout its vast network presents a number of challenges for SBI, especially in rural areas. Customer opposition to digital banking, cyber security threats, staff training requirements, and technological integration within old systems are some of the main obstacles. To overcome these obstacles, a deliberate emphasis on modernising infrastructure, fortifying cyber security frameworks, and providing thorough training programs for staff members is necessary. Furthermore, attaining high adoption rates and customer satisfaction requires informing consumers about CBS's advantages and guaranteeing dependable digital connection in rural locations.

In conclusion, SBI has both opportunities and problems as a result of the implementation of CBS in Gujarat; yet, the bank's dedication to financial inclusion and technical innovation can ultimately lead to favourable results. SBI can successfully realise CBS's full potential by keeping up its investments in consumer outreach, cyber security, infrastructure, and staff training. In addition to increasing operational effectiveness and customer service standards, this will also greatly advance digital transformation and financial inclusion in India's banking industry.

7. Future Scope

The State Bank of India's (SBI) potential for deploying Core Banking Solutions (CBS), especially in Gujarat, offers encouraging avenues for development and expansion. First, SBI might gain a lot from expanding CBS to increase financial inclusion in rural areas. This would enable the bank to provide vital banking services to unbanked people via easily navigable digital platforms. Technological developments will also be crucial, particularly in the areas of cyber security and data protection. As the number of digital transactions rises, SBI will need to make significant investments in strong cyber security defences and adhere to stringent regulations to protect consumer data. Furthermore, SBI has the chance to improve CBS capabilities with the use of cutting-edge technologies like block chain, AI, and machine learning. Advanced fraud detection systems, more individualised client experiences, and more efficient operations could result from these technologies, helping SBI stay flexible and competitive.

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Measuring Organizational Impact: “The Value Added Approach”

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ABSTRACT:

No business enterprise can survive if it does not add to the value, as it is not able to pay any amount to most of the parties particularly employees, shareholders, government etc. The value added statement reflects how much value being a company is created and how it is distributed among various groups connected with business organisation. The main objective of this study is to prepare the value added statement of Rashtriya Chemicals and Fertilizers Limited (RCFL) using Additive, subtractive, income distribution and net output method for finding out GVA, NVA and application of it. All required data is obtained from secondary source. The main findings are that the company seems to be balancing its growth and efficiency objectives with stakeholder rewards. The higher retained earnings in 2023 suggest a focus on long-term financial health and potential investments, which could support future expansion or operational enhancements. The trend in interest payments and dividends indicates a conservative approach to financial leverage and a stable policy towards shareholder returns. The data shows a company that is not only becoming more efficient in its operations but is also proactively managing its financial resources to support sustainable growth.

KEYWORDS: value added statement, generation, distribution, GVA, NVA, RECL, financial performance

1. INTRODUCTION

A Value Added Statement (VAS) is a financial presentation that shows how the wealth created by a company is distributed among its stakeholders. This statement is an integral part of a company's annual report, providing a snapshot of the value generated beyond the financial performance captured by traditional financial statements like the income statement, balance sheet, and cash flow statement. The VAS highlights the company's role in wealth creation and distribution, offering a broader perspective on its economic impact.

Meaning of Value:

The term "value" has a broad spectrum of meanings, depending on the context in which it is used. It can refer to the importance, worth, or usefulness of something, as well as more specific interpretations in ethics, economics, mathematics, and art.

In the context of a Value Added Statement (VAS), "value" refers to the economic value that a company generates through its operational activities. Specifically, it represents the wealth created by the organization's operations over and above the cost of the goods, services, and resources it consumes to produce its products or services. This concept is central to understanding how companies contribute to the economy and distribute the wealth they generate among various stakeholders.

Meaning of Value Added:

In the specific context of a Value Added Statement (VAS), "value added" is the extra value created over and above the original value of something. It can apply to products, services, companies, management, and other areas of business. In other words, it is an enhancement made by a company/individual to a product or service before offering it for sale to the end customer.

Value Added=Sales Revenue–Cost of Bought-in Goods and Services

Meaning of value added statement:

Value added statement is a periodic statement and gives us an idea about the value created by the enterprise. During this period and as to how such value is distributed among the various parties contribution to such value creation. Basically every organization obtains certain input factors and inputs of goods and services purchased by the business for carrying out its activity.

Rashtriya Chemicals and Fertilizers Limited (RCFL):

Rashtriya Chemicals and Fertilizers Limited (RCFL) is a leading fertilizers and chemicals manufacturing company with about 75% of its equity held by the Government of India. Company has been accorded the coveted "Navratna" status in August 2023.

It has two operating units, one at Trombay in Mumbai and the other at Thal, Raigad district, about 100 KM from Mumbai. RCF manufactures Urea, Complex Fertilizers, Bio-fertilizers, Micro-nutrients, 100 per cent water soluble fertilizers, soil conditioners and a wide range of Industrial Chemicals. The "Ujjwala (Urea) and "Suphala" (Complex fertilizer) brands of fertilizers manufactured by RCF carry high brand equity and are recognized brands all over the country. These products are taken to the farthest corner of the country by extensive RCF dealers network spread throughout the country.

Besides fertilizer products, RCF also produces a large number of industrial chemicals that are important for the manufacture of dyes, solvents, leather, pharmaceuticals and a host of other industrial products. Both the manufacturing units of RCF are accredited with ISO 9001 (Quality Management System), ISO 14001 (Environmental Management System), ISO 45001 (Occupational Health and Safety), ISO 50001: 2011 (Energy Management System) and ISO 27001 (Information Security Management). RCF has been performing well for the last several years and in one of the few PSU's which have been posting profits consistently.

2. REVIEW OF LITERATURE

(Riahi-belkaoui, 1998) Author explained the concept of Value added in four different chapter. First chapter "Wealth and Value Added Reporting" shows how to compute the value added, advantages and disadvantages of it. Chapter 2 "Value Added-Based Financial Analysis Role of Conventional Financial Statement" explains analysis of various Financial Ratios. Chapter 3 "Value Added Reporting under Price "focus on the Change Models value added reporting and accounting for inflation. In last chapter "The Effects of Accounting Knowledge on

the Omission of Value Added in Wealth Measurement and Distribution shows the role of accounting knowledge structure in the use of value added.

(Mandal & Goswami, 2008) The main objective of this study is to find out that whether Bharat Heavy Electrical Limited (BHEL) is having the ability to fulfil the expectation, trust and other parameters of society at large with the help of using value added statement. The required data is derived from secondary source for eight years from 2000 to 2007. researcher made analysis in the four parts: A) VAS analysis B) Time Series Analysis C) Regression Analysis D) Ratio analysis. Author also explained the advantages, usage, assumption and limitation of value added reporting in the study.

(Bagieńska, 2016) The article by Anna Bagieńska explores the relevance of the Value Added Statement (VAS) within the context of integrated reporting. It highlights the disparity between internal and market evaluations of enterprise value, attributed to stakeholders' varied access to information. The study identifies enterprises incorporating social responsibility into their reporting, emphasizing the significance of VAS in transparently communicating the allocation of generated value towards building financial, human, and social capital. Through comparative analysis of VAS and Global Reporting Initiative indicators, the research underscores VAS's complementary role to mandatory annual reports, offering a nuanced view of an enterprise's economic contribution to stakeholders.

(Hossain, 2017) This theoretical research paper purpose to examine the limitations of traditional accounting system and to develop and apply an alternative accounting framework called the Expanded Value Added Statement (EVAS). It is also explained the conceptual issues in VAS preparation specially for depreciation and indirect tax. VAS offers a detailed view of wealth distribution among all stakeholders, fostering a sense of communal benefit and societal contribution. This perspective not only aids in gaining social approval but also in strategic financial planning, including retention and dividend policies. Furthermore, VAS analysis can guide future projections regarding stakeholder benefits and company profit targets, underscoring its importance in sustainable business growth and stakeholder engagement.

(Sahoo, 2018) With the object of understanding the usefulness of value added statement as a supplementary financial statement, to compute gross value added and net value added, to compute value added ratios and analyse them; Researcher has used ratio analysis from secondary data. The study suggests that changing traditional profit and loss statements to Value Added Statements (VAS) could provide a clearer picture of a company's contribution to the economy. This approach would benefit everyone from accountants to investors by showing how value is created and shared. The research, which analysed Steel Authority of India Ltd. over six years, calls for more exploration into how different types of companies generate and distribute value. It also encourages experts to develop standards for VAS to make it more useful and widely adopted.

(Polisetty et al., 2018) Study on Value Added Statements (VAS) in Volkswagen highlights various perspectives on the utility and implications of VAS in corporate reporting. It discusses the evolution of VAS, its importance in providing a more comprehensive view of a company's value creation for stakeholders, and the need for standardization in VAS reporting. The review incorporates findings from multiple studies, emphasizing VAS's role in enhancing transparency,

stakeholder engagement, and the overall understanding of a company's economic contribution beyond traditional financial metrics.

(Naganandini et al., 2020) This paper explores the objectives of incorporating Value Added Statements (VAS) into corporate social reports, aiming to determine an optimal format that fulfils these objectives. Through analyzing Madras Cement Limited's annual financial statements, the study establishes the firm's value distribution. It further identifies and calculates value added ratios, employing basic correlation analysis to examine relationships between variables. Highlighting the necessity of reporting these ratios for enhancing VAS informational value, the study advocates for their use in crafting diagnostic and predictive comparisons of corporate performance, thereby benefiting users and stakeholders.

3. STATEMENT OF PROBLEM

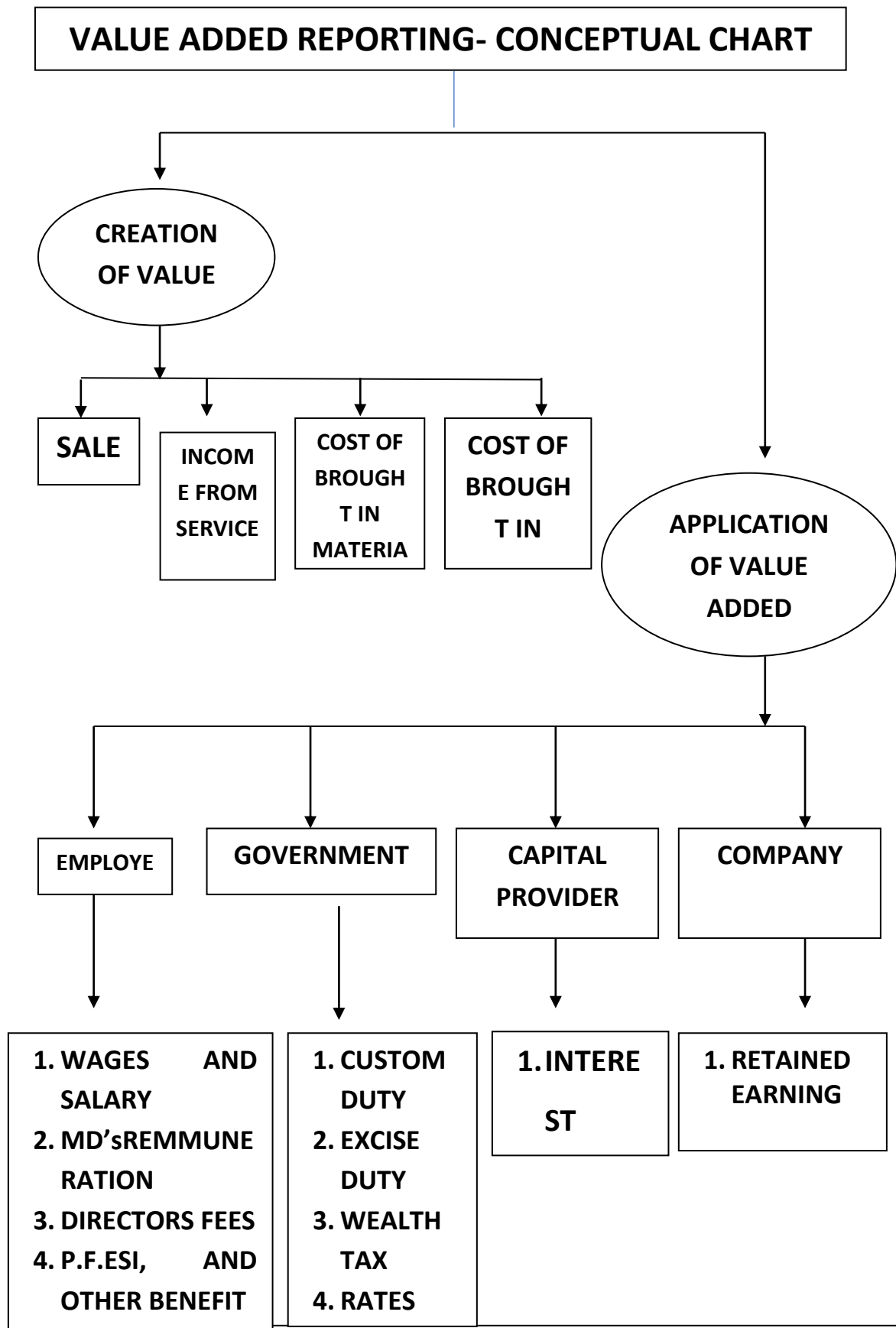
Profit and loss account shows the expenses of incomes of operations of the business and the final result of its operations. It shows the results from the viewpoint of owners only. VAS is prepared from the same figures, but it shows the contribution made by various parties to added value and net amount after deducting from net sales value, the materials and other services purchased from outside. VAS shows the contribution of various parties to the business namely, the employees, providers employees, providers of capital, owners of capital, owners of business, government etc. Profit and Loss account does not show the individual contribution of these parties. It only shows the profit or loss of owners and taxes paid to the government. So here an attempt is made to prepare value added statement of RCFL which will be useful to the above concerned parties.

4. OBJECTIVES

- To understand the concept of value added statement.
- To understand the method of preparing value added statement.
- To compute gross value added and net value added of ECFL.
- To prepare value added statement of RCFL.

5. RESEARCH METHODOLOGY

5.1 The Value added statement conceptual framework:



5.2 Sample size:

Researcher has selected the Rashtriya Chemicals and Fertilizers Limited (RCFL) from total Navratna companies in India.

5.3 Data source

The study is analytical in nature and completely based on secondary data. All required data are collected from various survey of literature in articles, journals, books, and government reports. All financial data is acquired from Money control Website and annual reports of Rashtriya Chemicals and Fertilizers Limited (RCFL).

5.4 Period of the Study

This study covers five years from the financial year 2018-19 to 2022-23.

5.5 Value Added Statement computation:

There are main two stage for preparing Value added statement:

1. Generation of Value Added:

The value added is an excess of turnover + income from services over the cost of brought in material and cost of the services. Here turnover indicates (Gross sales + sales Tax and duties - (rebate + returns - (-commission + discount + Goods used for self-consumption)). Income from services includes incomes in the form of dividend, rent, commission and other income. The word cost of brought in material includes purchases of material and consumed during the year, adjustment of WIP and finished goods. The term cost of services represents the cost of services paid to the external parties for using the facilities given by them.

Here, -VA means Value addition, $VA = S + I - C$, S means sales, I means Income from Services and, C Cost of brought in material and services.

Value Added may be classified into two categories:

A. Gross Value Added (GVA):

It refers to sales plus income from other services less bought in materials and services purchased from outsiders; and

B. Net Value Added (NVA):

It refers to the difference between GVA and Depreciation. In other words, NVA is the sum of the value added to employees, to providers of loan capital, to Government and to owners.

Bernard Cox suggested the following two methods for computing Gross Value Added (GVA):

i. **Additive method:**

Under this method gross value added is computed by using the following equation: $GVA = PBT + EC + D + I \dots\dots\dots (1)$

Where, PBT= Profit before Taxes, D = Depreciation

EC = Employee Cost and I = Interest.

ii. **Subtracting method:**

Under this method Gross Value Added is calculated by using the following equation:

$GVA = S + IS - CBGS \dots\dots\dots (2)$

Where, S = Sales IS = Income from Services

CBGS = Cost of Bought-in-goods and services

Studneski Paul suggested following two methods for calculating Net Value Added:

a. **Income Distribution Method:**

In this method Net Value Added (NVA) is determined by the following equation: $NVA = VAW + VAG + VAF + VAE \dots\dots\dots (3)$

Where, VAW = Value added to workers/employees,

VAG = Value added to Government,

VAF = Value Added to Financer,

VAE = Value Added to Entity.

b. **Net output method:**

Under this Net Value Added is determined by the following equation

$NVA = GVA - D = (S + IS) - CBGS - D \dots\dots\dots (4)$

Where, S= Sales,

IS = Income from other services,

CBGS = Cost of bought-in-goods and services and

D = Depreciation.

Accounting Standard Steering Committee (ASSC) suggests a formula for computing Value Added (VA), which is as follows:

$$VA = a - b = c + d + e + f \dots\dots\dots (5)$$

Where, VA= Value Added,

a = Turnover,

b = Bought-in-materials and Services,

c = employees' wages and other benefits,

d = Dividend and Interest payable,

e = Tax payable and f = Retained profit.

2. Application of Value Added:

The amount of value added is mainly distributed among four major contributors like employees, government ,provider of capital and the owner, if any excess remaining after the distribution, this will reinvested business for future development.

i. Distribution of value added to employee:-

The items like wages and salaries, Managing Director's Remuneration, Directors sitting fees, contribution to provident Fund, Staff welfare Expenses, etc. are included.

ii. Distribution of value Added to Government:-

The taxes and duties like customs duty, excise duty, sales tax, income tax, wealth tax, rates and taxes, etc. are included here.

iii. Distribution of Value Added to Providers of Capitals:-

This includes interest on bank loan, interest on term loans, interest on debentures, dividends, etc.

iv. Distribution of Value Added to Shareholders:-

All payments made to Shareholders such as interim dividend,final dividend, bonus share are included under this heading.

v. Distribution of Value Added to owners/company:-

The balance of value added, if any should be shown separately under the heading of Retained Earning or ploughed back of profit.

6. DATA ANALYSIS AND INTERPRETATION

The value added statement of SAIL has been analyzed in two parts viz. Generation of Value Added and application of Value Added.

6.1 THE GENERATION OF VALUE ADDED:

Table-1 The value added generated by the RCFL (In Cr.)					
Year	2023	2022	2021	2020	2019
Particulars	Rs.	Rs.	Rs.	Rs.	Rs.
Generation of value added:					
Sales Revenue	21451.54	12812.17	8281.18	9697.95	8885.47
Other income	143.3	136.45	132.65	129.17	79.67
Total SR (A)	<u>21594.84</u>	<u>12948.62</u>	<u>8413.83</u>	<u>9827.12</u>	<u>8965.14</u>
Less: Bought in materials and Services: Materials used (stores)					
Cost Of Materials Consumed	8839.6	5469.83	3022.67	3776.22	3880.01
Purchase Of Stock-In Trade	3047.43	1742.21	749.21	294.43	798.15
Operating And Direct Expenses	0	0	0	0	0
Changes In Inventories Of FG,WIP And Stock-In Trade	252.96	-859.69	-30.73	603.25	-605.27
Other Expenses	7145.99	4816.77	3243.19	3824	3777.49
Total CBMS (B)	<u>19285.98</u>	<u>11169.12</u>	<u>6984.34</u>	<u>8497.9</u>	<u>7850.38</u>
Gross Value Added (A-B)	2308.86	1779.5	1429.49	1329.22	1114.76
Less: Depreciation charged	212.12	183.55	174.63	171.04	155.69
Net Value Added	2096.74	1595.95	1254.86	1158.18	959.07

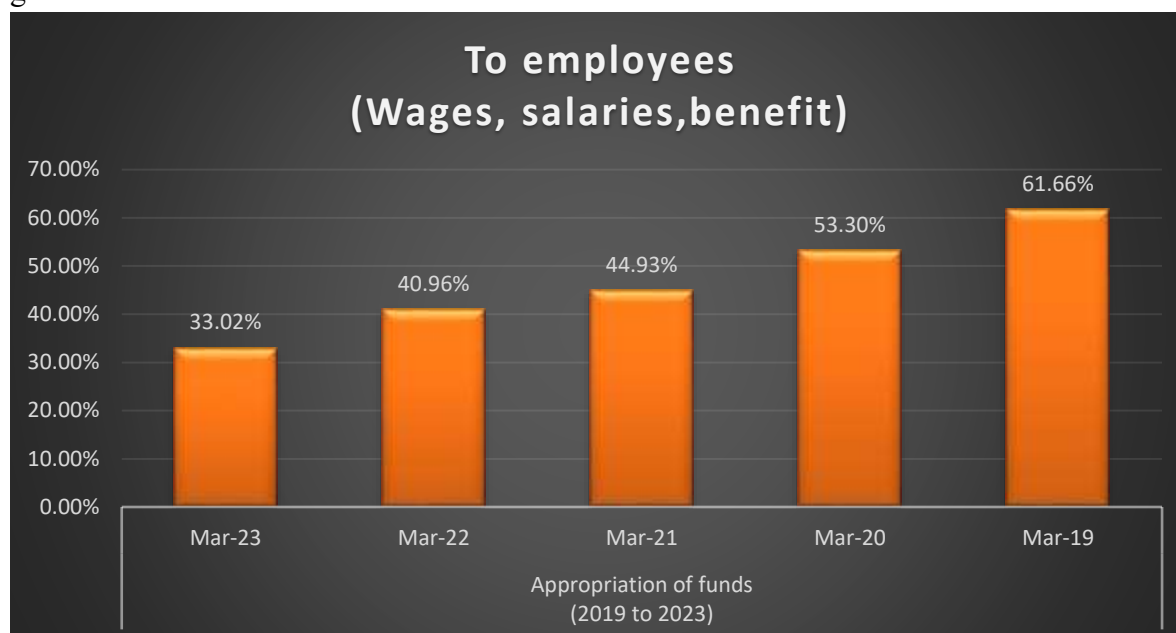
Analyzing the value added by RCFL from 2019 to 2023, there is a notable upward trajectory in sales revenue, indicating substantial growth in the company's primary business activities. The cost of materials and purchases has risen as well, but at a slower rate than sales, suggesting improved efficiency and profitability. Other expenses have also increased, which may reflect expansion costs or inflationary pressures. Despite this, the company has consistently enhanced its gross value added, nearly doubling the net value added over the five-year span, even after accounting for the growing depreciation expenses. This points to RCFL's increasing capability to generate economic benefits and value for its stakeholders, reflecting a positive business performance and possibly an expanding operational scale.

6.2 APPLICATION OF VALUE ADDED:

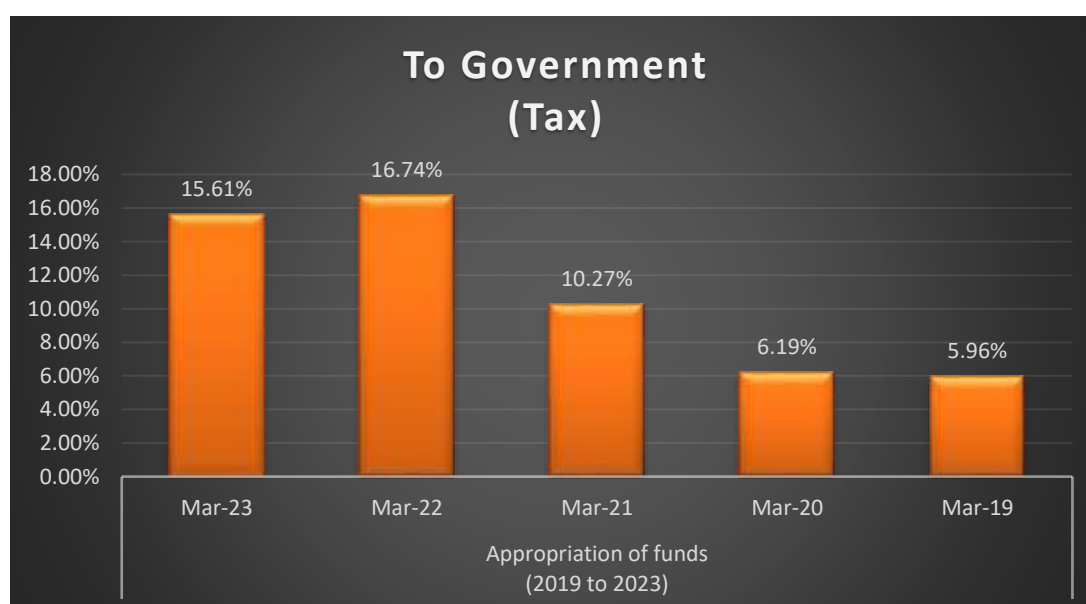
Appropriation of funds (2019 to 2023) (In Cr.)										
Year	2023		2022		2021		2020		2019	
Distribution of Net Value Added:	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%
To employees (Wages, salaries,benefit)	692.37	33.02	653.78	40.96	563.83	44.93	617.26	53.30	591.41	61.66
To Government (Tax)	327.33	15.61	267.11	16.74	128.88	10.27	71.72	6.19	57.12	5.96
To Provider of Capital (Interest)	223.86	10.68	125.89	7.89	179.57	14.31	237.82	20.53	155.85	16.25
To shareholders (Dividend)	226.19	10.79	172.68	10.82	222.88	17.76	51.21	4.42	39.91	4.16
To owners /Company (Retained earnings)	626.99	29.90	376.49	23.59	159.70	12.73	180.17	15.56	114.78	11.97
Total	2096.74	100.00	1595.95	100.00	1254.86	100.00	1158.18	100.00	959.07	100.00

The appropriation of funds at RCFL from 2019 to 2023 shows a dynamic allocation of net value added across various stakeholders. The distribution indicates a decreasing trend in the percentage of net value added to employees, dropping from 61.66% in 2019 to 33.02% in 2023, possibly due to automation or operational efficiency improvements. The tax contributions to the government have increased in absolute terms, reflecting the company's growing profitability, but they fluctuate as a percentage of net value added, perhaps due to changing tax obligations or profit margins. Interest to providers of capital peaked in 2020, which could suggest a higher debt load or increased financing costs during that year. Dividends to shareholders have seen an increase, signifying a potentially higher return to investors. Notably, retained earnings, which

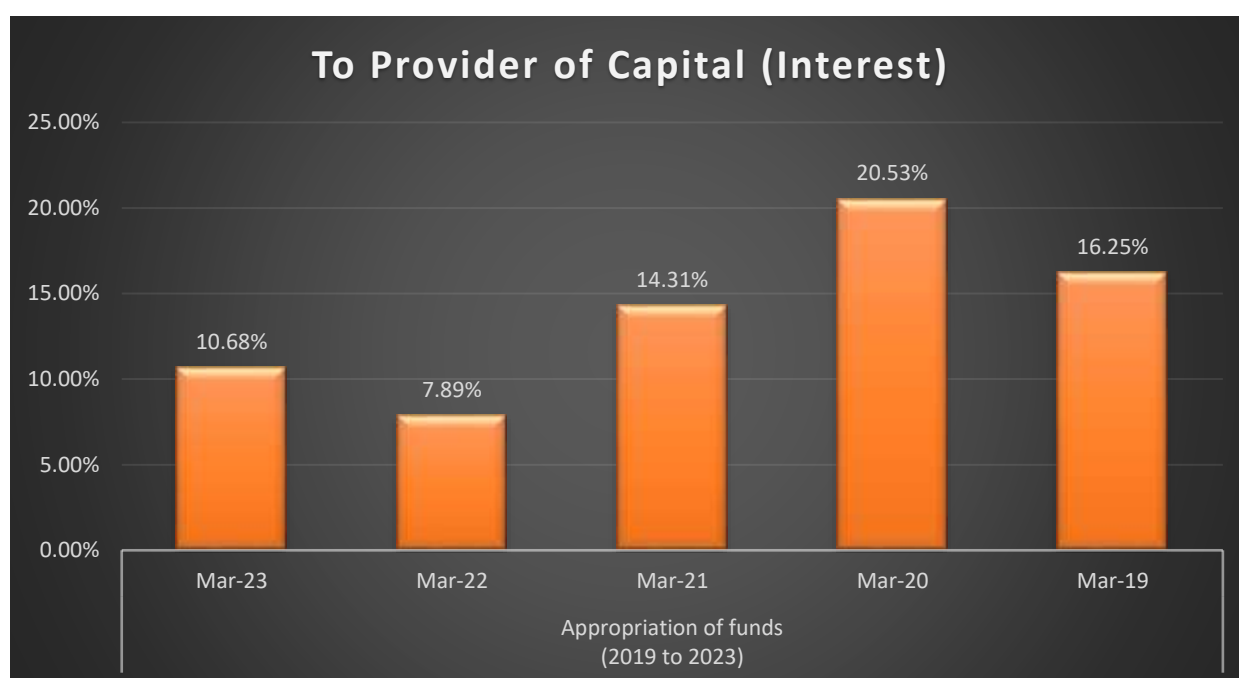
indicate reinvestment back into the company, show an upward trend, especially in 2023, illustrating a strategic focus on future growth and company development. Overall, the company appears to be balancing the interests of stakeholders while positioning itself for continued growth.



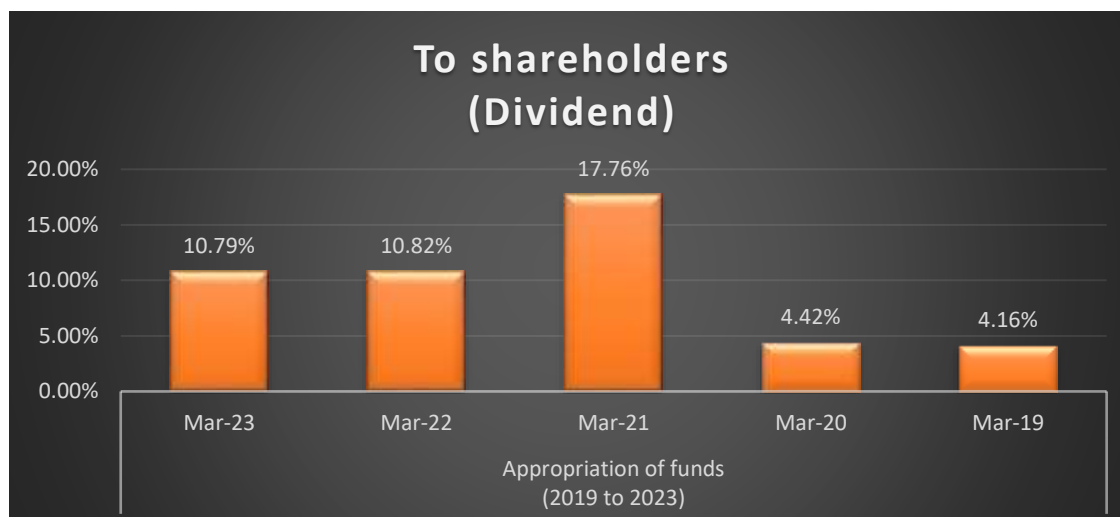
The bar chart provided illustrates the appropriation of funds to employees in terms of wages, salaries, and benefits from 2019 to 2023 at RCFL. It shows a clear trend where the percentage of net value added allocated to employees has decreased over the five years. In March 2019, a substantial 61.66% of net value added was directed towards employees, indicating a labor-intensive cost structure or a strong emphasis on employee compensation. This percentage has steadily declined each year, reaching 33.02% by March 2023.



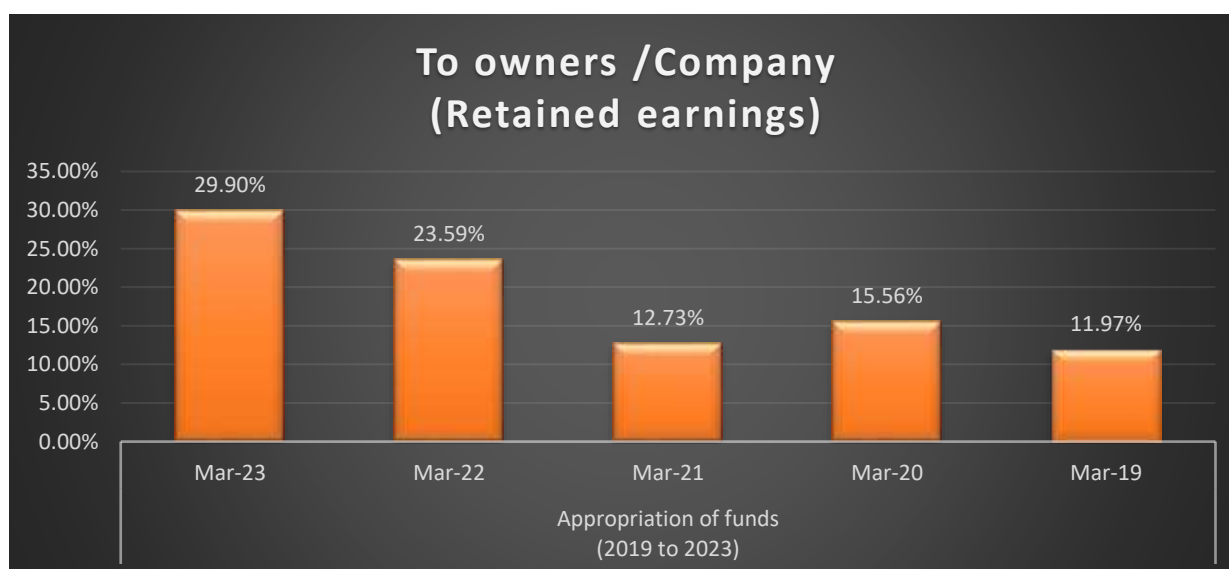
This fluctuation in tax percentages could reflect a combination of factors, including variations in corporate tax rates, changes in the company's profitability, or alterations in tax legislation. The overall increase from 2019 to 2023 could be due to the company's growing profitability, resulting in higher absolute tax payments even if the company's effective tax rate remained unchanged. The data indicates that while RCFL's tax commitments have varied, there's a general upward trend in the portion of value appropriated to the government, which may correlate with an increase in the company's overall financial performance.



In March 2019, 16.25% of RCFL's profits were used to pay interest, which was a significant portion. This dropped to 20.53% in March 2020, indicating the company was paying more interest that year, which could mean they had more debt. By March 2021, this figure decreased to 14.31%, suggesting a possible reduction in debt or lower interest rates. In March 2022, the percentage of profits going to interest payments dipped further to 7.89%, continuing this trend. However, in March 2023, the figure rose again to 10.68%, indicating an increase in interest payments relative to the company's profits, which could be due to new loans or rising interest rates. In March 2019, 16.25% of RCFL's profits were used to pay interest, which was a significant portion. This dropped to 20.53% in March 2020, indicating the company was paying more interest that year, which could mean they had more debt. By March 2021, this figure decreased to 14.31%, suggesting a possible reduction in debt or lower interest rates. In March 2022, the percentage of profits going to interest payments dipped further to 7.89%, continuing this trend. However, in March 2023, the figure rose again to 10.68%, indicating an increase in interest payments relative to the company's profits, which could be due to new loans or rising interest rates.



The provided bar chart illustrates the percentage of RCFL's net value added that was distributed to shareholders as dividends from 2019 to 2023. In March 2019, a modest 4.16% of the company's net value added was given out as dividends. This figure saw a slight increase in March 2020 to 4.42%. There was a significant jump in March 2021, where 17.76% of the net value added was allocated for dividends, indicating a possible substantial profit increase or a change in the company's dividend policy to distribute more profits to shareholders. However, in the following years, the dividend percentages settled to 10.82% in March 2022 and 10.79% in March 2023, suggesting a normalization of dividend policy or adjustments in line with the company's performance and strategy for reinvestment.



In March 2019, 11.97% of net value added was kept as retained earnings, which then increased to 15.56% in March 2020, indicating a decision to retain more profit within the company possibly for internal investment or other financial strategies. The year March 2021 saw a decrease to 12.73%, which might reflect a change in strategy or different financial requirements. In March 2022, the retained earnings rose significantly to 23.59%, suggesting further internal

reinvestment or preparation for future plans. Finally, in March 2023, a substantial 29.90% of net value added was retained, the highest in the five-year period, indicating strong future-oriented initiatives such as expansion, research and development, or strengthening the company's financial position.

Conclusion:

This paper begins with the concept of value added and analysed how it is different from the concept of profit. It collected the financials statements of Rashtriya Chemicals and Fertilizers Limited (RCFL), for five years and restated them into value added statements. The findings of the study would help to improve the current accounting practice by restating profit and loss account into value added statement. From value added statement the gross or net value added information would help to understand how the company has generated value added and how it has distributed to different stakeholders. Investors would know the contribution of the company in terms of value addition. As value added is different from profit figure, it would help various parties to the business namely, the employees, providers employees, providers of capital, owners of capital, owners of business, government etc. to use value added information to make decisions. Further research in this area is needed to understand value added by public sector undertakings and private sector undertakings.

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Education : Inclusive And Innovative Method

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Abstract:

Education is a foundational process for individual and societal development, encompassing the acquisition of knowledge, skills, values, and attitudes through various formal, informal, and non-formal means. It serves as a key driver of personal growth, economic progress, and social transformation. Modern education emphasizes not only cognitive learning but also emotional, social, and ethical development, aiming to create well-rounded individuals prepared for the complexities of the 21st century.

Innovative and inclusive educational practices, such as Universal Design for Learning (UDL), experiential learning, and the integration of technology, play a crucial role in addressing diverse needs. Contemporary approaches, including project-based learning, blended learning, and culturally responsive teaching, foster critical thinking, creativity, and adaptability.

Education's ultimate purpose is to empower individuals to reach their full potential, contribute positively to their communities, and adapt to a rapidly changing global landscape. It remains an evolving field, constantly reshaped by cultural shifts, technological advancements, and societal demands.

Key Words :

Education, Inclusive and Innovative Method

Inclusive and Innovative Education Methods

Inclusive and innovative education methods aim to create learning environments where all students, regardless of their backgrounds or abilities, can thrive. These methods focus on accessibility, engagement, and adaptability to meet diverse learning needs while leveraging modern technology and approaches.

Inclusive Education Methods

1. Universal Design for Learning (UDL):

- Provides multiple means of representation, expression, and engagement.

- Ensures materials and assessments are accessible to all learners, including those with disabilities.

2. Differentiated Instruction:

- Tailors teaching strategies to students' varying readiness levels, interests, and learning styles.
- Adapts content, process, and products to maximize individual success.

3. Culturally Responsive Teaching:

- Recognizes and incorporates students' cultural backgrounds into teaching practices.
- Promotes a more inclusive and respectful classroom environment.

4. Assistive Technology:

- Tools like screen readers, speech-to-text software, and braille devices help students with disabilities participate fully.
- Educational apps support different learning styles.

5. Flexible Grouping:

- Dynamic groupings based on students' skills, learning pace, or interests.
- Encourages peer learning and collaboration.

6. Inclusive Curriculum Design:

- Incorporates diverse perspectives and content that reflect all students' experiences.
- Prevents marginalization and promotes equity.

Innovative Education Methods

1. Project-Based Learning (PBL):

- Students tackle real-world problems, promoting critical thinking, collaboration, and creativity.
- Fosters deeper learning and engagement.

2. Flipped Classroom:

- Students learn content at home through videos or readings.
- Classroom time focuses on interactive activities, discussions, and problem-solving.

3. Blended Learning:

- Combines online learning with traditional face-to-face instruction.
- Allows personalized pacing and flexible learning paths.

4. Gamification:

- Integrates game elements (points, rewards, and challenges) into learning to motivate students.
- Enhances engagement and retention.

5. STEAM Education (Science, Technology, Engineering, Arts, Mathematics):

- Encourages interdisciplinary learning and creativity.
- Prepares students for future technology-driven careers.

6. Experiential Learning:

- Emphasizes hands-on, real-world experiences through internships, fieldwork, and simulations.
- Connects theoretical knowledge with practical application.

7. AI and Adaptive Learning Systems:

- Uses artificial intelligence to personalize content based on students' progress.
- Provides real-time feedback and tailored learning experiences.

Benefits of Inclusive and Innovative Methods

- Equity: Reduces achievement gaps and provides equal opportunities for all learners.
- Engagement: Makes learning relevant and exciting, increasing student motivation.
- Skill Development: Fosters critical thinking, problem-solving, collaboration, and adaptability.
- Future Preparedness: Equips students with the skills needed in a rapidly evolving global economy.

Reference :

"The Differentiated Classroom: Responding to the Needs of All Learners" Author: Carol Ann Tomlinson

"Universal Design for Learning: Theory and Practice" Authors: Anne Meyer, David H. Rose, David Gordon

"Pedagogy of the Oppressed" Author: Paulo Freire

"Culturally Responsive Teaching and The Brain" Author: Zaretta Hammond

"The Flipped Classroom: Practice and Practices" Author: Jonathan Bergmann and Aaron Sams

"Project-Based Learning: Real Questions, Real Answers" Author: Thom Markham

"Gamify Your Classroom: A Field Guide to Game-Based Learning" Author:
Matthew Farber

"Innovate Inside the Box" Authors: George Couros, Katie Novak

A Path to Better Education: What India Can Learn from Finland's Educational System

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Abstract

In order to enhance its own educational framework, this study investigates the possible lessons that Finland's well-known educational system might teach India. The study contrasts India's National Education Policy (NEP) 2020 with Finland's education model, which emphasizes inclusion, teacher development, flexible curriculum, and application-oriented learning. Important topics including decreasing rote learning, integrating vocational training, and holistic child development are evaluated for their applicability to India's educational problems. The results point to workable solutions, such as income-based fee structures, improving teacher preparation, fortifying government-run schools, and moving toward an education system that is more adaptable and application-driven. India can create an education system that is more student-centered, efficient, and equal by using these Finnish-inspired tactics.

Keywords:

Better Education, India, Finland's Educational System

Introduction

The foundation of societal growth is the educational system. Finland's educational system (FES) has won praise from all around the world for establishing the benchmark for diversity, adaptability, and all-around growth. However, in India, which has one of the largest student populations, issues include rote learning, uneven access, and poor infrastructure. India's attempt to change its educational system is reflected in the National Education Policy (NEP) 2020. This essay looks at what Finland can teach India to improve its educational system and meet its objectives of innovation and inclusivity.

Research Objectives To analyze key features of Finland's education system.

1. To assess the alignment of NEP 2020 with Finland's model.

Discussion:

1. Flexibility in Education and Fees

Finland's egalitarian approach to early education is one of its most remarkable educational traits. Because the tuition is set by family income, all students, regardless of socioeconomic background, will have equal access to a top-notch education. This strategy creates an environment where all children have an equal opportunity to learn basic skills, regardless of their socioeconomic situation.

Many Indians are still unable to pay for their education because of financial constraints. Families are increasingly selecting expensive private schools despite the fact that government schools are free since they usually lack facilities, qualified teachers, and credibility. India can adopt a paradigm where family income determines tuition costs for both public and private schools. When paired with strict government oversight, this approach can increase enrollment, reduce disparities in educational quality, and improve transparency.

Furthermore, without the stigma attached to non-university education, Finland gives students the freedom to select their academic pathways, including professional training. A comparable system may be put in place in India to support a more adaptable and inclusive educational paradigm that accommodates a range of interests and viewpoints. Additionally, this will help close the skills gap in India and better prepare students for the workforce.

2. Increasing Credibility of Government-Run Schools

Finland has minimal to no reliance on private schools, with the government funding more than 97% of schools. These educational institutions uphold high standards for instruction, facilities, and student performance. However, public schools in India are frequently underfunded and beset by problems including low teacher attendance, a lack of basic amenities, and antiquated teaching strategies.

The public's lack of faith in government-run institutions is demonstrated by India's growing preference for private schools. India has to give the following top priority in order to solve this:

Infrastructure Development: Give public schools secure, hygienic, and fully furnished instructional spaces.

Teacher Training: Provide instructors in government schools with comprehensive,

ongoing professional development programs. Modernize the curriculum by implementing engaging, contextually appropriate courses that emphasize real-world knowledge and abilities.

Community Involvement: Encourage collaborations between parents, local communities, and schools to increase accountability and guarantee that educational institutions are meeting the requirements of their children.

In addition to raising educational standards, these reforms would persuade parents that public schools are a good alternative, relieving families of financial burdens and decreasing their need on private schools.

3. Strengthening the Role of Teachers

The foundation of Finland's educational system is its teachers. They are well-respected, have extensive training, and are crucial to the creation of curricula and the application of policies. Only the top 10% of graduates are chosen for teaching positions in Finland, where master's degrees in education are required. This guarantees that the most gifted and driven people are drawn to the teaching profession.

However, teaching is frequently viewed as a backup career in India. There are few possibilities for professional growth, and many instructors lack proper training. In order to follow Finland's lead, India ought to:

Raise Entry Standards: Aspiring teachers should be subject to more demanding coursework and higher certifications.

Boost the autonomy of teachers: To empower educators and make sure they feel appreciated, include them in curriculum creation and decision-making processes.

Raise Benefits and Salaries: In order to draw and keep top-notch teachers, provide competitive compensation and benefits.

Emphasis on Hands-on Training: Train teachers in experiential and application-based teaching methods to move away from rote learning.

By investing in teacher training and welfare, India can significantly improve the quality of education and student outcomes.

4. Moving Away from Rote Learning to Application-Based Learning

Exam-centric teaching methods and rote memorization have long been faulted in Indian education. Instead of applying knowledge to real-world scenarios, students are frequently assessed on their ability to replicate material from textbooks. Creativity,

critical thinking, and problem-solving abilities are suppressed by this system.

Finland's educational system emphasizes application-based and interdisciplinary learning, which is a distinct approach. Students are urged to apply their knowledge to real-world situations and make connections between ideas from different areas. Less emphasis is placed on standardized testing and more on encouraging inquiry and teamwork in the classroom.

India can benefit by:

Redefining Success Metrics: Put more emphasis on abilities like creativity, communication, and critical thinking rather than test results.

Presenting Multidisciplinary Initiatives: Through practical projects, encourage students to investigate the relationships between the humanities, arts, and sciences. Streamline curricula to enable deeper comprehension of fewer topics rather than cursory knowledge of many in order to reduce the load on the syllabus.

Encouraging Collaborative Learning: Create lessons that prioritize peer learning, problem-solving, and cooperation.

In addition to making learning more interesting, these adjustments will get pupils ready for difficult problems in the real world.

5. Altering the Mandatory Education Phase

In Finland, formal schooling begins at the age of seven, providing children adequate opportunity to develop emotional and cognitive abilities via play-based learning. Early childhood education builds a solid foundation for formal education by emphasizing creativity, curiosity, and fundamental abilities.

Formal schooling starts early in India, usually when a child is three or four years old. Children are under pressure to reach strict academic requirements from an early age, which can result in stress and exhaustion. Adopting Finland's approach can help:

Encourage learning through play: In early childhood education, place special emphasis on activities that foster social skills, curiosity, and problem-solving abilities.

Delay Formal Education: To promote overall development, start organized academics a little later in life.

Boost Early Childhood Education Facilities: Make an investment in top-notch pre-primary education with qualified teachers and interesting courses.

India can provide children the emotional and cognitive skills they need to succeed in

formal school by emphasizing early development.

6. Integrating Vocational Education

Vocational training and academic education are equally valued in Finland. In order to acquire practical skills for certain jobs, students are able to select career routes according to their preferences. This adaptability guarantees that students are prepared for the workforce and meet business demands.

Vocational training is frequently stigmatized in India's educational system since it is seen as a less desirable option than traditional academic pathways. This causes a disconnect between employment and education.

India may do the following to solve this:

Increase Vocational Training Programs: In partnership with industry, implement skill- based courses at the secondary level.

Raise Awareness: Using success stories and awareness campaigns, alter how society views vocational education.

Integrate Academic and Vocational Pathways: Give students the option to alternate between academic and vocational courses to promote flexibility and opportunity for lifetime learning.

Reducing unemployment and developing a workforce capable of meeting the needs of a fast evolving economy are two benefits of such changes.

By adopting Finnish principles, India's educational system might undergo a transformation. Although the NEP 2020 establishes the framework for reform, a more inclusive, application- focused, and future-ready educational system may result from the effective application of Finnish-inspired tactics, such as fair fee structures, strong teacher preparation, adaptable curricula, and vocational integration. India may get closer to its objective of offering high- quality education to everyone by accepting these adjustments.

Results

Structural compatibility: The emphasis on flexible curricula, rote culture reduction, and holistic development in NEP 2020 demonstrates compatibility with Finnish values.

Problems Found: In India, inadequate infrastructure, poor teacher-to-student ratios, and restricted teacher autonomy continue to be obstacles to successful implementation.

Possibilities: India can improve student performance and employability by adopting

Finland's methods for teacher training, curricular flexibility, and vocational education.

Findings

1. India's focus on exams and syllabus completion undermines critical thinking and creativity.
2. Finnish principles of equity, flexibility, and application-based learning are replicable within India's socio-economic framework.
3. Strengthening government schools and integrating vocational training at secondary levels can bridge the skill gap.
4. Early education reforms focusing on creativity and emotional intelligence are critical to long-term educational success.

Conclusion

Although India's NEP 2020 is a start in the right direction, it needs closer adherence to internationally effective models like Finland's. Indian education might be revolutionized by the Finnish system's emphasis on equity, teacher autonomy, and application-based learning. By implementing income-based fee structures, bolstering government-run schools, and embracing a comprehensive, application-focused strategy, India can equip its young people with the creativity and skills they will need in the future.

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Atmnirbhar Bharat (Self Reliance India) in context of NEP-2020

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Abstract:

The National Education Policy -NEP 2020 is a transformative framework aimed at overhauling the Indian educational system. One of its key objectives is to promote self-reliance, aligning with India's broader vision of Atmanirbhar Bharat (self-reliant India). Self-reliance means working based on your abilities and your efforts. This quality does not require a person to support others. Self-reliance requires original willpower and hard work. The text of self-reliance is not taught in a school, nor does it come from a sermon. The necessities of life gradually develop a sense of self-reliance.

Here's how NEP 2020 contributes to Atmnirbhar Bharat - goal:

1. Skill Development and Vocational Education.
2. Focus on Holistic Education
3. Promotion of Local Language and Culture
4. Flexible Learning Pathways
5. Strengthening Higher Education
6. Community and Stakeholder Involvement

Developing a research methodology for a Study on the National Education Policy (NEP) 2020 involves Content Analysis by Qualitative design - Review policy documents, reports, and academic literature related to NEP 2020 to contextualize findings to ensure comprehensive and systematic study. Objectives of the study was –

1. To analyze the impact of NEP 2020 on Educational outcomes regarding Atmnirbhar Bharat.
2. To evaluate the implementation challenges of NEP 2020'

NEP 2020 serves as a foundational step towards achieving self-reliance in India by equipping individuals with the necessary skills, knowledge, and entrepreneurial spirit. By focusing on holistic education, vocational training, and community engagement, the policy aims to create a robust workforce capable of contributing to a self-reliant economy. The successful implementation of these initiatives will be crucial in realizing the vision of Atmanirbhar

Key Words:

NEP-2020, Atmnirbhar Bharat-Self Reliance India, Skill Development

Introduction:

Before discussing self-reliance or self-reliance, it seems necessary to know about dependency. *Tulsidas* wrote about dependence that-

“पराधीन सपनेहुँ सुख नाहिं । कर विचार देखहुँ मन माहिं ॥”

“पराधीन सपनेहुँ सुख नाहिं ।

The proverb shows that a dependent person does not find happiness even in dreams, on the other hand, it also means that independence i.e. self-reliance is indispensable for attaining any kind of happiness. *Hitopadesh* also says that, "If the subordinate is called alive, then dead is he?" ("If this subject is called alive, who dies?") is also a translation of a popular saying in English: "It is better to rule freely in hell than to be a slave in heaven."

Self reliance means working based on your abilities and your efforts. This quality does not require a person to support others. Self-reliance requires original willpower and hard work. The text of self-reliance is not taught in a school, nor does it come from a sermon. The necessities of life gradually develop a sense of self-reliance. Self-reliance makes a man realistic and optimistic. He succeeds in every effort. By learning from their failures, they find new ways to succeed. A self-sufficient person tries to stay on earth and fly in the sky. Self-reliance means believing in yourself. Sitting in the name of luck does not develop capacity or self. It is well known in Sanskrit that,

'उद्यमेन हि सिद्ध्यन्ति कार्याणि न मनोरथैः। नहि सुप्तस्य सिंहस्य मुखे प्रविशन्ति मृगाः॥'

That menas, all works are accomplished not by the desires of the mind, but by the desires of the mind, because the deer (prey) in the mouth of a sleeping lion does not go by itself, i.e. it has to work hard to get the prey. Even a lion does not get its prey without hard work. All the great men of the world were self-reliant and became a source of inspiration to others. This dependence is not only political, but also psycho-intellectual and economic.

Methodology:

Developing a research methodology for a Study on the National Education Policy (NEP) 2020 involves Content Analysis by Qualitative design - Review policy documents, reports, and academic literature related to NEP 2020 to contextualize findings to ensure comprehensive and systematic study.

Objectives:

- To analyze the impact of NEP 2020 on Educational outcomes regarding Atmanirbhar Bharat.
- To evaluate the implementation challenges of NEP 2020.

Discussion:

Self Reliance and NEP-2020: The National Education Policy -NEP 2020 is a transformative framework aimed at overhauling the Indian educational system. One of its key objectives is to promote self-reliance, aligning with India's broader vision of Atmanirbhar Bharat (self-reliant India). Here's how NEP 2020 contributes to this goal:

1. Skill Development and Vocational Education.

- **Integration of Vocational Training:** NEP 2020 emphasizes the integration of vocational education into mainstream education from Grade 6 onwards. This approach aims to equip students with practical skills that enhance employability and foster entrepreneurship.
- **National Skills Qualifications Framework (NSQF):** The policy promotes the NSQF to ensure that skill development programs are standardized and recognized, allowing students to gain relevant skills that meet industry demands

2. Focus on Holistic Education.

- **Multidisciplinary Approach:** NEP 2020 encourages a multidisciplinary curriculum that allows students to explore various fields, fostering critical thinking and creativity. This holistic education prepares individuals to adapt to changing job markets and innovate in their chosen fields.
- **Experiential Learning:** The policy advocates for experiential learning methods, such as internships and project-based learning, which empower students to apply theoretical knowledge in real-world scenarios, contributing to self-reliance.

3. Promotion of Local Language and Culture

- **Cultural Awareness:** By promoting local languages and cultures in education, NEP 2020 helps students develop a strong sense of identity and pride in their heritage. This cultural grounding can lead to community-driven initiatives and local entrepreneurship.
- **Regional Content:** The inclusion of regional content in curricula can inspire students to engage with their local economies, fostering innovation and self-reliance among communities.

4. Flexible Learning Pathways.

- **Multiple Entry and Exit Points:** NEP 2020 introduces flexible learning pathways, allowing students to enter and exit educational programs at various stages. This flexibility enables individuals to pursue education while balancing work or entrepreneurial activities, enhancing their self-reliance.
- **Open and Distance Learning:** The policy encourages the use of technology in education, promoting online and distance learning options that make education accessible to a wider audience, including those who may wish to work while studying.

5. Strengthening Higher Education

- **Research and Innovation:** NEP 2020 aims to boost research and innovation in higher education institutions by encouraging collaboration with industries and promoting startup ecosystems. This focus on research can lead to new solutions and technologies, fostering self-reliance in various sectors.
- **Autonomy for Institutions:** By granting greater autonomy to higher education institutions, the policy encourages them to tailor programs according to local and national needs, thereby contributing to a self-reliant workforce.

6. Community and Stakeholder Involvement

- **Engagement with Local Communities:** NEP 2020 emphasizes the need for educational institutions to engage with local communities and industries, creating a symbiotic relationship that supports local economic development and self-reliance.
- **Public-Private Partnerships:** The policy encourages partnerships between public and private sectors to enhance educational outcomes and promote entrepreneurial initiatives.

Conclusion:

Self-reliance lies at the very foundation of self-Indian culture. It has been said in the Vedas that, 'Be strong yourself, and use your strength yourself.' So, it has been said in the well-known *Subhashit* that, "पुस्तकस्था तू या विद्या परहस्तगतम धनं, कार्यकाले समायाते न सा विद्या न तद्धनम्". Here too, it is about self/self-reliance. In the *Aranyaka Parva* of the Mahabharata, there is a phrase – 'Swayameva Utpadhyate', which shows the independence of our Aranyaka culture. According to Aranya culture one must be self-reliant whether he is a commoner or a king. Every plant or living thing produced in the forest is self-generating, 'swayam vardhate', grows by itself and sustains its own life by itself. Of course, self-reliance does not mean that one is only self-centered and does one's own will, we are part of a society that runs on mutual aid and

cooperation. He gives with one hand and takes with the other. This is proved wrong only when nothing is given in return, only taken, and when ingratitude, begging, stealing and plundering break out in the world, but not exchange.

This way, we are not completely self-sufficient, in other words, our culture is a culture of '*ten tyakten bhunjitha*': symbiosis is of paramount importance. So the question is, is this called dependence? It is natural that we are financially dependent on others. We help others too much, believe in empathy, sympathy, goodness. This has really increased our power and currency of self-employment. There is saying in English, "God helps those who help themselves," A Person who makes such an effort does not fail in life and anywhere. A self-reliant person has deep faith in everything he does, because everything he does depends on his efforts. A sense of achievement overcomes obstacles.

NEP 2020 serves as a foundational step towards achieving self-reliance in India by equipping individuals with the necessary skills, knowledge, and entrepreneurial spirit. By focusing on holistic education, vocational training, and community engagement, the policy aims to create a robust workforce capable of contributing to a self-reliant economy. The successful implementation of these initiatives will be crucial in realizing the vision of Atmanirbhar Bharat.

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NEP2020: Inclusivity, Innovation, and Challenges in Indian Education

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Abstract:

Hence after independence improving education system was one of the major concerns of Government of India. Education is the systematic process of enlightenment that assists individuals to acquire knowledge, skills and experiences; it is the foundational base that is essential to achieve full human potential and foster holistic development of an individual. You all will agree that education is the foundation of all kinds of development for developing sound education system in independent India several initiatives have been taken and forming policies are one amongst them. Many initiatives and attempts have been made by the Government of India to date to provide education for all. One of the most important initiatives is the formulation of the National Policy on Education (NPE). The National Policy on Education (NPE) is a policy that is formulated by the Government of India mainly to promote and regulate education in India. The first National Policy on Education was rolled out in 1968. The need for 'radical reconstruction of education' (NPE1968, para 3) as recommended by the Education Commission (1964-66) for the socio-cultural and economic development of the country. This National Education Policy envisions an education system rooted in Indian ethos that contributes directly to transforming India, that is Bharat, sustainably into an equitable and vibrant knowledge society, by providing high-quality education to all, and thereby making India a global knowledge superpower. NEP 2020: Emphasis on holistic and multidisciplinary education, inclusivity, and skill-based learning for global competitiveness. The National Education Policy (NEP) 2020 introduced in India aims to transform the education system with an emphasis on inclusivity, innovation, and addressing various challenges.

Keywords –

NEP – 2020, Inclusivity, Innovation, Challenges

Introduction:

India is a democratic country and in a democratic society, the purpose lies within the numerous components of the welfare of the people. For the wellness of the Indian nation and the Indian society on the neighbourhood and international degree, a particular pressure has been laid down on education. So there is a need for democratization of education. . After independence in 1947, the GOI faced many challenges like illiteracy. For solving the problems of illiteracy, the GOI floated and sponsored different types of programs, policies, and regulations. the Government

of India through various the University Education Commission (1948–1949), the Secondary Education Commission (1952–1953), the Education Commission (1964–66) to develop guidelines and provide directions to Indian education system. The National Policy on Education (NPE-1968), National Policy on Education (NPE-1986), and Program of Action (1992) National Policy for ICT and in 2019, India released a draft of a new policy on Education.

The Education Commission (1964-66), popularly known as Kothari Commission, was the first comprehensive commission on education which covered all the levels of education from primary to higher education. In order to actualize recommendations of Kothari commission, the first National Policy on Education was rolled out in 1968. The need for ‘radical reconstruction of education’ (NPE1968,para 3) as recommended by the Education Commission (1964-66) for the socio-cultural and economic development of the country. The National Policy on Education (1986) was preceded by policy document ‘Challenges of Education -A Policy Perspective’ in 1985 that was widely discussed across the country and the suggestions received were incorporated in NPE 1986. The National Policy on Education (NPE) was adopted by the parliament in May1986. The policy considered that “education is a unique investment in the present and future. Sentence should be bold. (Para 2.4, NPE 1986).” The Programme of Action (POA, 1992) has 23 sections. The main emphasis of this Policy was to ensure quality in education by removing social, economic and regional and gender disparities. It aimed to promote national integration, a sense of common citizenship and culture, inculcation of values among young minds and improve the quality of education at all levels. A National Policy on Information and Communication Technology was brought out by the Government of India in 2012. “The ICT policy in school education aims at preparing youth to participate creatively in the establishment, sustenance and growth of knowledge society leading to all round socio economic development of the nation and global competitiveness.” In 2019, the Ministry of Human Resource Development (MHRD) released a Draft on NEP, 2019, which was trailed by several ideas and consultations offered by the stakeholders and public. The Draft NEP discusses reducing curriculum content to enhance essential learning and critical thinking. The objective is to promote holistic experiential, discussion-based, and analysis-based learning. It also talks about a revision of the curriculum for the first time.

Methodology:

Developing a research methodology for a Study on the National Education Policy (NEP) 2020 involves Content Analysis by Qualitative design - Review policy documents, reports, and Research papers related to NEP 2020 to contextualize findings to ensure comprehensive and systematic study.

Objectives

1. To study The National Education Policy (NEP) 2020 and Inclusivity.
2. To study The National Education Policy (NEP) 2020 and Innovation method in education
3. To study The National Education Policy (NEP) 2020 and challenges.

Discussion:

1. The National Education Policy (NEP) 2020 and Inclusivity.

The National Education Policy (NEP) 2020 introduced in India aims to transform the education system with an emphasis on inclusivity, innovation, and addressing various challenges.

Inclusivity

Focus on Universal Access: NEP 2020 emphasizes universal access to education at all levels, from early childhood to higher education, aiming to reduce dropout rates and ensure every child has access to quality education. It targets children who are currently out of school and encourages states to create school complexes in underserved areas. For higher education, the policy proposes increasing the Gross Enrolment Ratio (GER) from 26.3% to 50% by 2035, making college more accessible to students across the country.

- **Equitable Opportunities for Marginalized Groups:** The policy prioritizes inclusion for disadvantaged and marginalized groups, including socio-economically disadvantaged communities, gender minorities, children with disabilities, and children from rural areas. Special funds and scholarships are introduced to support these groups. The policy also encourages states to establish special education zones in areas with high populations of disadvantaged groups.

- **Gender Inclusion Fund:** To promote gender equity, NEP 2020 introduces a Gender Inclusion Fund. This fund supports initiatives aimed at helping girls continue their education, particularly in rural and economically backward areas, and provides resources for gender-sensitive teaching materials and teacher training.

- **Children with Disabilities:** NEP 2020 mandates inclusive schooling options for children with disabilities, integrating them into mainstream education wherever possible. Schools are encouraged to provide appropriate resources, accommodations, and support staff to help children with disabilities succeed. Teacher training programs are being restructured to help Educators better support students with diverse learning needs.

- **Multilingual Education and Cultural Inclusivity:** NEP 2020 promotes education in regional languages and mother tongues, especially in the early years, to make learning more accessible for children from diverse linguistic backgrounds. The policy also aims to include traditional knowledge systems and cultural heritage within the curriculum, promoting a sense of belonging and respect for India's diversity.

Flexible Learning Pathways: NEP 2020 advocates for multiple entry and exit options in higher education to accommodate diverse needs and life circumstances, especially for those who cannot pursue education in a linear, uninterrupted manner. NEP 2020 emphasizes a holistic and flexible approach to education, focusing on the overall development of students and catering to individual needs and interests, which align with constitutional principles of equality and non-discrimination.

In summary, NEP 2020 aims to make the Indian education system more inclusive by addressing financial, geographical, social, and physical barriers, ensuring that every child has the opportunity to access and benefit from quality education.

2. The National Education Policy (NEP) 2020 and Innovation method in education

The National Education Policy (NEP) 2020 emphasizes innovation in education, introducing new methods and practices to foster critical thinking, creativity, and adaptability among students. Here are some of the key ways NEP 2020 aims to bring innovation to Indian education:

1. Competency-Based and Holistic Learning

- NEP 2020 moves away from rote memorization and encourages competency-based learning, focusing on developing skills like problem-solving, critical thinking, and creativity. A holistic approach to education combines academic subjects with co-curricular activities such as arts, sports, and vocational training, making education more well- rounded.

2. Multidisciplinary and Flexible Curriculum

- NEP 2020 encourages a multidisciplinary approach, allowing students to choose courses across different streams and disciplines. This enables students to combine sciences, arts, and vocational subjects, nurturing creativity and innovation. The policy allows flexibility in higher education, enabling students to switch majors or choose courses from different fields, which is especially useful in an era where jobs require diverse skill sets.

3. Use of Technology in Education

- NEP 2020 emphasizes integrating digital tools, online learning platforms, and artificial

intelligence into education to make learning more engaging and interactive. The policy promotes virtual labs and simulation-based learning, especially for STEM subjects, to give students practical knowledge and hands-on experience. Schools are encouraged to use adaptive learning software that customizes content based on a student's learning pace and style.

4. Promoting Critical Thinking and Creativity

- NEP 2020 introduces activities and project-based learning to encourage critical thinking and creativity. This includes real-world projects, internships, and community engagements where students can apply theoretical knowledge. The focus on experiential learning allows students to learn through hands-on experiences and critical reflection, fostering innovative thinking from a young age.

5. Innovative Assessment Methods

- NEP 2020 proposes changes in assessment methods to focus on understanding, application, and analysis, rather than just memorization. Students will have formative assessments (regular, smaller assessments) in addition to traditional exams, giving teachers a better understanding of a student's strengths and areas for improvement.

6. Promotion of Coding and Digital Literacy

- NEP 2020 introduces coding as a skill starting in middle school to encourage logical reasoning, computational thinking, and problem-solving. Digital literacy is emphasized, equipping students with knowledge about cyber security, data analysis, and digital ethics, making them future-ready.

7. Research and Innovation in Higher Education

- NEP 2020 proposes setting up the National Research Foundation (NRF) to promote research across various disciplines, especially in higher education. The NRF will fund research projects, foster collaboration between institutions, and support cutting-edge research in fields like AI, climate change, and sustainable technology, making India a hub for innovation.

8. Teacher Training for Innovation

- NEP 2020 emphasizes continuous professional development for teachers to adopt new teaching methods and stay updated with technology and modern pedagogical practices. Teachers are encouraged to participate in workshops, digital training, and creative teaching strategies, fostering an innovative classroom environment.

NEP 2020 aims to transform Indian education by fostering a culture of innovation,

flexibility, and creativity, preparing students for a rapidly changing world.

3. The National Education Policy (NEP) 2020 and challenges:

Implementing the innovative and inclusive reforms outlined in NEP 2020 comes with several challenges, especially given India's diverse socioeconomic landscape and existing disparities in infrastructure and resources.

1. Resource and Infrastructure Limitations

- Many schools, especially in rural and remote areas, lack basic infrastructure like functional classrooms, internet connectivity, and digital devices. Implementing technology-driven and innovative learning methods becomes difficult in these settings.
- The cost of upgrading facilities, training staff, and providing learning resources to all schools is substantial, requiring consistent financial support from both central and state governments.

2. Teacher Training and Support

- Teachers play a central role in implementing NEP 2020, but many educators are unprepared for competency-based, multidisciplinary, and technology-integrated teaching.
- Training millions of teachers in new teaching methodologies, digital skills, and inclusivity practices requires extensive time and resources.
- Many teachers face large class sizes and heavy workloads, making it challenging to adopt personalized and project-based learning approaches.

3. Digital Divide

- NEP 2020's emphasis on digital learning highlights the urban-rural and socioeconomic divide, where a large portion of students lack access to internet, devices, and stable electricity.
- Bridging this gap is crucial for equitable implementation, as students from disadvantaged backgrounds may fall further behind without access to digital learning tools and resources.

4. Financial Constraints

- Implementing NEP 2020 requires significant financial investment, and the policy recommends increasing public spending on education to 6% of GDP, which has yet to be fully achieved.
- Funding is needed to build new schools, upgrade existing infrastructure, support teacher training, and ensure accessible resources for marginalized communities, but there are

concerns over budget allocation and efficient utilization of funds.

5. Language and Cultural Barriers

- NEP 2020 encourages education in regional languages, but providing high-quality resources, teacher training, and assessments in multiple languages is logistically complex.
- Creating and distributing culturally relevant, multilingual materials for a diverse population requires a coordinated effort, which is challenging in a country as linguistically and culturally diverse as India.

6. Systemic Resistance to Change

- The shift from traditional, exam-oriented teaching to competency-based, multidisciplinary, and project-based learning represents a major cultural change for many institutions and families.
- There may be resistance from educators, institutions, and parents accustomed to the established system of rote learning and standardized exams, especially if they are sceptical about the new methods' impact on students' academic and career prospects.

7. Assessment and Evaluation Challenges

- Moving from rote-based assessments to skill-based evaluations requires changes in assessment methods, which may be challenging to design and implement consistently across all schools.
- Standardized testing has been the norm for decades, and transitioning to diverse evaluation formats may lead to inconsistencies and a lack of clarity for teachers and students alike.

8. Coordination between State and Central Governments

- Education in India is a joint responsibility of the central and state governments, and implementing NEP 2020 uniformly requires extensive coordination and cooperation.
- Each state has unique educational needs and resources, so aligning them with national standards while allowing flexibility for regional differences is a complex task.

9. Social Barriers to Inclusivity

- Despite provisions for scholarships and support for marginalized communities, deep-rooted social biases and stigmas may limit access to education for certain groups, including girls, children with disabilities, and economically disadvantaged students.
- Addressing these barriers requires not only policy changes but also widespread awareness, advocacy, and social reform.

10. Monitoring and Accountability

- Ensuring consistent implementation across thousands of schools and universities is challenging, as it requires robust monitoring, evaluation, and accountability systems.
- Establishing clear metrics for success and progress, and creating mechanisms for feedback and improvement, is necessary to ensure that the policy's inclusive and innovative goals are met.

NEP 2020 has a transformative vision, but realizing its goals for innovation and inclusivity demands overcoming challenges related to resources, infrastructure, social attitudes, and institutional resistance.

Conclusion:

NEP 2020 introduces a more flexible and dynamic curriculum framework, emphasizing holistic development, critical thinking, and skill-based learning to meet the demands of the 21st century. NEP 2020 has a transformative vision, but realizing its goals for innovation and inclusivity demands overcoming challenges related to resources, infrastructure, social attitudes, and institutional resistance.

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A Study of Student Teachers' View about Mathematics Week Celebration

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Abstract

The present study explores the mathematics student teachers learn to teaching mathematics meaningful and enjoyable with the help of one week programme of Mathematics Celebration. This study utilizes a qualitative approach, specifically a phenomenological design, to explore the lived experiences of Mathematics students Teachers. Objectives for the study were to know the responses, coping strategies and perceptions of mathematics student teachers about Mathematics Week Celebration. 32 student teachers from Shrirang Shikshan Mahavidyalay,, Bilimora of Navsari district was situated as population. Data was gathered by three tools -1. Programme for Mathematics Week Celebration, 2. Questioner for finding Responses and 3. Interview to find perceptions which was analysed qualitatively. Main findings of the study were student teachers proactively deal with the academic challenges they face in mathematics classroom activities with help of peers, Laptop, websites, videos and other resources. Through peer discussions, student teachers develop deeper insights into problems and improve their understanding of the material. Student teachers appreciated the learning opportunities Mathematics Week Celebration Programme. When teachers provide the proper assistance, school students are more likely to engage in learning, such as asking questions or attempting more challenging problems.

Key words:

Mathematics week Celebration, Activity of mathematics, Student Teachers of Mathematics, Mathematics Laboratory

1.1 Introduction

Mathematics is today a necessity and a high-priority requirement in every area, which requires high-level mathematics teaching practices to facilitate students' permanent and pragmatic learning. Content and topics in mathematics textbooks are

usually taught without making maths enjoyable. Through this kind of mathematics education intended for only right answers in the exams, it is impossible to develop the mathematical thought in students mind. The easiest way to make students willing is to associate subjects with everyday life. There is also a need for teaching materials that make learning meaningful, associate concepts with everyday life and make students willing to learn and responsible for their own learning. Teacher's role is important to make students interested in mathematics subject. Teacher's teaching pedagogy making subject learning meaningful. At the pre service phase of teachers it is needed that they learn how to make mathematics subject Interesting. So, in this paper, researcher's intention is that their mathematics student teachers learn to teaching mathematics meaningful and enjoyable with the help of one week programme of Mathematics Celebration.

1.2 Statement of the Problem

The statement of problem is,

A Study of Student Teachers' View about Mathematics Week Celebration.

1.3 Objectives of the Study

Objectives of the study are

1. To know the responses of mathematics student teachers about Mathematics Week Celebration.
2. Find the mathematics student teachers' coping strategies for managing challenges during Mathematics Week Celebration.
3. To know the mathematics student teachers' perceptions of various classroom activities during Mathematics Week Celebration?

1.4 Questions of the study:

Question of the study are

1. What are the responses of mathematics student teachers about Mathematics Week Celebration?
2. What are mathematics student teachers' coping strategies for managing challenges during Mathematics Week Celebration?
3. What are mathematics student teachers' perceptions of various classroom activities during Mathematics Week Celebration?

1.5 Research Design

This study utilizes a qualitative approach, specifically a phenomenological design, to explore the lived experiences of Mathematics students Teachers in Mathematics Week Celebration classroom activities. This design allows for an in-depth exploration of how Mathematics students Teachers experience and cope with challenges in their Mathematics Week Celebration classroom activities, offering insights into their emotional responses and the impact on their learning process.

The data were analysed by use of qualitative approach.

1.6 Population and sample

For present study, Shrirang Shikshan Mahavidyalay,, Bilimora of Navsari district was situated as population.

From population, there are 32 student teachers are studying in sem 2 and sem 4. They all were selected for this study. From them all 27 girls and 05 boys were taken as sample.

1.7 Tool of the Study

In the present study three tools were use

1. Programme for Mathematics Week Celebration
2. Questioner for finding Responses
3. Interview to find perceptions.

The detail about the tool is as below:

1. Programme for Mathematics Week Celebration:

The mathematics week celebration was held from 16th December 2024 to 22nd December 2024. These seven days were celebrated as mathematics week celebration. Various seven activities were held by mathematics student teachers. The one week programme were chalk out in Guidance of teacher Educator Dr. Namrata K. Patel. The Different seven activities are mention below:

Table:1.1

Mathematics Week Celebration Programme

No .	Date	Day	Activity	Description
1	16-12-2024	Mon	PreranaGatha : Mara Ganitagy ni'	Mathematics student teachers read the life story of their favourite mathematician and discuss that mathematician life's motivational part with their peers.

2	17-12-2024	Tue	Mathematics Teacher and Teaching	Mathematics student teachers arrange a field visit of nearby school and arrange meeting with mathematics subject teacher of secondary and higher secondary. They discuss about teaching mathematics in classroom, problems faced by them teaching and curriculum of mathematics and level of student to grasp mathematics subject and how to create –develop interest for mathematics subject in students and examination –assessment about maths subject.
3	18-12-2024	Wed	Mathematics laboratory Setup	Learn about Mathematics laboratory and arrange it according to theory they learn
4	19-12-2024	Thu	Make Teaching Learning Aid/Material	Mathematics student teachers make a Teaching Learning Aid/Material on anyone concept from Std. 8/9/10 mathematics Textbook of GSEB.
5	20-12-2024	Fri	Make Mathematics Easy	Mathematics student teachers arrange a field visit of nearby school and take one or two period of mathematics subject in secondary. In this period they discuss with class students about the difficult point of mathematics subject and then student teachers explain that content in depth by using different teaching –learning methodology.
6	21-12-2024	Sat	Mathematics Day Celebration	Mathematics student teachers celebrate the birth anniversary of mathematician Shrinivas Ramanujam. On that day Mathematics student teachers perform many activities in B.Ed. college for tribute great mathematician Shrinivas Ramanujam. And also create interest about mathematics subject in remaining of all student teachers of B.Ed. college. They Perform – mathematics Poem, general Knowledge Quiz, Thought of maths for life, Vaidik mathematics, Puzzle, Fun with Maths, Presentation of Indian Mathematician , Presentation of Prizes in Mathematics, Presentation of Life of Shrinivas Ramanujan etc.
7	22-12-2024	Sun	My Favourite Mathematics Teacher	Mathematics student teachers meet their favourite mathematics Teacher and share their gratitude. They also discuss and learn from the journey of their Favourite Mathematics Teacher.

2. Questioner for finding Responses:

Mix type of questioner with 15 question were form to know the responses about Mathematics Week Celebration Programme.

3. Interview to find perceptions:

Interview for findings their perception and also pros and cons of Mathematics Week Celebration Programme.

1.8 Data Collection

To collect relevant data for the study, the researcher followed a systematic approach. First, a Mathematics Week Celebration Programme, Questioner, and interview was developed and validated by expert. Suggestions and corrections were carefully considered and incorporated into the final version of the Mathematics Week Celebration Programme, Questioner, and interview. Then, permission and approval to conduct the Mathematics Week Celebration Programme, Questioner, and in-depth interviews were obtained from the Principal of various Schools and B.Ed. College.

All the seven days average 2-3 hours spend for programme and then researcher collect data from 2nd and 3rd tool.

1.9 Findings

Finding from the gathered data is mention below:

Experiences in Mathematics Classroom Activities

- Many student teachers feel a sense of pressure and nervousness during day celebration.
- Despite the anxiety, student teachers also appreciate the learning gains from these
- activities, especially how group work and help them understand topics better and
- enhance their skills as future teachers.
- Emotional responses highlight the common challenges student teachers face in handling
- classroom activities, with anxiety and self-doubt emerging as significant factors
- affecting their experiences.
- Anxiety, particularly due to lack of preparedness, plays a major role in student teachers
- emotional responses to classroom activities.

- Insecurity is a common affective response among student teachers who feel inadequate
- compared to their peers. Cognitively, student teachers experiencing insecurity may
- where they believe that their mathematical abilities are static and unchangeable.
- Student teachers emotional responses to classroom activities—nervousness, anxiety, and
- insecurity—are deeply intertwined with their beliefs about their own abilities and their
- fear of being judged by peers, teachers and students.
- Student teachers proactively deal with the academic challenges they face in mathematics
- classroom activities with help of peers, Laptop, websites, videos and other resources.
- Through peer discussions, student teachers develop deeper insights into problems and
- improve their understanding of the material.
- Independent studying and practicing help Student teachers build confidence and reduce
- anxiety over Time.
- Student teachers take the initiative to seek out additional learning materials online,
- demonstrating independence in their learning.
- By using resources like YouTube or online tutorials, they actively engage with the
- content outside of the classroom.

Student teachers' Perceptions of Classroom Activities

- Student teachers appreciated the learning opportunities Mathematics Week Celebration
- Programme.

- Student teachers acknowledged the importance of being prepared for such activities.
- Student teachers recognized the potential benefits of classroom activities in developing
- their knowledge and skills.
- Student teachers feel positive and motivated by Mathematics Week Celebration
- Programme.
- School students perceive activities as valuable tools for deepening their understanding
- of complex mathematical concepts.
- Student teachers enjoyed and accept about the favourable attitude towards mathematics
- because of the celebration of Mathematics Week..

Importance of the Teacher's Role in Clarifying Concepts

- School students are more engaged and willing to participate when they feel supported by
- their teacher's guidance
- When teachers provide the proper assistance, school students are more likely to engage
- in learning, such as asking questions or attempting more challenging problems.

1.10 Conclusion

Mathematics subject in today is necessity for each and every student and field of education. Mathematical knowledge is a high-priority requirement in every area of human life. From schooling it is important that mathematics subject take place as a favourite subject of almost students. But the reality is disappointing much. Student left this subject or dislike because of its bearing and drying teaching pattern. Which requires high-level mathematics teaching practices to facilitate students' permanent and pragmatic learning. Additionally, there is a need for people who know and love mathematics in order to be advanced in mathematics. So at the leaning phase of teaching pedagogy would be teachers must practice this subject teaching interesting and meaningful. This research showed that how student teachers learn a lot from this practice.

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Nano Teaching: A microscopic view of pedagogy

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Abstract:

Nano Teaching: A Microscopic View of Pedagogy

Nano teaching is an emerging pedagogical approach that emphasizes the breakdown of complex learning processes into small, manageable, and easily digestible units. This method draws inspiration from the principles of nanotechnology. In education, nano teaching deconstructs traditional teaching into micro-level instructional units, enabling precise, focused, and personalized learning experiences.

The paper explores the theoretical part of Nano teaching, its relevance in contemporary education, and its application across various disciplines. It highlights how Nano teaching promotes active learning, cognitive engagement, and learner autonomy. By minimizing cognitive overload, this approach enhances knowledge retention and bridges the gap between theoretical knowledge and practical application. Also explores the core principles and techniques of Nano teaching, including the importance of clear learning objectives, active learning strategies, and timely feedback. Social media and its other factor like reels also become Nano and here correlate it with Education. Nano teaching is connected with Nano learning also. Planning of Nano Teaching, what is Nano in planning, it's cycle, use of media in it and Feedback also, how to evaluate it.

Additionally, the challenges and limitations associated with implementing Nano teaching, such as time constraints, resource limitations, and the need for teacher training. By adopting Nano teaching strategies, educators can foster a student-centered learning environment that promotes critical thinking, problem-solving, and lifelong learning.

Keywords: Nano Teaching, Pedagogy

1.1 Introduction

Teaching and Learning is important part of Education system. How to teach and its journey is most important in this field. Pedagogy describes the art and science of teaching students. The New Education Policy-NEP 2020 documents in Part-1 School Education, point 4 about Curriculum and Pedagogy in Schools: Learning Should be Holistic, Integrated, Enjoyable, and Engaging. Also, in Part-2 Higher Education, point 9.3 (d), point 11.6, point 12.1, point 12.2 and

point 12.6, envisions innovative pedagogical approaches and their role in higher education. In Teacher Education field, Micro teaching is base of trainee's development. Micro Teaching introduced by Dr. Dwight Allen at Stanford University, USA. Dwight Allen say that Micro Teaching is a scaled-down teaching encounter in class size and time. Nowadays In all B.Ed. colleges of India, Micro teaching is a part of curriculum in semester-1. Micro teaching is an art performing by trainees on particular topic and science according it cycle. Skill is special factor in micro teaching. On the base of Micro Teaching the concept of Nano Teaching is coming in Education. Nano word came from Nano technology. Nano like Small parts has big impact. So here microscopic view of pedagogy is Nano Teaching.

1.2 Objective of Study

The objectives of paper are following:

1. To know about concept of Nano Teaching.
2. To know about Nano Teaching cycle in the learning process.
3. To know roles and responsibilities of trainees in Nano Teaching.
4. To know about role of ICT (Information and communication Technology) in Nano Teaching.
5. To know about challenges in implementation of Nano Teaching.
6. To know about difference between Nano Teaching and learning.
7. To know about merits and demerits of Nano Teaching.

1.3 Concept of Nano Teaching

Nano Teaching is combined word. There is two separate word, one is nano and another is teaching. The meaning of separate word nano is very small part, in other word nano is extremely small. Teaching means ideas and beliefs that are taught by somebody/something as per oxford Dictionary. Edmund Amidon (1967) defined teaching as "an interactive process, primarily involving classroom talk which takes place between teacher and pupil and occurs during certain definable activities".

According to Omprakash H M "Nano-Teaching is an extension of micro teaching, it facilitates self-evaluation and develop self-confidence, self-acceptance to student-teacher". And "Nano-Teaching is a system of uncontrolled teaching practice that is possible to more concentrate on specific teaching behavior and to practice teaching under self- evaluation." Nano teaching is an emerging pedagogical approach that emphasizes the breakdown of complex learning processes into small, manageable, and easily digestible units. This method draws inspiration from the principles of nanotechnology. In education, Nano teaching deconstructs traditional teaching into micro-level instructional units, enabling precise, focused, and

personalized learning experiences.

Nano Teaching can be applied across various subjects and educational levels. Its nanostructure enables both teachers and students to concentrate on a singular concept at a time, ensuring better understanding and retention. It's an ideal approach for modern classrooms where the attention span of students can be limited, and the demand for fast-paced learning is ever-present.

The term "Nano" in Nano teaching signifies the microscopic nature of the teaching. Here three things are Nano while teaching.

- **Time:** The time duration of Nano teaching is significantly shorter than traditional lessons, enabling a concentrated focus on specific teaching objectives. It is 30 second to 1 or 2 minutes.
- **Content:** The content covered in Nano teaching unit is typically limited to a single concept, allowing for in-depth exploration and mastery with use of ICT visual Tool.
- **Class Size:** Nano teaching session often involve a small group of students, facilitating personalized attention and instruction. There are 4 students in group.

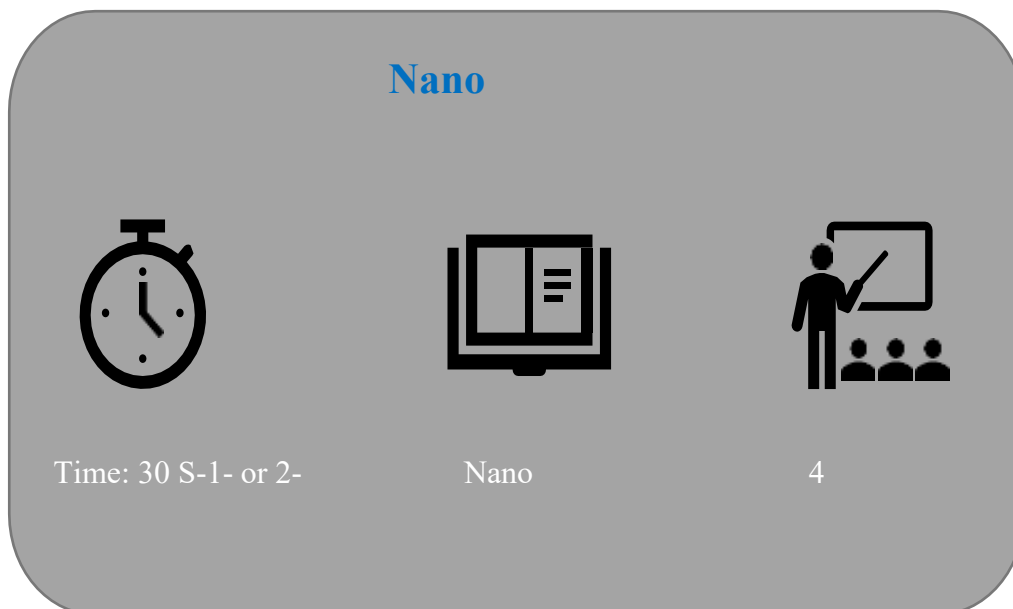
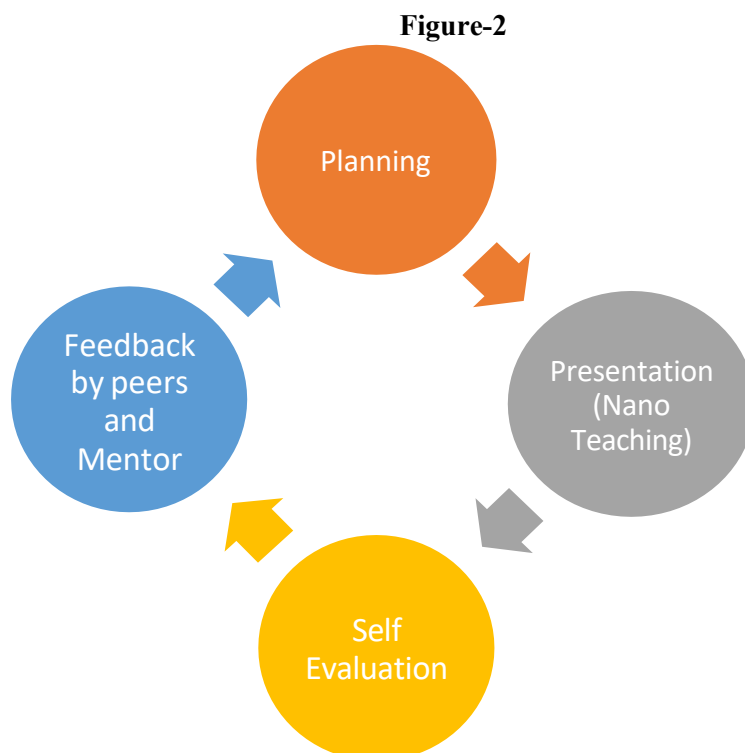


Figure-1

So, Nano teaching is a teaching technique that involves planning, delivering short content in short time and focused on teaching style.

1.4 Nano Teaching cycle in the learning process

The Nano teaching cycle comprises four key stages:



1. **Planning:** In this stage, Trainee is choosing a nano topic related to subject, make a nano lesson plan, make a objectives, proper technique and visual tool with reference materials.
2. **Presentation (Nano Teaching):** The teacher delivers the planned lesson to a small group of students, focusing on communication in nano time. As per nano teaching content delivery system.
3. **Self-Evaluation:** Trainee is at mature level. Video recording of Nano teaching is for self-evaluation. Also, according to planning lesson given or not. Time management, content delivery and technique properly use or not as per mind setting and lesson planning.
4. **Feedback:** After the teaching session, the trainee receives feedback from peers, and expert teacher for focusing on both strengths and areas for improvement. The trainee reflects on the feedback received and identifies specific areas for improvement. This reflection process informs future teaching practices and guides subsequent nano teaching session.

1.5 Roles and responsibilities of trainees in Nano Teaching The Role of Trainees in Nano-Teaching

In nano-teaching, trainees play a pivotal role in both their own learning and the improvement of teaching practices. Here mention key responsibilities:

1. Theoretical Part:

Trainees are Understand the theory of Nano Teaching, what is nano teaching, its cycle and procedure, role, merit, demerit etc. after that Observation of demo lesson given by experienced college professor. Paying attention to their teaching strategies, classroom management techniques, and student engagement methods. If some issues then solve the quires related Nano Teaching. Also, Trainee learn ICT tools and techniques theory from expert teacher.

2. Practical Part:

Lesson Planning and Preparation

Trainee is select proper topic related to subject, that is cover by nano time. So, choose nano content for nano time. Read reference book, E-resources related topic, ICT and Nano Teaching. After that develop lesson plan for nano teaching, which include Outline, learning objectives, teaching technique, create a Visual ICT tool.

Teaching the Lesson:

Trainee is delivering a nano content, in nano time to a small group of students, also using teaching technique with use of visual ICT tool as per lesson planning. In nano time there is no possibility of ask question and student involvement. So, here trainee is focus on content delivery with teaching technique like easy to hard, only point given, how to express, how to use ICT tool, create a content.

Observation and Feedback:

Observe the lessons of fellow trainees, taking notes on their strengths and areas for improvement. Here also a chance of self- evaluation by recording video of lesson. Self-evaluation and peer evaluation sheet prepare by expert of Education field. Most important observation and feedback given by expert teacher for positive points and need to improve. Trainee realize a mistake and make better for next Nano teaching.

1.6 Role of ICT in Nano Teaching

Nano teaching content must be delivered by use of ICT Tools and techniques, so visual effect clearer that short topic in short time. Visual ICT tools can significantly enhance the impact of Nano teaching by making complex concepts easily understandable and engaging. Here are a few effective tools:

1. PowerPoint presentation: make a ppt by using image, chart, diagram, sound, animation as content.
2. Whiteboard Tools Microsoft Whiteboard used, Canva whiteboard, Miro, Jamboard can be used for interaction and content delivery as per requirement and planning.
3. Making Reels: There are many software for making reel. Examples are Instagram's In-App Editor, Inshot, Canva, Cap cut etc. In reels audio and video must include. With use of this reel trainee try to teach a content easily.
4. Video Editing Software: Create short, impactful videos to illustrate key points, music to enhance the video. Use software like Adobe Premiere Pro, iMovie etc. for better presentation.
5. Trainee must provide hardware like mobile, computer, internet connection and project from the institute.

1.7 Challenges in implementation of Nano Teaching

While Nano teaching offers numbers of benefits, Planning and Implementation of Nano teaching in real world have many challenges.

1. Students learn theory of Nano teaching properly.
2. Lesson plan approved by related expert teacher and guide trainee properly.
3. Nano content selection is most challenging task for trainee. Condensing too much information into a short time frame may lead to cognitive overload for students.
4. The short time period of Nano teaching only cover outline of topic.
5. There is no chance of student interaction.
6. Select visual ICT tool, make the E-content and use it properly is also difficult.
7. The controlled nature of Nano teaching may not fully replicate real-world classroom dynamics. It is artificial learning environment.

1.8 Difference between Nano Teaching and learning

Nano teaching and Nano learning are closely related concepts, both aiming to provide quick, focused, and effective learning experiences. However, they differ in their roles, purpose, and implementation. Here's the key differences between them:

1. Nano teaching is the method of teaching (how content is delivered), while Nano learning refers to the process of learning
2. Nano teaching is about the teacher's approach to delivering content, while Nano learning is about the learner's engagement with content.

3. Nano teaching's goal is to deliver content, while Nano learning's goal is to absorb or practice content.
4. Nano teaching often involves instructor-led sessions, while Nano learning is usually self-paced and technology-driven.
5. Nano teaching is more focused on live or real-time interaction with the teacher, while Nano learning emphasizes independent learning with content.
6. Nano teaching is the action of teaching, while Nano learning is the action of learning.

In conclusion, while both Nano teaching and Nano learning are designed to provide short, focused learning experiences, they differ in who is responsible for delivering the content and how the content is consumed. Nano teaching is about the teaching method, and Nano learning is about the learning process.

1.9 Merits and demerits of Nano Teaching

Nano teaching offers several advantages for both teachers and trainees:

1. Concentrate on Nano time teaching, less time more preparation is concept.
2. Focus on specific teaching objectives, improvement regarding teaching style.
3. The structured feedback from peer and expert teacher provides opportunities for growth and improvement.
4. Self-evaluation is key point of Nano teaching. It realizes trainee mistake, what points need to improve in teaching process.
5. Trainee feel free to use ICT tools and techniques.
6. Trainee is developed skill like content creation, presentation, listening and observation skill.
7. Trainee is developed quality like time management, concentration, analysis, synthetic, clarification, decision making and correlate with life.

While Nano teaching is a valuable tool, it is essential to acknowledge its limitations:

1. The short duration of Nano teaching session may not adequately address complex teaching challenges.
2. The controlled environment of Nano teaching may not fully capture the complexities of real-world classrooms.
3. Focus on skills may lead to a reductionist view of teaching.
4. Some complex topics may not be suitable for such short teaching sessions.
5. Teachers must be able to convey the essence of a concept in a very limited time

frame, which can be challenging.

6. Without careful planning, Nano Teaching can lead to fragmented knowledge rather than comprehensive understanding.

1.10 Conclusion

Nano Teaching represents an innovative approach to modern education, offering a more focused and engaging learning experience. By breaking down lessons into small, digestible segments, this pedagogy ensures greater attention and retention. As education continues to evolve, Nano Teaching holds significant promise, especially when combined with emerging technologies like social media and digital learning tools. By carefully considering the challenges and leveraging the benefits, educators can harness the potential of Nano teaching to enhance their instructional practices and ultimately improve student learning outcomes.

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Orientation for educational innovation among teacher educators

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Abstract

With the changing occurring in different sectors in the world, changes are also expected in education. Education is a key sector which definitely affects the quality of other sectors. To create an environment where learners learn effectively and through experience, teachers will have to think differently from the traditional system and adopt innovative perspectives. The present paper studies innovative steps adopted by the teacher educators of B.Ed. colleges through a survey. The opinions of teacher educators from government, semi-government and private B.Ed. colleges were taken on the opinionnaire keeping in mind their orientation for educational innovations components like learning, teaching, methodology, evaluation and professional preparedness. Teacher educator use digital platforms for learning, teaching, evaluation or for updation. They try to provide an environment for student - teachers to learn through discovery and self-experience. However, they did admitted that this does not happen every time.

Key words:

Educational Innovation, Orientation.

Introduction:

Globally, the changes in various sectors have affected other sectors, and the education sector is no exception. Education is a key platform that cannot remain isolated without impacting other sectors and professions. The National Education Policy (2020) also emphasizes on skills and abilities, not degrees obtained at the end of different levels of education. Therefore, education should naturally be quality-oriented. What is quality education? Quality Education means an environment which the role of the learner is considered important while the teacher is like an artist behind the scenes. Students learn by exploring, experiencing, visiting people and places, from peers, society or environment. In short, there is a need to create an environment where learners learn to learn and this will happen only when the teacher comes out of the stereotyped tradition

and does something new and inspiring to learn. For that, the teacher should be proactive, experimental, accepting of making mistakes and learning, should be able to ask questions easily and try to use new platforms to understand what is not understood. An attempt has been made here to conduct a small survey on the initiative or inclination of teacher educators to do such innovative work.

❖ **Objectives of the study:**

1. To study orientation for educational innovation with respect to learning.
2. To study orientation for educational innovation with respect to teaching.
3. To study orientation for educational innovation with respect to teaching process.
- 4 To study orientation for educational innovation with respect to professional preparation.
5. To study orientation for educational innovation with respect to students' teachers career guidance.

❖ **Sample Selection:**

A proper selection of sample for the research is essential. For the present research teacher education from 4 government, 4 aided and 4 private B.Ed. Colleges were selected as the sample.

❖ **Data collection and analysis:**

For the research, the researcher obtained the opinions of the teacher educators through a self-designed opinionnaire on five points, considering a total of 5 components. A Google form was created to collect the opinions. The information obtained was analyzed on the basis of frequency & percentage.

❖ **Major findings of the study:**

- Maximum resources were used by the teachers for the content related to the B.Ed. course
- Innovative methods were adopted for learning however the latest technology for effective presentation required for the course.
- The session was mostly interactive during the teaching and learning.
- The teacher used more than one teaching method to make teaching interesting.

- The teachers motivated the student teachers to learn through group discussions wherever needed in the curriculum.
- There was not much success in creating an environment where student teachers would think from a Science, Technology, Engineering, Arts and Mathematics (STEAM) perspective during their studies.
- The teacher educators mostly tried to ensure that student teachers learned on their own during practical work.
- There was success in providing suitable and adequate resources for student teachers to learn on their own.
- The student teachers were able to provide suitable and adequate resources for self-learning.
- Teachers were found to have sufficient options for trainees to learn through experience.
- It was mostly seen that during the teaching work, the process of student teachers learning, clarifying and reasoning takes place.
- Teacher educators could easily use Google Forms or other technical platforms for evaluation.
- In addition to traditional methods for assessment, portfolio, project or group work methods were used.
- Teacher educators often used digital platforms to make teaching materials effective.
- Mostly, they could use various platforms of Artificial Intelligence for teaching and learning.
- Many Teacher educators used to make advance plans or strategies to facilitate different activities of the institution.
- Teacher educators could take enough time for emotional development along with their professional development.
- Teacher educators could take enough time to conduct small-scale research whenever needed.
- Expert lectures or seminars were organized as per the needs of the curriculum.

- Teacher educators adopted innovative technologies to ensure a healthy environment at the workplace.

❖ **Conclusion:**

To conclude, it can be said that Teacher educators are working in innovative ways for the effectiveness of learning and teaching, professional preparedness, teaching process, student teachers career guidance and the environment of the institution. Of course, there is some difference in the pace of their work.

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Integrated Teacher Education Program In India : Challenges And Suggestions

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Abstract:

Teacher education encompasses all the components that are designed to give student teachers the fundamental ability for which they can carry out their jobs in the real world. The present study made an effort to study the teacher education programme in India with special reference to challenges and suggestions to resolve the challenges. The world is changing rapidly due to explosion of knowledge have led to a constant transformation of the educational system worldwide. Teachers are the architects of a nation, influencing and motivating students through their intellect, ideals, experience, wisdom, and dynamic personality. To create dedicated and dutiful teachers, a nation must provide various teacher education programs to ensure a diverse and effective education system. The National Education Policy 2020 in India introduced a revolutionary 4-year integrated teacher education program. In this paper attempt has been made to explore the opportunities and challenges as well as suggestions of major Integrated Teacher Education Programme initiatives

Key words:

Teacher Education, Student Teacher, Challenges, Suggestions, Professionalism.
Integrated Teacher Education Programme, NEP 2020

Introduction :

The world is changing rapidly due to explosion of knowledge have led to a constant transformation of the educational system worldwide. Teachers are considered as the most creative and unique person because teacher has the capability to influence and motivate students through his intellect, ideals, experience, wisdom and dynamic personality and for this reasons teachers are considered a true architect of a nation. India is blessed to have renowned educationists like Charaka, Susruta, Aryabhata, Varahamihira, Chanakya, Panini, Patanjali, Nagarjuna, Gautama, Sankardev, Maitreyi, Gargi, and Thiruvalluvar who have not only enlightened India but also the world, and their lessons are indebted to the entire world. It has been rightly pointed out by the

Education Commission (1964-65) that “The destiny of India is being shaped in her classroom” (Chakraborty, 2022). The teaching profession is considered a noble profession as it directly impacts a country's development, which relies on its education system. The Indian government has placed special emphasis on education, establishes various commissions for continuous development, such as the University Education Commission in 1948, Mudaliar Commission in 1952, Indian Education Commission (1964-66), National Policy on Education (1968, 1986 & 1992), Sarva Shiksha Abhiyan (SSA, 2000-2001), Right to Education Act (2009), and the latest National Education Policy 2020. (Chakraborty, 2022). Understanding the concept and meaning of teacher education programs is crucial as teachers are only created in educational institutions teacher education programme is provided. Teachers are the pillars of any country as they are the one in which hand the entire destiny of a country rests upon. They are the most important element of any educational program as they are responsible for providing alternate learning experiences to the students in the class. There is a saying that “Teachers are born not made” but actually “Teachers are made not born” and for this education of the teacher is responsible. The main objective of any teacher education program is to equip all the teachers with essential skills which help to build the personality of a teacher. Both Content knowledge as well as pedagogical knowledge is important on the part of a teacher as it helps a teacher in designing lessons for the students. A statutory entity of the Indian government, the National Council for Teacher Education (NCTE) oversees teacher education in the country. Teacher education is defined by NCTE as a program of instruction, research, and preparation for teaching from pre-primary to higher education levels. Teacher Education is very important as it makes the prospective teachers and teacher educators competent about child psychology and it develops a proper attitude towards teaching which gives self - confidence in the teachers. In order to maintain the quality of teacher education various policies, committees, commission have made various recommendations. So our duty is now to look after the issues in ongoing teacher education program and to work in this regard so that different issues related to teacher education can be addressed before time and in this way we can promote the quality of teacher education.

Concept and Meaning of Teacher Education Programme

A nation must offer various teacher education programs to create dedicated and competent teachers. These programs can prepare teachers for primary, secondary, and

higher secondary levels of education. DIETS programs prepare teachers for primary education, while B. Ed programs prepare teachers for secondary and higher secondary education.

An Analysis About Different Teacher Education Programmes In India

Diploma in early childhood education program (D.E.C.Ed.)

The DPSE program is a two-year educational program recognized by NCTE. It aims at preparing teachers for preschool programmes. Candidates with at least 50% marks in 12th or equivalent are eligible to apply for the program. However admission to this program is as per the norms laid down by NCTE and govt. from time to time.

Diploma in Elementary Education (D.El.Ed.)

Diploma in Elementary Education is two-year (full-time) educational program. This course is recognized by NCTE. Minimum eligibility to take admission in this program is 12th. However selection of the candidates to this program is solely based upon merit and as per the norms laid down by NCTE and govt. from time to time.

Bachelor of Education (B.Ed.)

It is a two-year, full time degree to prepare the teachers from upper primary level to Secondary level and higher secondary level. Admission to this program is done as per the norms laid down by NCTE and govt. from time to time. Candidates are eligible to Enroll in this program if they have at least 55% of their marks in either the bachelor's or master's degree. Reservation policy is applied for admission .

Diploma in Physical education program (D.P.Ed.)

An intensive two-year curriculum called the Diploma in Physical Education prepares instructors of Physical education for primary school teaching. To apply for this program, candidates must have secured at least 50% of marks in their 12th grade or comparable grade.

Concept of Integrated Teacher Education Programme

India's education sector has been a priority since independence, but still lags behind other countries in teacher education. The National Education Policy 2020 was introduced by the National Council for Teacher Education (NCTE) under the Ministry of Education. It contains new guidelines for the effective execution of the Integrated Teacher Education Programme (Chakraborty, 2022). Previously a student had to complete a minimum three years degree programme like B .A., B. Sc or a B.Com or a Master degree programme and after that if he/she wished to be a teacher than he/she

had to compulsorily enrol for a 2 year B. Ed programme. But Integrated Teacher Education Program is different from that type of teacher education program. It is a four year uniquely designed integrated degree programme in which a student will study general course like B.A or B. Sc for the first two year and in the last two year they will study about teacher education and in this way students will be able to save a year and after the completion of the programme they will be awarded a degree like BA/ B. Sc alongwith B. Ed. National Council for Teacher Education (NCTE) has launched Integrated Teacher Education Programme (ITEP) in 57 Teacher Education Institutions (TEIs) from the academic session 2023-24 throughout the country. This is a flagship programme of NCTE under NEP 2020 (Department of School Education and Literacy).

Integrated B.A. B.Ed. /B.Sc. B.Ed.

It is a flagship teacher education program recognized by NCTE. It allows the students to complete their graduation along with B.Ed. at a time. The duration of this program is 4 years. The purpose of this curriculum is to get teachers ready for upper primary and secondary education.

Integrated B.Ed.-M.Ed.

It allows a student to complete his/her B.Ed. and M.Ed. at a time in three years. Candidates having postgraduate degree in the humanities, social sciences, or sciences with a minimum of 55% marks are eligible for the program. Currently, In Odisha and Gujarat there are five universities who are running this program Fakir Mohan University, Balosore, Maharaja Sriram Chandra Bhanjdeo University, Mayurbhanj, Sambalpur University, Sambalpur and Rajendra University, Balangir. And in Gujarat IITE university Gandhinagar.

Diploma in Art Education (Visual Arts)

Preparing teachers to teach visual arts up to class VIII is the goal of this pre-service teacher education program. To be considered for admission to this program, candidates must have secured at least 50% of their marks in visual arts, as an elective subject, in their 12th grade or equivalent.

Diploma in Art Education (Performing Arts)

It is a pre-service teacher education program which aims to prepare teachers to teach performing arts up to class VIII. Candidates with at least 50% marks in 12th or its equivalent with music/dance/theatre as a elective subject are eligible to take admission to this program.

Master of Education (M.Ed.)

It is a two year full time teacher education program which prepares the teachers to teach the trainee teachers and other students at various levels. Candidates having at least 50% marks in B.Ed. or graduate with D.El.Ed. (50% in each) are eligible for the admission.

Master of Physical Education (M.P.Ed.)

The purpose of the Master of Physical Education (M.P.Ed.) program is to prepare physical education teachers at various levels. In physical education departments at universities and colleges, they can work as assistant professors, directors, sports officers, or teacher educators. Its duration is two years. Applicants are eligible for the program if they have secured at least 50% marks in B.P.Ed. or B.Sc. in health and physical education. The qualifying marks for reservation students are lenient in accordance with the guidelines established by the central and state governments for the aforementioned teacher education programs.

Salient Features of Integrated Teacher Education Program in NEP 2020 :

Some of important recommendations which have been suggested in NEP 2020 are as follows: –

- It involves a dual-major holistic bachelor's degree offering B.A. B.Ed./ B. Sc. B. Ed. and B.Com. B.Ed. which is one of the major mandate of the National Education Policy 2020 related to Teacher Education.
- Teachers will be appointed in teaching profession only through ITEP from 2030.
- Teacher education will be moved into multidisciplinary colleges and universities by 2030.
- All the multidisciplinary colleges and universities will have education departments and that offer B.Ed., M.Ed., and Ph.D. degrees in education.
- It will be offered in pilot mode initially in about 57 selected multidisciplinary institutions across the country.
- The National Council for Teacher Education (NCTE) under the Ministry of Education will devise the curriculum of this course.

- The new curriculum enables a student-teacher to get a degree in education as well as a specialized discipline such as history, mathematics, science, arts, economics, or commerce.
- The ITEP will be available for all students who choose teaching as a profession after secondary, by choice.
- The ITEP will prepare teachers for the 4 stages of the new school structure i.e. Foundational, Preparatory, Middle and Secondary (5+3+3+4).
- This integrated course will benefit students since they will save one year by finishing it in four years rather than the customary five years required by the present B.Ed. plan.
- The commencement of Four Year ITEP will be from the academic session 2023-24.
- Admission into the ITEP will be carried out by the National Testing Agency (NTA) through the National Common Entrance Test (NCET).
- This course will be offered by multidisciplinary institutions and will become the minimal degree qualification for school teachers.
- This is a flagship programme of NCTE under NEP 2020.

MAJOR CHALLENGES IN TEACHER EDUCATION

As teacher training is essential hence to impart quality education to the trainee teachers the following

1. Lack of human resources

One of the major problem which we are going through is shortage of teachers. Due to lack of teachers it is difficult to impart quality instructions to the students. Hence the pupil teachers are unable to get continuous guidance and support.

2. Inappropriate teaching internship

The most important component of any teacher education program is practice teaching. But the thing is that due to shortage of pedagogy teachers the pupil teachers are not getting proper guidance. So that they face many problems during classroom transactions and failed to develop command on pedagogy part which is a big concern.

3. Lack of Supervision

The supervision for practice teaching should aim at guiding the pupil teachers in learning to organize their content, planning their lessons, techniques of assessment

and essential skills. But at present their lesson plans are checked superficially also there is no class observation by the concerned pedagogy teachers for which the students are not getting proper feedback which is a big issue.

4. Attitudinal barrier

The quality of teacher education is steadily declining because some of us view teaching as a secondary career. Students with this mindset approach everything with a casual attitude and lack the motivation to understand the subjects covered in teacher education.

5. Incompetent teacher educators

As now it is said that besides content and pedagogical knowledge a teacher should be technology savvy as today's age is the digital age and to meet the current requirement of society we have to make up-to-date ourselves. Hence those are who not that much familiar with the technology face problems in dealing with the student teachers.

6. Lack of Infrastructure

Due to lack of Infrastructures sometimes it is not possible to maintain the quality of teacher education. In some institutions there is no ICT lab, Psychology lab, library etc. which are important for the student teachers.

7. Admission Procedure

It has been observed that certain educational institutions use career marks as a criterion for selecting students, whereas other educational institutions are conducting entrance examinations Thus, the selection process is not consistent. Hence the standard of teacher education program is significantly impacted by this.

8. Lack of Professionalism

It is essential to be up-to-dated on a daily basis so that we will be able to know about the daily happenings around the globe. Only by confining ourselves within the books or syllabus we can't provide quality education to the student teachers. In order to be professional a teacher educator have to read journals, magazines, current affairs, etc or he or she can join conferences, webinars to enhance his/her outlook.

9. Lack of Funds

A shortage of funding prevents an institution from providing workshops and in-service training for teacher educators, which eventually lowers the standard of teacher education.

10. Monitoring of the institutions

Monitoring of the teacher education institution is important nowadays as there are some institutions which are not recognized by NCTE still they are taking the admission of the students and they are more oriented to money making rather than the educational growth of the students (Dodiya, 2018).

11. Qualification of Teacher Educators/Assistant Professors

Qualifications and eligibility criteria for appointing teacher educators is changing frequently. It is noticed that sometimes the recruiting body is lowering the qualification. Hence by lowering the qualifications how can we expect to get the teachers of higher quality? (Bala, 2018).

For major Challenges of the Integrated Teacher Education Programme:

The National Education Policy 2020 is a significant step towards the development of our education system, introducing the Integrated Teacher Education Programme (ITEP). However, it has several shortcomings that may pose challenges for the nation's development and implementation of ITEP are as follows

1. Implementation of the ITEP may have a curriculum burden for the students owing to they have to complete five years curriculum in four years.
2. Implementation of ITEP requires educational institutions, infrastructure, well trained teachers, prescribed curriculum. This may take lots of time to provide all types of facilities for the students, teachers and parents.
3. All the colleges and universities may not be able handle this type of course due to lack teaching staffs and time management.
4. All the students may not be interested for the ITEP because they want to complete their graduation as far as short duration and engage in any type of job to financially help their parents.
5. This programme may create gap for teaching profession and others professions. Because for engagement in teaching profession one needs to have 4 years Bed certificate but in others professions this type of educational qualifications is not required. So people may prefer teaching profession to others professions.
6. Parents may be financially weak for affording all the expenditures require for this course.

SUGGESTIONS :

Some suggestions to overcome the challenges:

- Workshops, In-service training should be organized for the teacher educators time to time to maintain the quality of teacher education.
- Stricter requirements for affiliation and an efficient monitoring system by NCTE are necessary to uphold the decorum of teacher education in India.
- The curriculum needs to be changed periodically to meet the needs of both society and the pupils.
- There should be a common admission procedure in order to admit the students in various teacher education programs. Content knowledge, general awareness, reasoning ability along with teaching aptitude can be assessed prior to the admission.
- The qualification of Teacher Educators or Assistant Professors to teach the student teachers should be decided strictly as per the NCTE norms.
- In order to revitalize India's teacher education institutes, funds and other resources should be made available.
- To preserve the standard of teacher education in India, timely appointments of Assistant Professors or Teacher Educators are required.
- The trainee teachers' evaluations have to be continuous and comprehensive. So that they will be able to know their strength and weakness and accordingly they can improve themselves. The nature of feedback should be constructive.
- Internship period can be increased a little bit to make the student teachers more familiar with the school as well as class environment.
- Teacher Educators should integrate different methodologies as well as approaches to facilitate the students. Traditional approach of teaching should be avoided as far as possible

Recommendations Of National Education Policy (2020) On Teacher Education:

Some of the key recommendations of NEP (2020) regarding Teacher Education are listed below.

- NEP (2020) has placed emphasis on the Integrated Teacher Education Program.

- By 2030, all standalone teacher education institutions will become interdisciplinary ones in order to provide the four-year integrated teacher education program.
- By 2030, a 4-year integrated B.Ed. degree will be the minimal need for teachers in schools to instruct pupils at different levels.
- To uphold the consistent standards for teacher education in India, admission to the pre-service teacher training program will be conducted through the National Testing Agency (NTA).
- For teachers' ongoing professional development, the usage of online platforms such as SWAYAM/DIKSHA for online training will be promoted.
- To guide the teachers, a National Mission for Mentoring will be formed, and senior/retired faculty members will be the mentors. An overall analysis reveals that if the NEP (2020) recommendations on teacher education are properly implemented at the local level, it will contribute in improving the quality of teacher education program in India.

CONCLUSION:

One of the most significant educational programs is the teacher education program. There will be challenges or issues in a programme but the most important thing is solutions. Our duty is to face all these challenges and find out the proper remedies beforehand. So that all issues can be addressed and the standards of teacher education program will remain maintained. In the field of teacher education numerous policies, committees, commissions, and research articles also occasionally suggest valuable points but everything is documented in writing. It is up to us that how effectively we are taking the advantage of such good points and work in this regard for its implementation in order to preserve the caliber of teacher preparation programs across the nation.

Teacher education is crucial for a country's development, as well as the overall progress of the nation. The National Education Policy 2020 introduces an integrated

Teacher education program, which could be a key factor in achieving this goal. Despite potential implementation barriers, the policy aims to strengthen and develop the entire education system, making the country a recognized developed nation

globally. The implementation of this program has immense strength and benefits, but challenges may arise. The hope is that NEP 2020 will lead to a more robust and well-developed education system.

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Emotional Intelligence of Secondary Teacher Trainees of Surat City

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Abstract

The National Education Policy (NEP) 2020 emphasizes holistic development and focuses on emotional intelligence as a key attribute for teachers. The present study investigates the level of emotional intelligence of secondary teacher training in Surat City, using the The Schutte Emotional Intelligence Scale (SEIS) translated into Gujarati by the researchers. A descriptive survey methodology was adopted and data of randomly selected 125 trainees collected using the Google form. Descriptive statistics and t-test was conducted to examine the emotional intelligence level and hypothesis testing. The findings suggest that the secondary teacher trainees of Surat city have high level of emotional intelligence. The gender, marital status and educational stream does have any significant effect on the levels of emotional intelligence.

Keywords:

Emotional intelligence, NEP 2020, Secondary teacher trainees

Introduction

The National Education Policy (2020) proposes a transformative approach to education in India, prioritizing holistic and multidisciplinary learning. Teachers are expected to nurture not only cognitively but also emotionally. Emotional intelligence (EI) is integral to fulfilling this vision, as it enables teachers to identify, use, understand, and manage emotions in oneself and others.

In 1990 Mayer and Salovey proposed the existence of a new intelligence called “Emotional Intelligence (EI)”. Drawing only such findings in areas of emotion, intelligence, psychotherapy, and cognition. This suggested that some people might be more intelligent about emotion than others (Mayer and Salovey, 1990, p.189). The general public was made aware of the concept of emotional intelligence through the publication of the book in 1995 (Goleman, 1995). Mayer and Salovey define emotional

intelligence as the capacity to identify emotions, use emotions for the facilitation of thought, understand emotions, and manage emotions.

However, rather than the consensus on emotional intelligence, several alternative models of emotional intelligence have been proposed. The ability model (Mayer and Salovey 1997), the mix model (Bar-on, 1997; Goleman, 1995), and the Trait model (Petrides, 1990) are widely accepted. Out of these models of emotional intelligence, researchers selected the Ability model of emotional intelligence suggested by Mayer and Salovey (1990) for the study. Mayer and Salovey proposed the first draft of this model. It consists of four key elements of emotional intelligence. Later on, they modified the model in 1997 (Mayer and Salovey, 1997). The model suggested that emotional intelligence should be measured in terms of four branches, i.e. identifying emotions, use of emotion for facilitation of thoughts, understanding emotions, and managing emotions.

Teacher trainees are the foundation of the future education systems. Their emotional intelligence is critical for implementing the National Education Policy (NEP-2020) which calls for nurturing creativity, critical thinking, and emotions among the students. Emotional intelligence contributes to the improvement of teachers' performance, student all-round development, and overall classroom harmony. Understanding the EI levels of teacher trainees can help institutions design targeted interventions to foster emotional skills. positive learning environment. This study investigates the emotional intelligence levels of secondary teacher trainees in Surat City. The findings aim to highlight the importance of EI in teacher training programs and provide recommendations for enhancing emotional intelligence among trainees.

Methodology

Objectives

1. To study the emotional intelligence of secondary teacher trainees of Surat city.
2. To study the emotional intelligence of secondary teacher trainees of Surat city in relation to their gender.
3. To study the emotional intelligence of secondary teacher trainees of Surat city in relation to their marital status.
4. To study the emotional intelligence of secondary teacher trainees of Surat city in relation to their educational stream.

Hypothesis

1. There will be no significant difference between the means of emotional intelligence score of male and female secondary teacher trainees of Surat city.
2. There will be no significant difference between the means of emotional intelligence score of married and unmarried secondary teacher trainees of Surat city.
3. There will be no significant difference between the means of emotional intelligence score of secondary teacher trainees of science and other streams of Surat city.

Variable

For this study, gender, marital status, and educational stream of secondary teacher trainees were the independent variables. The emotional intelligence of secondary teacher trainees was the dependent variable.

Population and Sampling

Secondary teacher trainees from the B.Ed colleges of Surat city were the population for the study. A total of 198 secondary teacher trainees, pursuing their B.Ed. degree during the academic year 2024-2025 from the five B.Ed. colleges of Surat City was the population for the study. The researchers decided to use simple random sampling for the sampling. A total of 125 secondary teacher trainees were selected as the sample for the study with the help of random numbers generated from randomlists.org.

Tool

Schutte et al (1998) developed an Emotional Intelligence Scale, Schutte Emotional Intelligence Scale (SEIS) on the basis of Ability Model suggested by Mayer and Salovey. The researchers got the permission to use the SEIS from Nicola Schutte (Schutte, N., personal communication, January 29, 2024). The researchers translated the SEIS in Gujarati language and used it for present study. The internal consistency of the SEIS as measured by cronbach's alpha is 0.87. The test-retest reliability of the SEIS is 0.78 and the convergent validity was 0.43. The scale consisting 33 items. Respondents need to rate themselves on items using 5point scale. the emotional intelligence score has a range from 33 to 165.

Data collection and analysis

The researchers converted the translated SEIS into a Google Form. Data was collected using the Google form. For the data analysis and interpretation, the initial scoring is

done using Microsoft Excel and Social Science Statistics calculator from <https://www.socscistatistics.com> was used for calculating descriptive statistics, mean, standard deviation, and t-test.

Findings

The data was collected from 125 secondary teacher trainees of Surat city. Descriptive statistics of emotional intelligence score was calculated and mentioned in table 1.1.

Table 1.1 Descriptive statistics of overall frequency distribution of emotional intelligence score

Mean	133.78
Median	132
Standard Deviation (s)	12.92
Skewness	0.29691
Kurtosis	0.0163
Lowest Score	110
Highest Score	161
Distribution Range	51
Total Number of Scores	23

From the above table 1.1 it was interpreted that the value of Mean and Median are nearer to each other, so it can be said that the measures of central tendency were near to the centre of the frequency distribution. The value of Kurtosis was 0.0163, so it can be said that measure of departure from the normal convexity of a distribution was less. Hence the curve was normal Mesokurtic, the value of Skewness was 0.2969, so it can be said that there was skewed distribution which showed lack of symmetry.

Three levels of the emotional intelligence; low, medium and high were determined to study the emotional intelligence of secondary teacher trainees of Surat city. The emotional intelligence scores were classified into three classes as shown in table 1.2.

Table 1.2 classification of Emotional Intelligence score of all trainees

No	Class	Frequency	Level of Emotional intelligence
1	33-76	0	Low
2	77-121	13	Medium
3	122-165	112 N=125	High

From the above table 1.2, it was observed that the number of frequencies for class 33-76, 77-121 and 122-165 was 0, 13 and 112 respectively. The majority of secondary

teacher trainees had high level of emotional intelligence while few has medium and none has low level of emotional intelligence. The mean emotional intelligence score 133.78 indicated that the secondary teacher trainees of Surat city had high level of emotional intelligence

The emotional intelligence of secondary teacher trainees of Surat city was studied in relation to gender, marital status and educational stream. Three hypotheses were framed and tested for that. The data analysis for the three variables; gender, marital status, and educational stream is presented as table 1.3, 1.4 and 1.5 respectively.

Table 1.3 Analysis of emotional intelligence scores of male and female trainees

Gender	N	Mean	Standard Deviation	t-value	p-value
Female	98	137.79	13.87	0.63	0.53
Male	27	139.63	11.92		

Table 1.3 indicates that there was no significant effect of gender, $t(123)=.63$, $p=.53$, despite male ($M=139.63$, $SD=11.92$) attaining higher emotional intelligence score than female ($M=137.79$, $SD=13.87$).

Table 1.4 Analysis of emotional intelligence scores of married and unmarried trainees

Marital Status	N	Mean	Standard Deviation	t-value	p-value
Married	23	133.78	12.90	1.75	0.82
Unmarried	102	139.18	13.43		

Table 1.4 indicates that there was no significant effect of marital status, $t(123)=1.75$, $p=.82$, despite unmarried trainees ($M=139.18$, $SD=13.43$) attaining higher emotional intelligence score than unmarried trainees ($M=133.78$, $SD=12.90$).

Table 1.5 Analysis of emotional intelligence scores of trainees of common and science stream

Educational Stream	N	Mean	Standard Deviation	t-value	p-value
Common	83	139.84	13.16	1.96	0.052
Science	42	134.90	13.56		

Table 1.4 indicates that there was no significant effect of educational stream of the trainees, $t(123)=1.96$, $p=.052$, despite trainees of common stream ($M=139.84$, $SD=13.16$) attaining higher emotional intelligence score than trainees of science stream

(M=134.90, SD=13.56).

Conclusion

The research aimed to study the emotional intelligence of secondary teacher trainees in Surat City. The findings suggest that the secondary teacher trainees of Surat city have high level of emotional intelligence. The gender, marital status and educational stream does have any significant effect on the levels of emotional intelligence. This indicates that emotional intelligence among teacher trainees remains consistent regardless of their demographic or academic characteristics. This consistency suggests that emotional intelligence is a universal trait that may not be significantly influenced by external factors such as gender, marital status, or stream of study. The Schutte Emotional Intelligence Scale (SEIS) was made available in the Gujarati language at the end of present research that can be used to measure the emotional intelligence.

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A Study of Mental Health for B.Ed. Trainees

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Abstract

According to the American Psychiatric Association (2018), Mental Hygiene consists of measures to reduce the incidence of mental illness through prevention and early treatment and to prompt mental health. Shidapara (2011) studied in psychology field and stated that men exhibit better mental health compared to women. Suthar (2020) stated that female trainees in B.Ed. colleges have better mental health than their male trainees. In the present study, the researcher examined the mental health of B.Ed. trainees using a self-constructed mental health scale as the research tool. This scale has included four components that is Structured Personality, Academic Self-evaluation, Perception of Reality, and Dominance over Social Environment. The researcher developed 44 items based on these components. Population of the study consisted of trainees from 27 B.Ed. colleges affiliated to Veer Narmad South Gujarat University. Using a purposive sampling method, 160 trainees from R.K. Desai B.Ed. College were selected. Data collection was conducted via Google Forms for two days in November 2024. Data analysis was carried out using MS Excel and a Social Science Statistics Calculator, employing measures such as mean, median, standard deviation, t-test, and p-value. The findings revealed that the mental health of male and female trainees was almost identical, and there was no significant differences observed between married and unmarried trainees. The study suggests that conducting similar research on larger samples may yield more conclusive results, highlighting the need for further research in this field.

Keyword :

Mental Health, NEP 2020, B.Ed. trainees.

Introduction

According to the National Education Policy (2020, ch.5, p. 26), "Teachers truly shape

the future of children and thereby also shape the future of the nation." Teachers are a crucial part of the education system for the future of the nation and children. NEP 2020 emphasizes the importance of focusing on the quality of teacher training to achieve this. As per Teacher Education by Raval and others (2011, p. 43), a teacher is responsible for the holistic development of students. To achieve this, the teacher must understand the characteristics of students' personalities, individual differences, their problems, issues of adjustment, and properly integrate these into their educational approach. Additionally, a teacher must consider students' developmental stages—physical, mental, emotional, and social—while planning educational activities.

A teacher's responsibility does not end with subject knowledge; they must also possess qualities such as love, warmth, acceptance, safety, satisfaction, and adaptability. However, this is only possible when the teacher maintains mental well-being.

Previous Researches Regarding Study

Shidapara (2011) studied in psychology field and stated that the male has good mental health than female but in case of type of family Joint family have very good mental health than nuclear family, and regarding marital status Unmarried people have better mental health than married people. Similarly, Suthar (2020) was studied on mental health and found that the female trainees has better mental health than male trainees. there is no significant difference between rural and urban regarding mental health but regarding rural area the female trainees has better mental health than male trainees. the female trainees are also better in mental health than male trainees. For the comparison of female trainees urban once are superior than rural but, for male trainees rural and urban level has seen similar.

For the present study, the components of mental health were determined by reviewing books, articles, and journals by various eminent authors. Additionally, previous research is studied in detail. Based on this review, components of mental health were identified were and decided research design.

1.0 Objectives of the Study

Objectives of the present study are as follows;

1. To study the mental health of B.Ed. trainees.
2. To study the mental health of B.Ed. trainees with reference to gender.
3. To study the mental health of B.Ed. trainees with reference to marital status.

2.0 Hypotheses of the Study

Null hypothesis of the present study are as follows;

1. There will be no significant difference in the mental health scores of male and female B.Ed. trainees on the mental health scale.
2. There will be no significant difference in the mental health scores of married and unmarried B.Ed. trainees on the mental health scale.

3.0 Variables of the study.

Variables of the present study are as follows;

1. Independent variable

❖ gender

1. female
2. male

❖ Marital status

1. Unmarried
2. Married

2. dependent variable

❖ Mental health

4.0 Population and Sample

The population of the present study was limited to B.Ed. trainees of 27 B.Ed. colleges affiliated with Veer Narmad South Gujarat University during the academic year 2024-25. For data collection, a purposive sampling method was chosen. The sample consisted of 160 trainees from R.K. Desai B.Ed. College, Vapi of Gujarat state.

5.0 Tools

For this study, the researcher reviewed books and articles by various scholars on mental health and its measurement. Based on the literature, four key components were identified:

1. Well-structured Personality
2. Educational Self-Evaluation
3. Perception of Reality
4. Dominance over Social Environment

A scale comprising 44 items was developed to measure these components of mental health. Suggestions were sought from experts, and necessary modifications were made

to finalize the mental health scale.

6.0 Research Methodology

Since the present study focuses on analyzing the mental health of B.Ed. trainees, the survey method was adopted.

7.0 Data Collection

For data collection, approval was obtained from the principal of R.K. Desai B.Ed. College, Vapi, affiliated with Veer Narmad South Gujarat University. The mental health scale was administered to B.Ed. trainees of Semester-2 and Semester-4 by sharing a Google Form link. The responses collected through the Google Form were used for analysis.

8.0 Data collection and analysis

Data were collected using Google form.

For the data analysis and interpretation, the initial scoring is done using Microsoft Excel and after attaining the social statistic calculator calculations like mean, standard deviation, t test, significance of t-value were done. The important analysis & results related data has been explained as follow.

Results and Discussion

Table 1.1 Analysis and Interpretation of mental health score of all B.Ed. trainees

No	Class	Frequency
1	44 - 102	0
2	103 - 161	15
3	162 - 220	145 N= 160

From the above table 1.1, it can be said that B.Ed. trainees between class 44-102 has poor level of mental health, B.Ed. trainees between class 103-161 has medium level of mental health and B.Ed. trainees between class 162-220 has good level of mental health. In this study, the data was collected overall from 160 B.Ed. trainees. sample selected based on two independent variables, gender and marital status. Descriptive statistics of overall frequency distribution of mental health score was calculated and mentioned in table 1.2.

Table 1.2 Descriptive statistics of overall frequency distribution of mental health score

Mean	186.55
Median	190
Standard Deviation (s)	18.03972
Skewness	-0.94886
Kurtosis	0.94494
Lowest Score	128
Highest Score	216
Distribution Range	88
Total Number of Scores	160
Number of Distinct Scores	61

From the above table 1.2 It was interpreted that the value of Mean (186.55) & Median (190) are nearer to each other, so it can be said that the measures of central tendency were near to the centre of the frequency distribution. The value of Kurtosis was 0.94494, so it can be said that measure of departure from the normal convexity of a distribution was less. Hence the curve was normal Mesokurtic, the value of Skewness was -0.94886, so it can be said that there was skewed distribution which showed lack of symmetry.

Table 1.3 mean, standard deviation, t value of female and male B.Ed. trainees

Variable	N	M	SD	t-value	p- value
Female	144	187.15	17.81	1.26	0.21
Male	16	181.19	19.79		

Above table 1.3 Shows mean, standard deviation and t value of male and female trainees on mental health. The mean score for female and male B.Ed. trainees was 187.15 and 181.19. standard deviation was 17.81 and 19.79. t value was 1.26 which is less than tabulated t-value 1.96 at 0.01level and p-value 0.21 respectively, which was not significant at 0.01 and 0.05. so, there is no significant difference between mental health of female and male trainees. so, here hypothesis **There will be no significant difference in the mental health scores of male and female B.Ed. trainees on the mental health scale** was accepted.

Table 1.4 mean, standard deviation, t value of unmarried and married trainees

Variable	N	M	SD	t-value	p-value
Unmarried	141	186.35	13.65	0.39	0.70
Married	19	188.05	13.71		

Above table 1.4 The mean score for unmarried and married trainees was 186.35 and 188.05. standard deviation was 13.65 and 13.71 t value was 0.39 which is less than tabulated t-value 1.96 at 0.01 level and p-value was 0.70 which was not significant at 0.01 and 0.05 level. It indicate that there is no significant difference between mental health of unmarried and married trainees. and mean, standard deviation and t value of unmarried and married trainees on mental health. so, here hypothesis **There will be no significant difference in the mental health scores of married and unmarried B.Ed. trainees on the mental health scale** was accepted.

Conclusion

This study indicate the importance of addressing mental health issues among secondary teacher trainees. By identifying areas of concern and implementing targeted interventions, teacher training programs can ensure that future educators are better equipped to handle the demands of the teaching profession. Further research with larger samples and longitudinal designs could provide deeper insights into the mental health challenges faced by teacher trainees.

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The Integration of STEAM Education: Enhancing Conceptual Understanding and Critical Thinking

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Abstract

STEAM education, which integrates Science, Technology, Engineering, Arts, and Mathematics, represents a paradigm shift from traditional STEM approaches. This thematic paper explores how STEAM fosters conceptual understanding and critical thinking, essential skills for 21st-century learners. By examining the framework of STEAM education, its components, and its applications, this paper highlights its transformative potential in education while addressing challenges educators face in its implementation. Practical insights are provided to bridge the gap between theory and classroom practice, ensuring holistic student development.

Introduction

In today's rapidly evolving world, education systems must equip students with skills beyond rote learning and standardized tests. Conceptual understanding and critical thinking are essential competencies for navigating the complexities of the 21st century. Traditional STEM (Science, Technology, Engineering, Mathematics) education has long been a cornerstone of efforts to prepare students for careers in science and technology-driven fields. However, the inclusion of Arts, transforming STEM into STEAM, provides a broader, more interdisciplinary approach. By fostering creativity, inquiry, and collaboration, STEAM empowers students to connect their learning to real-world contexts and prepares them to solve complex problems. This paper examines the framework and implications of STEAM education, focusing on its impact on conceptual understanding and critical thinking.

Definition of STEM Education

According to the National Science Teachers Association (NSTA), "A common definition of STEM education is an interdisciplinary approach to learning where rigorous academic concepts are coupled with real-world lessons as students apply science, technology, engineering, and mathematics in contexts that make connections

between school, community, work, and the global enterprise enabling the development of STEM literacy and with it the ability to compete in the new economy.”

Definition of STEAM Education

The origin of STEM term was in 1990's by the National Science Foundation (NSF) in USA. In many educational reforms that take place today, STEM was considered as a supportive approach that emphasized on the multidisciplinary approach to better prepare students for STEM occupations and to compete in the global economy. STEM Approach can be defined as a paradigm that emphasis on teaching a subject by grafting the four disciplines in a planned- integrated way. This approach is conducted in a well-established environment with suitably prepared instructor. The classroom appears as a group of clusters of collaborating and actively communicating learners with the goal of empowering them with the 21st century skills. Coupled with Arts discipline, STEM paradigm is shifting to become STEAM. The debate is that Arts may provide learners with new ways of thinking, observing, and more chances of creativity.

STEAM represents a paradigm shift from traditional education philosophy, based on standardized test scores, to a modern ideal which focuses on valuing the learning process as much as the results. In essence, we dare our students to be wrong, to try multiple ideas, listen to alternate opinions and create a knowledge base that is applicable to real life as opposed to simply an exam.

STEAM Education is an approach to learning that uses Science, Technology, Engineering, the Arts and Mathematics as access points for guiding student inquiry, dialogue, and critical thinking. (Susan riley, arts integration specialist)

STEAM encourage important learning characteristics and qualities for students.

- **Science** requires students to not only answer but also to ask questions. Science powers curiosity, investigation, and problem solving, often involving experimentation and exploration.
- **Technology** refers to applying the scientific knowledge a students gains. They do this by using the most basic tools like crayons and rulers, as well as more complex technological inventions like microscopes and computers.
- **Engineering** activities in school are concerned with the design and building. It is testing structures and designs, as well as discovering and testing possible solutions.

- **Arts** encourages creativity and process development, as well as allows students to illustrate concepts they are learning.
- **Mathematics** isn't limited to just number sense for students. It also includes the ability to see and create patterns, shapes, as well as organizational skills like graphing and sorting.

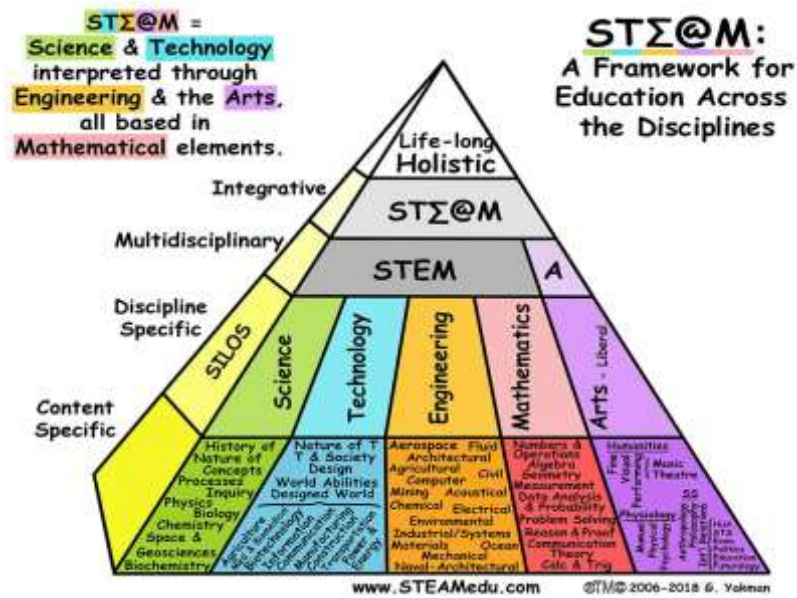


Figure-1

What is the Difference between STEM vs. STEAM ?

According to the institute for arts integration and STEAM on website <https://artsintegration.com/what-is-steam-education-in-k-12-schools/> The STEM to STEAM movement has been taking root over the past several years and is surging forward as a positive mode of action to truly meet the needs of a 21st century economy. STEM alone misses several key components that many employers, educators, and parents have voiced as critical for our children to thrive in the present and rapidly approaching future.

Much has been proclaimed about the need for more STEM “programs” in our schools. The logic is simple: the wave of future economic prosperity lies in a workforce that is well-versed in rising Job markets like science, technology, engineering and math. Thus, there has been an increased investment in STEM initiatives in schools. This includes (but is not limited to):

- providing mobile devices for students (sometimes in the forms of computer labs, and other times in the form of 1:1 – a single device for each student)
- after-school STEM clubs or programs
- STEM curriculum, where projects using STEM practices are embedded
- BYOD initiatives (bring your own device)
- STEM days to encourage hands-on exploration within each of these disciplines
- robotics programs

While these initiatives are a wonderful start into the exploration of these four areas of study, the critical process of creativity and innovation is missing. Students in STEM programs may have more experiential learning opportunities, but they are limited to only science, technology, engineering and math. Our economy requires so much more than an understanding of these areas – it requires application, creation and ingenuity. STEM alone does not foster these essential nutrients.

STEAM is a way to take the benefits of STEM and complete the package by integrating these principles in and through the arts. STEAM takes STEM to the next level: it allows students to connect their learning in these critical areas together with arts practices, elements, design principles, and standards to provide the whole pallet of learning at their disposal. STEAM removes limitations and replaces them with wonder, critique, inquiry, and innovation.

Explore the STEAM Model

The pathway to STEAM is exciting, but can also be dangerous without an understanding of what STEAM truly means in both its intention and its implementation. Like its STEM predecessor, STEAM can stop short of its best manifestation without several core components:

- STEAM is an integrated approach to learning which requires an intentional connection between standards, assessments and lesson design/implementation.
- True STEAM experiences involve two or more standards from Science, Technology, Engineering, Math and the Arts to be taught AND assessed in and through each other
- Inquiry, collaboration, and an emphasis on process-based learning are at the heart of the STEAM approach

- Utilizing and leveraging the integrity of the arts themselves is essential to an authentic STEAM initiative

How to Use STEAM: Process and Product

There are actually 6 steps to creating a STEAM-Centered classroom, no matter what area you teach. In each step, you're working through both the content and the arts standards to address a central problem or essential question.

What's great about this process is that you can as easily use it to help plan for a lesson as you can to facilitate the actual learning process in your STEAM classroom. Let's take a look at each step.

1. Focus

In this step, we're selecting an essential question to answer or problem to solve. It's important to have a clear focus on both how this question or problem relates to the STEM and the Arts content areas you've chosen.

2. Detail

During the detail phase, you're looking for the elements that are contributing to the problem or question. When you're observing the correlations to other areas or why the problem exists, you begin to unearth a lot of key background information, skills or processes that students already have to address the question.

3. Discovery

Discovery is all about active research and intentional teaching. In this step, students are researching current solutions, as well as what ISN'T working based on the solutions that already exist. As a teacher, you can use this stage to both analyze the gaps your students may have in a skill or process and to teach those skills or processes explicitly.

4. Application

This is where the fun happens! After students have dived deep into a problem or question and have analyzed current solutions as well as what still needs addressed, they can begin to create their own solution or composition to the problem. This is where they use the skills, processes and knowledge that were taught in the discovery stage and put them to work.

5. Presentation

Once students have created their solution or composition, it's time to share it. It's important that the work is presented for feedback and as a way for expression based on a student's own

Perspective surrounding the question or problem at hand. This is also an important opportunity to facilitate feedback and help students learn how to give and receive input.

6. Link

This step is what closes the loop. Students have a chance to reflect on the feedback that was shared and on their own process and skills. Based on that reflection, students are able to revise their work as needed and to produce an even better solution.

Conceptual Understanding

According to Tan and yangco, One Important aspect of conceptual understanding is its capacity to promote retention of lessons learned.

Meaning of Concepts

According to Kid sense child development Concepts help a child to understand about direction, location, position, number, quantity, sequence, attributes, dimension, size and similarities and differences.

In order to function in society one must learn the rules and structures of the language system. One structure of language that helps a child to become more specific in their understanding and use of language is the knowledge of concepts.

Important of Understanding of Concepts

It is important for children to have a good understanding of different concepts as it assists in their ability to follow instructions and be specific in what they are talking about. In order for a child to use concepts in their spoken language, they first need to have a good understanding about what these concepts are and what they mean. By developing this understanding they are then better able to follow instructions at home, at preschool and in the school environment.

The building blocks Necessary to Develop the Understanding of Concepts

- **Hearing** : A child needs to have adequate hearing abilities to ensure that they can hear appropriate language models, and therefore use appropriate language.
- **Attention and concentration** : Sustained effort, doing activities without distraction and being able to hold that effort long enough to get the task done.
- **Play skills** : Voluntary engagement in self motivated activities that are normally associated with pleasure and enjoyment where the activities may be, but are not necessarily, goal oriented.

- **Receptive (understanding) language** : Comprehension of language. Understanding of language develops before expressive language. In order to be able to use language appropriately, a child first needs to be able to understand the specific language area.

Child has Concept Difficulties

When a child has concept difficulties, they might also have difficulties with:

- **Following instructions:** The ability to independently complete tasks/instructions upon request.
- **Receptive (understanding) language:** Comprehension of language.
- **Expressive (using) language:** The use of language through speech, sign or alternative forms of communication to communicate wants, needs, thoughts and ideas.
- **Drawing pictures:** Unable to conceptualize what it looks like.
- **Puzzle completion.**
- **Problem solving:** The identification of a challenge, including what the challenge is, what strategies could be used to overcome it, and the subsequent performance to overcome it.
- **Literacy:** Reading and writing.
- **Play skills:** Voluntary engagement in self motivated activities that are normally associated with pleasure and enjoyment where the activities may be, but are not necessarily, goal oriented.

Activities can Help Improve Concept Development

- **Reading story books** that have flaps and discuss locations (e.g. Spot books – Where is Spot? He is *behind* the door).
- **Following instructions:** In play ask the child to follow instructions containing age appropriate concepts (e.g. “Let’s feed the *big* bear” or “Drive your car *under* the table”).
- **Play games** where you take it in turns to hide toys around the room (e.g. “Put the car *on* the table” or “Hide your teddy *behind* the couch”).
- **Hide and Seek:** Once you locate the child or they locate you, get them to say where they were hiding (e.g. *In* the cupboard, *under* the bed, *behind* the curtain).

- **Sing songs** that involve concepts (e.g. I'm going up; If you're happy and you know it; Build it Up; Wet washing hanging on the line). A lot of Playschool Sound Tracks will have songs that discuss different concepts.
- **Teaching colours:** Place the child's favourite snack or toy in containers with different coloured lids. To get the item they have to name the colour correctly.
- **Scavenger hunt:** Go on a scavenger hunt and find items that are all a particular colour (e.g. find a bucket of red items – apple, car, and crayon).
- **Wash dishes:** (Teaching wet/dry) Wash the dishes and encourage your child to either make the dishes 'wet' or 'dry'.

Critical Thinking

According to Beyer (1990), who strongly argued that critical thinking, was defined as ability and readiness of individuals to reflect on their own and others' thinking in relation to its truth, value and validity in a logical argument. He also differentiated between critical thinking and other types of thinking such as problem-solving, creative thinking, and decision-making. In his view all these processes were interrelated, but could be differentiated from one other, as each one of them served a specific purpose.

Meaning of Critical Thinking

According to the university of Tennessee Chattanooga When examining the vast literature on critical thinking, various definitions of critical thinking emerge. Here are some samples:

- "Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action" (Scriven, 1996).
- "Most formal definitions characterize critical thinking as the intentional application of rational, higher order thinking skills, such as analysis, synthesis, problem recognition and problem solving, inference, and evaluation" (Angelo, 1995, p. 6).
- "Critical thinking is thinking that assesses itself" (Center for Critical Thinking, 1996b).

- "Critical thinking is the ability to think about one's thinking in such a way as 1. To recognize its strengths and weaknesses and, as a result, 2. To recast the thinking in improved form" (Center for Critical Thinking, 1996c).

Perhaps the simplest definition is offered by Beyer (1995) : "Critical thinking... means making reasoned judgments" (p. 8). Basically, Beyer sees critical thinking as using criteria to judge the quality of something, from cooking to a conclusion of a research paper. In essence, critical thinking is a disciplined manner of thought that a person uses to assess the validity of something (statements, news stories, arguments, research, etc.)

Characteristics of Critical Thinking

Wade (1995) identifies eight characteristics of critical thinking. Critical thinking involves asking questions, defining a problem, examining evidence, analyzing assumptions and biases, avoiding emotional reasoning, avoiding oversimplification, considering other interpretations, and tolerating ambiguity. Dealing with ambiguity is also seen by Strohm & Baukus (1995) as an essential part of critical thinking, "Ambiguity and doubt serve a critical-thinking function and are a necessary and even a productive part of the process" (p. 56).

Another characteristic of critical thinking identified by many sources is metacognition. Metacognition is thinking about one's own thinking. More specifically, "metacognition is being aware of one's thinking as one performs specific tasks and then using this awareness to control what one is doing" (Jones & Ratcliff, 1993, p. 10).

In the book, Critical Thinking, Beyer elaborately explains what he sees as essential aspects of critical thinking. These are:

- **Dispositions** : Critical thinkers are skeptical, open-minded, value fair-mindedness, respect evidence and reasoning, respect clarity and precision, look at different points of view, and will change positions when reason leads them to do so.
- **Criteria** : To think critically, must apply criteria. Need to have conditions that must be met for something to be judged as believable. Although the argument can be made that each subject area has different criteria, some standards apply to all subjects. "... an assertion must... be based on relevant, accurate facts; based on credible sources; precise; unbiased; free from logical fallacies; logically consistent; and strongly reasoned" (p. 12).

- **Argument** : Is a statement or proposition with supporting evidence. Critical thinking involves identifying, evaluating, and constructing arguments.
- **Reasoning** : The ability to infer a conclusion from one or multiple premises. To do so requires examining logical relationships among statements or data.
- **Point of View** : The way one views the world, which shapes one's construction of meaning. In a search for understanding, critical thinkers view phenomena from many different points of view.
- **Procedures for Applying Criteria** : Other types of thinking use a general procedure. Critical thinking makes use of many procedures. These procedures include asking questions, making judgments, and identifying assumption

Teach Critical Thinking

Oliver & Utermohlen (1995) see students as too often being passive receptors of information. Through technology, the amount of information available today is massive. This information explosion is likely to continue in the future. Students need a guide to weed through the information and not just passively accept it. Students need to "develop and effectively apply critical thinking skills to their academic studies, to the complex problems that they will face, and to the critical choices they will be forced to make as a result of the information explosion and other rapid technological changes" (Oliver & Utermohlen, p. 1).

As mentioned in the section, Characteristics of Critical Thinking, critical thinking involves questioning. It is important to teach students how to ask good questions, to think critically, in order to continue the advancement of the very fields we are teaching. "Every field stays alive only to the extent that fresh questions are generated and taken seriously" (Center for Critical Thinking, 1996a).

Beyer sees the teaching of critical thinking as important to the very state of our nation. He argues that to live successfully in a democracy, people must be able to think critically in order to make sound decisions about personal and civic affairs. If students learn to think critically, then they can use good thinking as the guide by which they live their lives.

Teaching Strategies to Help Promote Critical Thinking

The 1995, Volume 22, issue 1, of the journal, Teaching of Psychology, is devoted to the teaching critical thinking. Most of the strategies included in this section come from

the various articles that compose this issue.

- **CATS (Classroom Assessment Techniques)** : Angelo stresses the use of ongoing classroom assessment as a way to monitor and facilitate students' critical thinking. An example of a CAT is to ask students to write a "Minute Paper" responding to questions such as "What was the most important thing you learned in today's class? What question related to this session remains uppermost in your mind?" The teacher selects some of the papers and prepares responses for the next class meeting.
- **Cooperative Learning Strategies** : Cooper (1995) argues that putting students in group learning situations is the best way to foster critical thinking. "In properly structured cooperative learning environments, students perform more of the active, critical thinking with continuous support and feedback from other students and the teacher" (p. 8).
- **Case Study /Discussion Method** : McDade (1995) describes this method as the teacher presenting a case (or story) to the class without a conclusion. Using prepared questions, the teacher then leads students through a discussion, allowing students to construct a conclusion for the case.
- **Using Questions** : King (1995) identifies ways of using questions in the classroom:
- **Reciprocal Peer Questioning** : Following lecture, the teacher displays a list of question stems (such as, "What are the strengths and weaknesses of..."). Students must write questions about the lecture material. In small groups, the students ask each other the questions. Then, the whole class discusses some of the questions from each small group.
- **Reader's Questions** : Require students to write questions on assigned reading and turn them in at the beginning of class. Select a few of the questions as the impetus for class discussion.
- **Conference Style Learning** : The teacher does not "teach" the class in the sense of lecturing. The teacher is a facilitator of a conference. Students must thoroughly read all required material before class. Assigned readings should be in the zone of proximal development. That is, readings should be able to be understood by students, but also challenging. The class consists of the students

asking questions of each other and discussing these questions. The teacher does not remain passive, but rather, helps "direct and mold discussions by posing strategic questions and helping students build on each others' ideas" (Underwood & Wald, 1995, p. 18).

- **Use Writing Assignments :** Wade sees the use of writing as fundamental to developing critical thinking skills. "With written assignments, an instructor can encourage the development of dialectic reasoning by requiring students to argue both [or more] sides of an issue" (p. 24).
- **Dialogues :** Robertson and Rane-Szostak (1996) identify two methods of stimulating useful discussions in the classroom:
- **Written dialogues :** Give students written dialogues to analyze. In small groups, students must identify the different viewpoints of each participant in the dialogue. Must look for biases, presence or exclusion of important evidence, alternative interpretations, misstatement of facts, and errors in reasoning. Each group must decide which view is the most reasonable. After coming to a conclusion, each group acts out their dialogue and explains their analysis of it.
- **Spontaneous Group Dialogue :** One group of students are assigned roles to play in a discussion (such as leader, information giver, opinion seeker, and disagreeer). Four observer groups are formed with the functions of determining what roles are being played by whom, identifying biases and errors in thinking, evaluating reasoning skills, and examining ethical implications of the content.
- **Ambiguity:** Strohm & Baukus advocate producing much ambiguity in the classroom. Don't give students clear cut material. Give them conflicting information that they must think their way through.

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Innovative Practices In Teaching Science In Inclusive School

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Abstract:

In Constructivist Approach it is said that science teachers has not only to gives knowledge in form of some texts and picture and students learn it directly is not fruitful. Innovative practices are necessary so that students develop High Ordered Thinking and answer the questions in this competitive world. In Inclusive Education Teachers develop their own Teaching Practices especially for those students, who are with special needs. In present study, researcher had prepared 'Teaching Practice Inventory' in Gujarati language in Science Subject for the Teachers in Upper Primary schools of South Gujarat with Objective to identify the innovative practices implemented in teaching Science to the students. Major preference was given to three Innovative Domains i.e. Visual, Auditory and Kinesthetic. Researcher had given 'Teaching Practice Inventory' to 50 teachers with some directly filling up their responses and some filled responses in Google Form link. Analysis of the obtained data was done and frequency distribution was calculated and percentage was obtained. The results showed that 53% teachers follow Visual Teaching Practice, 14% follow Auditory Teaching Practice and 33% highest showed that they follow Kinesthetic Teaching Practice.

Keywords:

Teaching Practice Inventory, Science Subject

1. Introduction

Education system has become the factory of producing student who can just memorize the content given the textbook rather than understand the concept of the theory. In Science subject also school is giving pressure on just getting marks no matter how it comes. Thus, whole education system has forgot the concept of Teaching Practice of Teachers, which has to be given importance unless students are not going to be ready for the upcoming challenges faced by the world. The students in next generation will compete not only with humans but also with Technology.

Skill is most important for the science students to know, as new discovery or inventions

only comes when thinking cognition level of students is at high ordered level. In past years, many psychologist have identified multi-level thinking process, which include concept attainment, problem solving, creative thinking, decision making etc...All these cognitive abilities shares a common psychological domain. Revised Blooms Taxonomy has given levels of thinking that include Lower-Order Thinking Skills and Higher-Order Thinking Skills. The Basic Thinking in Lower Oder includes Remembering, Understanding and Applying, while Abstract Thinking in Higher Order includes Analyzing, Evaluating and Creating. Actually the learning goals are divided into 3 domains, Cognitive, Affective and Psychomotor. Cognitive is the mental abilities, Affective is related to emotional sides and Psychomotor is related to physical abilities. All these domains affect's the Teaching Practice of students. Cognitive, affective and physiological traits that serve as relatively stable indicators of how learners perceive, interact with and respond to the learning environment.

The principles of diversity, equity and inclusion if embedded within the school education system lays the foundation for access to schooling for all, a larger population joining the workforce and opportunities for lifelong learning for all learners. The National Education Policy (NEP), 2020 emphasizes that, "Education is the single greatest tool for achieving social justice and equality" which has implications for development of an inclusive community and society at large. In order for policy to translate to practice, educational barriers, facilities and services for Children with Special Needs (CwSN) must be addressed. The NEP has infused the aspects of disability inclusion throughout the policy document with a dedicated chapter on equitable and inclusive education, focusing on issues, challenges and recommendations for bridging the gaps reducing the disparities in access and participation of all learners. The issues and recommendations for inclusion of underrepresented students groups including children with disabilities has been subsumed in the policy and covered under the SEDGs i.e. Socio-Economically Disadvantaged Groups (SEdGs) which is an umbrella term covering gender identities, socio-cultural and socio-economic identities, geographical identities as well as disabilities.

According to Harry Reinert, he described four perceptual modes for perception of information (a) visualization- a mental picture of some object or activity (b) written word –a mental picture of the word spelled out for reading (c) listening-no mental picture but the sound of the word carries meaning and (d) activity(Kinesthetic)- a

physical or emotional feeling about the word.

Thus, all this modes of learning describes the way students can gain knowledge and understand the concept of science more clearly and can develop Higher Order Thinking skill and become Creative.

2. Statement of the Study

Innovative Practices in Teaching Science in Inclusive School.

3. Objectives

1. To study about the Teaching Practice of Teachers in Science Subject.
2. To identify most often used Teaching Practice by Teachers in Science Subject.

4. Importance of the Study

1. This study will help teachers to decide teaching method to let student learn.
2. This study will help students to identify their Learning Style.

5. Delimitation of the Study

The present study was delimited to Gujarati medium upper primary school students studying from standard 6 to 8 of South Gujarat zone for academic year 2024-2025 only.

6. Population and Sample

All the Upper primary school Teachers where education is given by school in Gujarati medium of South Gujarat are population of the present study. Sample selection of schools and students are done randomly. From 50 schools samples were selected randomly in clusters. There were total 50 teachers from different areas, were considered as a sample of the study.

7. Research Methodology

In present research, type was Applied research and the method was descriptive-Survey method.

8. Tool

In the present study, researcher for the data collection constructed 'Teaching Practice Inventory' for Teachers of Upper Primary School in Science subject. It consists of 20 statements that survey the individual preference for each of three different elements of Teaching Practice. Subjects are instructed to read each statement and to indicate whether the statement is usually favourable for them when they are teaching something new. They had to give their immediate or first response to each item. The inventory is untimed in its administration.

9. Data Collection

Researcher had prepared 'Teaching Practice Inventory' to collect the data from students. Firstly, try to collect data directly and also prepared Google Link for 50 teachers. Teachers have visited the test site and given their responses on the site. All questions were marked required and teachers had to compulsory answer it with no time limit.

10. Data Analysis

Researcher had analyzed the response for each 20 statement, to find out Teaching Practice of teachers. The total response was counted for Visual Teaching Practice, Auditory Teaching Practice and Kinesthetic Teaching Practice. Frequency distribution was done by using proper scheme to convert response into score. With the help of frequency distribution researcher found out mean and percentage of responses.

Table 1: Summary of Data Analysis

	VISUAL	AUDITORY	KINESTHETIC	TOTAL
MEAN	27	7	16	50
PERCENTAGE	53%	14%	33%	

11. Findings and Discussion of the Study

1. The teachers using Visual Teaching Practice was 53%. When teachers used, ICT Smart board and Flipped Classroom method responses showed students like to video and film related to content, they also used DIKSHA APP for teaching students.
2. The teachers using Auditory Teaching Practice was 14%. When teachers used, Think Pair Share method, Group Discussion and presentation, Jig-Saw technique, Fishing Bowl technique, responses showed students like to discuss in group and do debate on different topic.
3. The teachers using Kinesthetic Teaching Practice was 33%. When teachers used, experiment method, some activities, Gamefication, response, showed students like to do performance work and learn.

12. Conclusion

Based on the findings and discussion, it can be concluded that teachers used Teaching Practice according to the content of the science subject. They showed more less to activity based Teaching Practice, as Science is the subject of experiment and it needs

to be proved with performance of kinaesthetic activity. Teachers also showed high responses for visual Teaching Practice when they had situation of classroom learning and watching shows and videos online of Science subject. Thus, it can be concluded that they also like to watch content related to science and gain experiences of the topic.

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Teaching Skills In Self-Determination

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ABSTRACT

The National Education Policy (NEP) 2020 emphasizes the importance of teachers and parents in providing quality education. The policy also aims to empower teachers and help them do their job effectively. Self-determination refers to a set of skills that helps individuals with disabilities control their life and achieve better inclusive outcomes. Self-determination is primarily concerned with intrinsically driven motivation and shines a light on the interplay between the external factors and internal motives inherent in human nature. In special education, self-determination is often conceptualized as an educational outcome, which recognizes the important role that education plays in the development of student self-determination skills. Consequently, a number of educational practices have been developed to teach students with disabilities these essential skills. Some of the practices focus on helping students to acquire and maintain these skills; others focus on developing a conducive environment that allows and encourages individuals with disabilities to apply and exercise self-determination skills. Some of the strategies focus on creating conducive environments that provide opportunities for individuals with disabilities to apply and exercise self-determination skills; others provide suggestions to families regarding what they can do to promote self-determination. A particular focus is on instructional practices because of the strong link between education and self-determination. Teaching self-determination skills can help students increase their autonomy and planning for the future. Students with disabilities who are more self-determined may be more academically successful.

Keywords:

National Education Policy (NEP) 2020, Choice Maker, Curriculum, skills, teaching, Learning Model, disabilities, inclusive outcomes, special education, self-determination

Introduction

The National Education Policy (NEP) 2020 emphasizes the importance of teachers and parents in providing quality education. The policy also aims to empower

teachers and help them do their job effectively. Self-determination is primarily concerned with intrinsically driven motivation and shines a light on the interplay between the external factors and internal motives inherent in human nature. Teaching self-determination skills can help students increase their autonomy and planning for the future. Students with disabilities who are more self-determined may be more academically successful. People are often motivated to act by external influences, be they financial reward, prestige, advancement, or the opinions of others. Just as often, people are motivated from within, by their beliefs and personal values. While extrinsic motivation is not necessarily a bad thing, it is intrinsic motivation that most effectively encourages and sustains action. We need to feel autonomous – that we are the authors and agents of our behavior – rather than feeling that external forces control our behavior. Self-determination skills include: self-regulation, choice making, goal attainment, autonomy, and problem solving.

Self-determination skills are important for students' academic, social, emotional, and career outcomes. They are also a strong indicator of post-school success. Self-regulated promoting practices foster students' development of metacognition, motivation and strategic action. These underlying learning competencies improve students' academic, social, emotional and career outcomes. Although beneficial, the development of self-regulated promoting practices is challenging, particularly for teacher candidates. This article describes self-regulated learning practices and how motivational supports for teacher candidates' self-determined motivation creates contextual conditions that foster teacher candidates' development of these practices. The article concludes with suggestions for future research.

What is self-determination?

Self-determination is an individual defining what they want in life, and then planning and executing the steps to make it happen. Being able to set goals, self-advocate, remain present in making life decisions, and actively work toward accomplishing those goals are all components of self-determination.

Self-determination can be a driving force for students, especially those with moderate to severe disabilities. Self-determination provides the skills needed for these students to thrive in school, friendships, relationships, employment, community living and beyond. In fact, self-determination is a research-based predictor of positive outcomes for individuals with disabilities.

Self-determination should be a central concept in postsecondary programs for students with disabilities. It also discusses characteristics of environments that support self-determination, such as self-determined role models and opportunities for choice.

Self-determination theory (SDT) is a macro theory of human motivation and personality that concerns people's innate growth tendencies and innate psychological needs. It pertains to the motivation behind people's choices in the absence of external influences and distractions.

Self-determination theory itself can be helpful in understanding the things that might motivate a given individual's behavior. Feeling like one has both the autonomy and the capabilities required to make choices on their own is something that most, if not every, individual would want to have.

Domains of Self-Determination

- **Self-Awareness:**

The skills of knowing one's own strengths, abilities and limitations, and knowing how to use these unique attributes to beneficially influence one's own life.

- **Self-Advocacy:**

Skills necessary to be able to speak up or defend a cause of personal interest.

- **Self-Regulation:**

The process of monitoring one's own actions.

- **Goal Setting:**

The skill of determining how you are going to accomplish what you want (setting the goal, putting it into action, and measuring **success**).

- **Problem Solving:**

Being able to identify a problem, identify different solutions, and make a choice.

- **Internal Locus of Control**

The belief that one has control over outcomes that are important to their life.

- **Decision Making**

The skill of choosing between more than two known options.

Why is Self-Determination Important?

Regardless of skill level, teaching self-determination skills increases autonomy and planning for a successful future. Students with disabilities who are more self-determined may be more academically successful and engaged in schoolwork,

contribute to their educational and transition planning, experience more post-secondary involvement, and report higher quality of life and more positive experiences in early adulthood.

The promotion and procurement of self-determination skills can help individuals of all ages, with or without disabilities, to assert personal control over their choices in life.

Within an educational setting, the integration of self-determination skills such as self-regulation, decision making, and action planning has been shown to help students evaluate and set personal goals; become more autonomous, self-determined learners; and increase the sense of control over their learning.

When young adults develop the ability to consider and implement solutions to their problems, they become intrinsically motivated and actively engaged in the learning process.

Self-determination refers to the ability of individuals to make choices and determine their own actions.

Self-determination can help with achieving independence, this concept plays an essential role not only in the overall well-being of the individual, but also their overall psychological health.

Self-determination program were more likely to live independently and move out of the family home, hold a job, and have greater financial independence.

Here are some ways the NEP 2020 relates to teaching skills and self-determination:

The **NEP 2020** is a forward-thinking policy that aims to equip students with the **skills** needed for success in the 21st century. By focusing on critical thinking, creativity, digital literacy, and collaboration, the policy lays the groundwork for a holistic and multidisciplinary education system.

Teacher development

The NEP 2020 provides opportunities for teachers to improve their skills through workshops and online modules. Teachers are expected to participate in at least 50 hours of Continuing Professional Development (CPD) opportunities each year.

Inclusive approach

The NEP 2020 focuses on providing accessible and inclusive education. The pedagogy used in the classroom should reflect an inclusive approach so that students can relate to what is taught.

Self-determination theory

Self-Determination Theory (SDT) suggests that autonomy, competence, and relatedness are basic psychological needs that must be satisfied for optimal motivation, well-being, and performance. SDT has been applied as a framework in education, including for academics from minority backgrounds.

Teacher demographic information

Teachers can be asked to provide demographic information, including their experience teaching students with disabilities and experience teaching self-determination skills.

CONCLUSION

Self-determination refers to a set of skills that helps individuals with disabilities control their life and achieve better inclusive outcomes. Self-determination refers to a person's ability to make choices and manage their own life. Being self-determined means that you feel in greater control, as opposed to being non-self-determined, which can leave you feeling that others control your life. Self-determination empowers students to control their own lives because it allows them to make appropriate decisions or choices offered throughout life.

Consequently, a number of educational practices have been developed to teach students with disabilities these essential skills. Some of the practices focus on helping students to acquire and maintain these skills; others focus on developing a conducive environment that allows and encourages individuals with disabilities to apply and exercise self-determination skills.

Self-determination theory offers a powerful framework for enhancing the well-being of both teachers and learners. By addressing the psychological needs of autonomy, competence, and relatedness, SDT provides a pathway to creating a supportive and motivating educational environment. Implementing SDT principles in the classroom can increase teacher job satisfaction and improved engagement and academic outcomes for learners. As schools and educators continue to explore ways to support well-being, SDT offers a valuable approach to fostering a positive and thriving learning environment. All peoples have the right of self-determination. By virtue of that right they freely determine their political status and freely pursue their economic, social and cultural development.

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Maths and Artificial Intelligence

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Abstract

Artificial Intelligence could be used as a powerful and innovative tool in mathematics education. It is poised to transform the way of learning and teaching this subject. The main objective of our study is to provide a more complete and thorough understanding of the role and impact of using AI in mathematics education by determining the trends, the AI methods, the technological applications and the opportunities for utilizing AI by teachers and students. The potential benefits and threats caused by the use of AI are also discussed.

➤ Mathematics and AI in the Classroom

1. Mathematical Modeling: Use AI to model real-world problems, such as population growth or financial markets.
2. Data Analysis: Use AI to analyze and visualize data, making it easier for students to understand complex mathematical concepts.
3. Machine Learning: Teach students about machine learning algorithms and how they can be applied to mathematical problems.
4. Geometry and Computer Vision: Use AI to explore geometric concepts, such as object recognition and image processing.
5. Mathematical Games: Develop games that incorporate AI and mathematical concepts, making learning math fun and interactive.

➤ AI-Powered Tools for Teachers

1. Mathematical Software: Utilize software like GeoGebra, Desmos, or Mathematica to create interactive math lessons.
2. AI-Based Tutoring Systems: Leverage AI-powered tutoring systems, such as Khan Academy or Carnegie Learning, to provide personalized math support.
3. Automated Grading: Use AI to automate grading, freeing up time for more hands-on, interactive teaching.

4. **Mathematical Simulations:** Create simulations to help students visualize complex mathematical concepts, such as fractals or chaos theory.

➤ **Professional Development for Teachers**

1. **Workshops and Training:** Attend workshops and training sessions to learn about AI and mathematical applications.
2. **Online Courses:** Take online courses, such as those offered by Coursera or edX, to learn about AI and math education.
3. **Collaboration with Peers:** Share knowledge and best practices with colleagues to integrate AI and math into teaching practices.
4. **Stay Updated with Educational Research:** Follow educational research and publications to stay informed about the latest developments in AI and math education.

By embracing mathematics and AI in teaching practices, educators can create engaging, interactive, and effective learning experiences for their students.

Artificial Intelligence (AI) teacher for math subjects:

➤ **Benefits**

1. **Personalized learning:** AI teacher can tailor math lessons to individual students' needs, abilities, and learning styles.
2. **Interactive and engaging:** AI-powered math lessons can include interactive simulations, games, and visualizations, making math more enjoyable and interactive.
3. **Real-time feedback:** AI teacher can provide instant feedback and assessment, helping students identify areas where they need improvement.
4. **Accessibility:** AI teacher can reach students with disabilities, remote or underprivileged students, and provide equal access to quality math education.
5. **Supplemental support:** AI teacher can assist human teachers by providing additional support, freeing up time for human teachers to focus on other aspects of teaching.

➤ **Features**

1. **Adaptive assessments:** AI teacher can adjust the difficulty level of math problems based on student performance.
2. **Mathematical modeling:** AI teacher can help students create mathematical models to solve real-world problems.
3. **Step-by-step solutions:** AI teacher can provide detailed, step-by-step solutions to math problems.

4. Virtual manipulatives: AI teacher can provide interactive virtual manipulatives, such as graphs, charts, and geometric shapes.

5. Natural Language Processing (NLP): AI teacher can understand and respond to students' natural language inputs.

➤ **Technologies Used**

1. Machine Learning (ML): AI teacher can learn from student data and adapt to their needs.

2. Deep Learning: AI teacher can use deep learning algorithms to analyze student performance and provide personalized feedback.

3. Computer Vision: AI teacher can use computer vision to analyze student work and provide feedback on mathematical concepts.

4. NLP: AI teacher can use NLP to understand and respond to students' natural language inputs.

➤ **Examples of AI Teachers for Math**

1. DreamBox Learning: An online math platform that uses AI to provide personalized math lessons.

2. Khan Academy: A free online learning platform that uses AI-powered math exercises and quizzes.

3. Mathway: An online math problem solver that uses AI to provide step-by-step solutions.

4. Photomath: A mobile app that uses AI-powered math problem solving and step-by-step solutions.

➤ **Future Developments**

1. Increased personalization: AI teachers will become even more personalized, using machine learning algorithms to adapt to individual students' needs.

2. More interactive simulations: AI teachers will incorporate more interactive simulations and games to make math more engaging and fun.

3. Improved NLP capabilities: AI teachers will become more proficient in understanding and responding to students' natural language inputs.

4. Integration with other subjects: AI teachers will be integrated with other subjects, such as science and language arts, to provide a more holistic education.

The integration of Artificial Intelligence (AI) and mathematics in teaching has the potential to revolutionize the way we learn and teach math. By leveraging AI-powered tools and technologies, educators can create personalized, interactive, and engaging math lessons that cater to diverse learning styles and abilities. By embracing the integration of AI and math in teaching, we can create a more effective, efficient, and engaging math education system that prepares students for success in the 21st century.

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વાચન નિદાન કસોટીનું પ્રમાણીકરણ

હર્ષવી શંકરભાઈ પટેલ

રિસર્ચ સ્કોલર

શિક્ષણ શાખા, ગુજરાત વિદ્યાપીઠ, અમદાવાદ

સારાંશ

પ્રસ્તુત અભ્યાસ પ્રાથમિક શિક્ષણ ક્ષેત્રે વિદ્યાર્થીઓના નબળા વાંચન કૌશલ્ય માટે ડૉ. રઈશ મનીઆર રચિત વાચન નિદાન કસોટીનું પ્રમાણીકરણ કરવા હાથ ધરવામાં આવ્યો હતો. વિદ્યાર્થીઓની શૈક્ષણિક સિદ્ધિ ઘણા પરિબલો પર આધારિત છે એમાંથી એક વિદ્યાર્થીનું વાંચન કૌશલ્ય છે. અભ્યાસના મહત્વના સમયગાળા એટલે કે પ્રાથમિક શિક્ષણકાળ દરમિયાન 6થી 15% વિદ્યાર્થીઓનું વાંચન કૌશલ્ય નબળું રહે છે. આ નબળા વાંચન કૌશલ્યને પાછળથી સુધારવાનું મુશ્કેલ બનતું હોય છે; અને વિદ્યાર્થી નબળા વાંચન કૌશલ્ય સાથે તેનો અભ્યાસ ચાલુ રાખે છે. જેના કારણે શૈક્ષણિક સિદ્ધિને અસર થાય છે. આમ, દૂરોગામી અસરોને જોતાં વિદ્યાર્થીઓના નબળા વાચન કૌશલ્યની સમયસર ઓળખ કરવી-નિદાન કરવું અને ઉપચાર કરવો ખૂબ જરૂરી છે. સમયસરના પગલાંથી ઓછા પ્રયાસે સફળતા મળી શકે છે અને એ કામ પ્રાથમિક કક્ષાએ શિક્ષકોના હાથમાં છે. નબળા વાચન કૌશલ્યને ઓળખીને તેના ઉપચારમાં મોડું થઈ જાય તો એ ડિસ્ટેક્સિયા કે હતાશામાં પરિણમી શકે. જો કે શિક્ષણના પ્રારંભિક તબક્કામાં જ નબળા વાચન કૌશલ્યનું સચોટ નિદાન કરી આપતી કસોટીઓ ઓછી જોવા મળે છે. તે પૈકી બાળ મનોચિકિત્સક ડૉ.રઈશ મનીઆર રચિત વાચન નિદાન કસોટીનું પ્રમાણીકરણ પ્રસ્તુત સંશોધનમાં કરવામાં આવ્યું છે. આ સંશોધન ગુજરાતી મધ્યમના બીજું ધોરણ પસાર કરી ચૂકેલા વિદ્યાર્થીઓ પર કરવામાં આવ્યું હતું. વિદ્યાર્થીઓની સરેરાશ ઉંમર 8થી 10 વર્ષ વચ્ચે હતી. સંશોધનને અંતે એવી ભારપૂર્વક ભલામણ કરવામાં આવે છે કે નબળા વાચન કૌશલ્યને સમયસર સુધારવાના વિશેષ પ્રયત્નો પ્રાથમિક શિક્ષણના પ્રારંભે જ થઈ એ માટે શક્ય તેટલું વહેલું નિદાન કરવામાં આવે અને એ માટે રઈશ મનીઆર રચિત નિદાનાત્મક વાચન કસોટીનો ઉપયોગ વ્યાપકપણે કરવો જોઈએ. આ

સંશોધન પ્રાથમિક શિક્ષણ ક્ષેત્રે નબળા વાંચન કૌશલ્યના નિદાનની જરૂરિયાત માટે ઉચિત ઉપકરણના ઉપયોગ તરફ નિર્દેશ કરે છે.

કી વર્ડ : વાચન ક્ષમતા, વાચન નિદાન કસોટી

1. પ્રસ્તાવના

વિવિધ અભ્યાસોમાં પ્રાથમિક શિક્ષણની કક્ષાએ ઓછી ક્ષમતાવાળા બાળકોનું પ્રમાણ 6 થી 20 ટકા જેટલું જોવા મળ્યું છે. નબળી વાંચન ક્ષમતાવાળા બાળકો બીજા ધોરણમાં પરખાઈ જાય છે. આ વરસ દરમિયાન જો એમની તકલીફની ગંભીરતાથી હાથ પર ન લેવામાં આવે તો ત્રીજા ધોરણ પછી અભ્યાસક્રમની વધતી જતી અપેક્ષાઓ અને પોતાની વાંચન-લેખનની અણઆવડતની વચ્ચે બાળક ભીંસાતું જાય છે. લેખન વાચનની સમસ્યાનો ત્રીજા-ચોથા ધોરણ પછી ઉકેલ કાઢવો ખૂબ મુશ્કેલ છે. આવા બાળકોની અભ્યાસેતર બુદ્ધિક્ષમતા નોર્મલ હોવા છતાં તેઓ ક્ષતિપૂર્ણ વાચનને કારણે અભ્યાસમાં નબળું પરિણામ મેળવે છે અને માતાપિતા અને સમાજ તરફથી અવગણના અને ઠપકાનો ભોગ બને છે. આમાંથી અમુક બાળકો હતાશાનો ભોગ બને છે અમુક નિષ્ફળતાની વચ્ચે સન્માન જાળવવા વ્યસન અથવા અસામાજિક વર્તનની દિશા પકડે છે.

ઉપરોક્ત કારણોસર નબળી વાંચનક્ષમતાની સમસ્યાનું વહેલું નિદાન આવશ્યક છે. નબળી વાચનક્ષમતાવાળા બાળકો મોટી સંખ્યાના નોર્મલ વર્ગખંડમાં પરંપરિત શિક્ષણ પદ્ધતિથી વાચન શીખી શક્યા ન હોવાથી તેમના પર અલગ વ્યક્તિગત ધ્યાન આપી સઘન ઉપચારાત્મક કાર્ય કરવાથી એમનું વાચન કૌશલ્ય વિકસાવી શકાય છે અને બાળકને વિદ્યાતક દૂરોગામી પરિણામોથી બચાવી શકાય છે. આ માટે નબળી વાંચનક્ષમતાની સમસ્યાનું વહેલું નિદાન કરવું એ પ્રથમ સોપાન છે અને ત્યારબાદ વાંચન ક્ષમતા સુધારણાનો સઘન ઉપચારાત્મક કાર્યક્રમ લાગુ પાડવો એ બીજું સોપાન છે.

2. સંદર્ભ સાહિત્યની સમીક્ષા

2.1 વાચન એટલે શું?

Robinson (1946) કહે છે કે Reading ability is the ability to perceive and interpret the sounds and symbols.

અર્થાત્ ‘વાંચન શક્તિ એટલે સંજ્ઞાઓ અને અવાજનું પ્રત્યક્ષીકરણ સાધી તેનો અર્થ ઘટાવવાની શક્તિ’

જ્યારે John J. Deboer (1964) મુજબ Reading is an active process of reaching and searching for meaning.

અર્થાત્ ‘વાંચન એ અર્થ સંશોધવાની અને સમજવાની સક્રિય પ્રક્રિયા છે.’

આ વ્યાખ્યા અનુસાર વાંચન એ વિવિધ સંકેતો અને લિપિ દ્વારા મુદ્રિત પાનમાં રજૂ થયેલા વિચારોમાં અર્થગ્રહણની સક્રિય પ્રક્રિયા છે

2.2 વાંચન ક્ષમતા નબળી રહેવાના કારણો

બાળકોની વાંચન-અભિમુખતા ઓછી હોવાના, બાળકની વાંચન ક્ષમતા કાચી રહી જવાના અનેક કારણો છે. એમાંથી અમુક સંપૂર્ણપણે તો અમુક આંશિક રીતે નિવારી શકાય એવાં છે.

- બાળક તરફથી અપૂરતું ધ્યાન
- શાળા તરફથી અપૂરતી કેળવણી
- ન્યૂરોલોજિકલ સમસ્યા જેવી કે ડિસલેક્સિયા/ સ્પેસિફિક લર્નિંગ ડિસઓર્ડર

2.3 વાચન નિદાન સંદર્ભે થયેલાં સંશોધનો

પ્રસ્તુત સંશોધન પૂર્વે સંશોધક દ્વારા વાંચન ક્ષેત્રે થયેલા અનેક સંશોધનો પૈકી ભારતમાં થયેલાં કેટલાંક સંશોધનોનો અભ્યાસ કરવા બાબત આવ્યો હતો. ભગતવાલા જે. એ. (1966) એ પોતાના પીએચ.ડી.ના અભ્યાસ રૂપે ધોરણ 8 થી 12ના વિદ્યાર્થીઓ માટે ગુજરાતી ભાષામાં શાંત વાચન કસોટી તેને પ્રમાણિત કરી હતી. રમણભાઈ ત્રિવેદી અને ભાઈલાલ પટેલે વાચનશક્તિ કસોટીની રચના અને પ્રમાણિકરણ કર્યું હતું. આઈ.ટી. કોલેજ (1971) દ્વારા પ્રાથમિક કક્ષાના ધોરણ

૩ ના વિદ્યાર્થીઓ માટે હિન્દી વિષયમાં નિદાન કસોટીની સંરચના અને પ્રમાણિકરણ અંગે સંશોધન પ્રકાર ધરાયો હતો. જયેન્દ્ર ત્રિવેદી (1984) પોતાના પીએચ.ડી.ના અભ્યાસ માટે ધોરણ આઠના વિદ્યાર્થીઓ માટે હિન્દીમાં વાંચન સીધી કસોટીની રચના અને પ્રમાણિકરણ કર્યું હતું. ઉપરોક્ત તમામ સંશોધનોમાં સંશોધકોએ વિદ્યાર્થીઓની વાંચન ક્ષમતા માટે પ્રમાણભૂત અને વિશ્વસનીય ઉપકરણો તૈયાર કરીને તેના વિવિધ માનકો પ્રસ્થાપિત કર્યા હતા.

ક્રમ	કસોટી	રચિયતા	વર્ષ	કઈ ભાષા માટે?	કયા ધોરણ માટે?
1	શાંતવાચન કસોટી	ભગતવાલા જે. એ.	1966	ગુજરાતી	8 થી 11
2	વાચન શક્તિ કસોટી	રમણભાઈ ત્રિવેદી, ભાઈલાલ પટેલ	1968	ગુજરાતી	8 થી 10
3	વાચન નિદાન કસોટી	આઈ. ટી. કોલેજ	1971	હિન્દી	ધોરણ 3
4	હિન્દી વાચન કસોટી	જયેન્દ્ર ત્રિવેદી	1984	હિન્દી	ધોરણ 8
5	વાચન લબ્ધિ કસોટી	સુબ્રમણ્યમ	1982	તેલુગુ	3 થી 7

ઉપરોક્ત સંશોધનો ઉપરાંત અન્ય સંશોધનો વિવિધ ભાષાઓ અને વિવિધ ધોરણો માટેની વાંચન કસોટીની રચના અને પ્રમાણિકરણ માટે હાથ ધરાયેલાં જોવા મળ્યાં. ઉપરાંત સંદર્ભ તરીકે વિવિધ સંશોધનોના અભ્યાસને અંતે જણાવા મળ્યું કે વાંચન ઘટક ક્રમાંક મુજબ વિદ્યાર્થીઓના વાંચન કૌશલ્યનું નિદાન કરી આપતી કોઈ ચોક્કસ વાંચન નિદાન કસોટી ગુજરાતી ભાષામાં પ્રાપ્ત થઈ નહીં કે જેના દ્વારા વિદ્યાર્થીઓનું વાંચનનું લેવલ વાંચન ઘટકના ક્રમ મુજબ ચકાસી શકાય કે જાણી શકાય.

2.4 એક સરળ સુલભ અને સર્વગ્રાહી વાચન કસોટીની જરૂરિયાત

ઉપરોક્ત અને અન્ય સંશોધનોનો અભ્યાસ અને તપાસ કરતાં જણાય છે કે અત્યાર સુધી ગુજરાતી ભાષામાં સરળ સુલભ અને સર્વગ્રાહી વાંચન નિદાન કસોટી ઉપલબ્ધ નથી. નબળી

વાંચન ક્ષમતાવાળા બાળકો સાથે કામ પાર પાડવા માટે યોજનાબદ્ધ અભિગમ ન હોવાને કારણે બાળક ખૂબ નબળું પડે પાછળ પડે ત્યાં સુધી રાહ જોયા પછી એને વ્યાવસાયિક રેમેડિયલ એજ્યુકેટરને હવાલે કરવામાં આવે છે. આપણા દેશમાં પ્રશિક્ષિત રેમેડિયલ એજ્યુકેટરની સંખ્યા ખૂબ ઓછી છે એટલું જ નહીં આર્થિક રીતે પણ આ વ્યવસ્થા મોટા ભાગના વાલીને પરવડે એમ નથી. તેથી આનો વ્યવહારિક ઉકેલ એ જણાય છે કે,

1. આવા બાળકોને એમની સમસ્યા વકરે એ પહેલા વહેલા તારવી લેવા જોઈએ.
2. એ માટે વિશેષજ્ઞની મદદ વગર સરળતાથી લાગુ પાડી શકાય એવી કસોટી સુલભ હોવી જોઈએ.
3. ઉપચારાત્મક કાર્યક્રમ શિક્ષક અથવા શિક્ષિત વાલી/પરિચિત લાગુ પાડી શકે એટલો સરળ ત્યારે બનાવી શકાય જ્યારે આ સમસ્યા હળવી હોય ત્યારે જ એનું નિદાન થઈ જાય.

3. સંશોધન યોજના

પ્રસ્તુત સંશોધનનું શીર્ષક અને સંશોધન યોજના નીચે મુજબ છે:

3.1 શીર્ષક

વાંચન નિદાન કસોટીનું પ્રમાણીકરણ

3.2 શબ્દોની વ્યવહારિક પરિભાષા

3.2.1 વાંચનક્ષમતા

દૃશ્યસંકેતો દ્વારા લખાયેલી ભાષાને સમજીને એને ધ્વનિસંકેતોમાં રૂપાંતર કરવાની ક્ષમતા. જે ક્રમિક રીતે મૂળાક્ષરોની ઓળખ, માત્રા સહિતના મૂળાક્ષરોની ઓળખ, શબ્દોની ઓળખ અને એ રીતે વાક્યો અને ભાષાના અર્થઘટન સુધીની આયાસ અને દોરવણી હેઠળની પ્રક્રિયાથી બાળકની વાંચનક્ષમતા વિકસે છે.

3.2.2 નબળી વાચન ક્ષમતા

અટકી અટકીને, શબ્દને તોડીને કે નવા ધ્વનિ ઉમેરીને આરોહ-અવરોહવગર એવું વાંચવું કે વાંચેલી સામગ્રીના અર્થ વિશે વાંચનારને સમજ ન પડી હોય એટલે નબળી વાંચન ક્ષમતા.

3.2.3 વાચન નિદાન કસોટી

વાંચન ઘટક-વાચનવિકાસક્રમને દસ તબક્કામાં વહેંચી દરેક તબક્કા જેટલી સિદ્ધિને એક ગુણ આપી વાચનક્ષમતા માપવા માટે તૈયાર કરાયેલી કસોટી જેમાં નિમ્નતમ વાંચન ક્ષમતા 0 અને મહત્તમ વાંચનક્ષમતા 10 હોઈ શકે.

3.3 સંશોધનનો હેતુ

- પ્રાપ્ય વાચન નિદાન કસોટીની વિશ્વસનીયતા એની યથાર્થતા તપાસવી.
- પ્રાપ્ય વાંચન નિદાન કસોટીને પ્રમાણિત કરવી.

3.4 ઉત્કલ્પના:

1. વાંચન નિદાન કસોટી પરના જૂથ 1ના સરેરાશ પ્રાપ્તિાંકો અને જૂથના સરેરાશ પ્રાપ્તિાંકો વચ્ચે સાર્થક તફાવત નહીં હોય.
2. વાંચન નિદાન કસોટી અને તેની સમાંતર કસોટીના પ્રાપ્તિાંકો વચ્ચે સાર્થક તફાવત નહીં હોય.
3. વાંચન નિદાન કસોટી અને સ્પેસીફિક લર્નિંગ ડિસઓર્ડર સ્ક્રીનિંગ ટેસ્ટના પ્રાપ્તિાંકો વચ્ચે સાર્થક તફાવત નહીં હોય.

3.5 સીમાંકન

1. વર્તમાન અભ્યાસ ગુજરાતના નવસારી જિલામાં ગુજરાતી માધ્યમમાં અભ્યાસ કરતાં પ્રાથમિક શાળાના બાળકો પર કરવામાં આવેલ છે.
2. વર્તમાન અભ્યાસ બીજું ધોરણ પસાર કરી ત્રીજા ધોરણમાં પહોંચેલા બાળકો પર કરવામાં આવ્યો હતો.

3. વર્તમાન અભ્યાસમાં બાળકોની ઓછામાં ઓછી ઉંમર આઠ વર્ષ અને વધુમાં વધુ દસ વર્ષ હતી.

3.6 વ્યાપવિશ્વ અને નિર્દેશ પસંદગી

ગુજરાતી માધ્યમમાં પ્રાથમિક શાળાનું બીજું ધોરણ પસાર કરીને ત્રીજા ધોરણમાં પહોંચેલાં વધુમાં વધુ 8 થી 10 વર્ષનાં બાળકો વ્યાપ વિશ્વ તરીકે લઈ નવસારી જિલ્લાના એવાં કુલ 900 બાળકોની નિર્દેશ તરીકે પસંદગી કરવામાં આવી હતી.

3.7 સંશોધન પદ્ધતિ:

યદ્યપ્ત નિર્દેશ પસંદગીથી નવસારી જિલ્લાની વિવિધ શાળાઓમાંથી બીજું ધોરણ પસાર કરી ચૂકેલા ત્રીજા ધોરણના 8થી 10 વર્ષની વય ધરાવતાં 900 બાળકોની પસંદગી કરી તેમને બે જૂથમાં વહેંચવામાં આવ્યા હતા. બાળકો પર ડો. રઈશ મનીઆર રચિત વાચન નિદાન કસોટી લાગુ પાડવામાં આવી હતી. વિશ્વસનીયતા માટે આ કસોટીના બે સમકક્ષ સ્વરૂપ ઉપયોગમાં લેવાયા હતા. યથાર્થતા માટે NCERTના પ્રશસ્ત કાર્યક્રમમાં વપરાતી સ્પેસીફિક લર્નિંગ ડીસઓર્ડર સ્કીનિંગ ટેસ્ટમાંથી કલમ 12 જે વાંચન વિશે છે, એના દસ મુદ્દાને દસ ગુણાંક આપી પ્રયોગમાં લેવાયા હતા.

3.8 ઉપકરણ

- રઈશ મનીઆર રચિત નિદાનાત્મક વાચન કસોટી તથા એનું સમાંતર પરિરૂપ
- NCERTના પ્રશસ્ત કાર્યક્રમમાં વપરાતી સ્પેસીફિક લર્નિંગ ડીસઓર્ડર સ્કીનિંગ ટેસ્ટ

4 માહિતીનું પૃથ્થકરણ અને અર્થઘટન

4.1 માહિતી સંગ્રહણની વિધિ

નવસારી જિલ્લામાં ગુજરાતી માધ્યમમાં ભણતાં પ્રાથમિક શાળાનું બીજું ધોરણ પસાર કરી ત્રીજા ધોરણમાં પહોંચેલા કુલ 900 બાળકોને આ કસોટી આપવામાં આવી હતી. સૌ પ્રથમ અભ્યાસકર્તાએ આ કસોટી કઈ રીતે લઈ શકાય એ માટે અમુક શિક્ષકો તથા શિક્ષિત સવંચસેવકોને

તાલીમ આપી હતી. એમની સજ્જતા ચકાસ્યા બાદ આ ટીમ દ્વારા કુલ નવસો બાળકો પર આ કસોટીઓ અજમાવવામાં આવી હતી

ગણતરી માટે બાળકોને 450 ના બે જૂથમાં વહેંચવામાં આવ્યા હતા. વિશ્વનીયતા માટે ત્રણ પ્રકારે અભ્યાસ કરાવામાં આવ્યો હતો:

1. કસોટી- પુનઃકસોટી પદ્ધતિ

આ માટે 450 બાળકોના જૂથ 1 ને કસોટીનું પહેલું પરિરૂપ આપી થોડા સમય પછી કસોટીનું બીજું સમકક્ષ પરિરૂપ આપી બન્ને કસોટી શૂન્યથી દસના સ્કેલ પ્રાપ્તાંક મેળવવામાં આવ્યા હતા.

2. સમાંતર કસોટી

આ માટે 450 બાળકોના જૂથ 1 તથા 450 બાળકોના જૂથ 2 ને સમાન કસોટી આપી એમના પ્રાપ્તાંકો મેળવવામાં આવ્યા હતા.

3. અર્ધવિભાજન પદ્ધતિ

આ માટે કુલ 900 બાળકોમાંથી એકી સંખ્યા અને બેકી સંખ્યાના બાળકોના પ્રાપ્તાંકો મેળવવામાં આવ્યા હતા.

યથાર્થતા માટે 450 બાળકોના જૂથ 2 ને ડો. રઈશ મનીઆર રચિત વાચન નિદાન કસોટી તથા NCERTના પ્રશસ્ત કાર્યક્રમમાં વપરાતી સ્પેસીફિક લર્નિંગ ડિસઓર્ડર સ્ક્રીનિંગ ટેસ્ટ વારાફરતી આપીને બન્નેના પ્રાપ્તાંકો સરખાવવામાં આવ્યા હતા.

4.2 માહિતીનું વિશ્લેષણ

પ્રસ્તુત સંશોધનમાં વાંચન નિદાન કસોટીની વિશ્વસનીયતા અને યથાર્થતા માટે લેવામાં આવેલ કસોટીના પ્રાપ્તાંકોનું સારણીકરણ નીચે મુજબ છે:

1. સારણી: કસોટી- પુનઃ કસોટી પદ્ધતિ

જૂથ	પાત્રો	Mean	Variance
જૂથ 1	450	4.99	4.83
જૂથ 2	450	4.886	4.65

વાચન નિદાન કસોટીના પ્રાપ્તાંકોની અંકશાસ્ત્રીય ગણતરી કરતાં t મૂલ્ય 0.92 પ્રાપ્ત થયું હતું. એક પુચ્છ કસોટી મૂલ્ય 1.64 પ્રાપ્ત થયું હતું, જ્યારે દ્વિ પુચ્છ કસોટી મૂલ્ય 1.96 પ્રાપ્ત થયું હતું.

2. સારણી: કસોટી- સમાંતર કસોટી પદ્ધતિ

જૂથ	પાત્રો	Mean	Variance
જૂથ 1	450	4.72	4.32
જૂથ 2	450	4.43	4.14

વાચન નિદાન કસોટીના પ્રાપ્તાંકોની અંકશાસ્ત્રીય ગણતરી કરતાં t મૂલ્ય 0.86 પ્રાપ્ત થયું હતું. એક પુચ્છ કસોટી મૂલ્ય 1.47 પ્રાપ્ત થયું હતું, જ્યારે દ્વિ પુચ્છ કસોટી મૂલ્ય 1.71 પ્રાપ્ત થયું હતું.

3. સારણી: કસોટી- અર્ધ વિભાજન કસોટી પદ્ધતિ

જૂથ	પાત્રો	Mean	Variance
જૂથ 1	450	4.89	4.62
જૂથ 2	450	4.49	4.43

વાચન નિદાન કસોટીના પ્રાપ્તાંકોની અંકશાસ્ત્રીય ગણતરી કરતાં t મૂલ્ય 0.82 પ્રાપ્ત થયું હતું. એક પુચ્છ કસોટી મૂલ્ય 1.77 પ્રાપ્ત થયું હતું, જ્યારે દ્વિ પુચ્છ કસોટી મૂલ્ય 1.56 પ્રાપ્ત થયું હતું.

4. સારણી: કસોટી- અર્ધ વિભાજન કસોટી પદ્ધતિ

જૂથ	પાત્રો	Mean	Variance
જૂથ 1	450	4.56	4.87
જૂથ 2	450	4.67	4.61

યથાર્થતા માટે 450 બાળકોના જૂથ 2 ને ડો. રઈશ મનીઆર રચિત વાચન નિદાન કસોટી તથા NCERTના પ્રશસ્ત કાર્યક્રમમાં વપરાતી સ્પેસીફિક લર્નિંગ ડિસઓર્ડર સ્ક્રીનિંગ ટેસ્ટ વારાફરતી

આપીને બજેના પ્રાપ્તાંકોની અંકશાસ્ત્રીય ગણતરી કરતાં † મૂલ્ય 0.89 પ્રાપ્ત થયું હતું. એક પુચ્છ કસોટી મૂલ્ય 1.84 પ્રાપ્ત થયું હતું, જ્યારે દ્વિ પુચ્છ કસોટી મૂલ્ય 1.46 પ્રાપ્ત થયું હતું.

5. માહિતીનું અર્થઘટન અને તારણો

5.1 તારણો

- કસોટી- પુનઃ કસોટી પદ્ધતિ દ્વારા બે જૂથ વચ્ચે † મૂલ્ય 0.92 પ્રાપ્ત થયું અને મજબૂત સહસંબંધ પ્રાપ્ત થતા કસોટી વિશ્વસનીય પુરવાર થઈ હતી
- સમાંતર કસોટી પદ્ધતિ દ્વારા બે જૂથ વચ્ચે † મૂલ્ય 0.86 પ્રાપ્ત થયું અને મજબૂત સહસંબંધ પ્રાપ્ત થતા કસોટી વિશ્વસનીયતા પુરવાર થઈ હતી.
- અર્ધવિભાજન પદ્ધતિ પદ્ધતિ દ્વારા બે જૂથ વચ્ચે † મૂલ્ય 0.82 પ્રાપ્ત થયું અને મજબૂત સહસંબંધ પ્રાપ્ત થતા કસોટી વિશ્વસનીય પુરવાર થઈ હતી
- રઈશ મનીઆર રચિત વાચન નિદાન કસોટી તથા NCERTના પ્રશસ્ત કાર્યક્રમમાં વપરાતી સ્પેસીફિક લર્નિંગ ડિસઓર્ડર સ્ક્રીનિંગ ટેસ્ટના પ્રાપ્તાંકો વચ્ચે † મૂલ્ય 0.89 પ્રાપ્ત થયું અને મજબૂત સહસંબંધ પ્રાપ્ત થતા કસોટીની યથાર્થતા પુરવાર થઈ હતી.

ફલિતાર્થ

- શૂન્ય ઉત્કલ્પના 1 ‘વાંચન નિદાન કસોટી પરના જૂથ 1ના સરેરાશ પ્રાપ્તાંકો અને જૂથના સરેરાશ પ્રાપ્તાંકો વચ્ચે સાર્થક તફાવત નહીં હોયનો સ્વીકાર કરવામાં આવે છે.
- શૂન્ય ઉત્કલ્પના 2 ‘વાંચન નિદાન કસોટી અને તેની સમાંતર કસોટીના પ્રાપ્તાંકો વચ્ચે સાર્થક તફાવત નહીં હોય’નો સ્વીકાર કરવામાં આવે છે.
- શૂન્ય ઉત્કલ્પના 3 ‘વાંચન નિદાન કસોટી અને સ્પેસીફિક લર્નિંગ ડિસઓર્ડર સ્ક્રીનિંગ ટેસ્ટના પ્રાપ્તાંકો વચ્ચે સાર્થક તફાવત નહીં હોય.’નો સ્વીકાર કરવામાં આવે છે.

આમ, પ્રસ્તુત સંશોધન તમામ શૂન્ય ઉત્કલ્પનાઓના સ્વીકારની સાથે રઈશ મનીઆર વાચન નિદાન કસોટીની પ્રમાણભૂતતા અને સાર્થકતા સાબિત કરે છે.

ઉપસંહાર

નબળા વાચન કૌશલ્ય ધરાવતા બાળકોને અલગ તારવવા માટેની પ્રાપ્ત કસોટીની પ્રમાણભૂતતા અને યથાર્થતા ચકાસવા માટે કરવામાં આવેલું પ્રસ્તુત સંશોધન બાળકોના નબળા વાંચન કૌશલ્યને સમયસર સુધારવાના વિશેષ પ્રયત્નો પ્રાથમિક શિક્ષણના પ્રારંભે જ થઈ એ માટે શક્ય તેટલું વહેલું નિદાન કરવામાં આવે અને એ માટે રઈશ મનીઆર રચિત નિદાનાત્મક વાચન કસોટીનો ઉપયોગ વ્યાપકપણે કરવો જોઈએ એવું સૂચિત કરે છે. કારણ કે આ કસોટી વાંચન ઘટકના ક્રમથી લઈને વાંચન અર્થગ્રહણ સુધી વિદ્યાર્થીઓના વાંચન કૌશલ્યનું નિદાન કરી આપે છે. જેનાથી વિદ્યાર્થીના વાંચન કૌશલ્યનું લેવલ ચોક્કસપણે ખબર પડતાં અટક્યા હોય ત્યાંથી જ બાકીનું ઉચ્ચારાત્મક કાર્ય હાથ ધરી શકાય છે. આ કસોટી વાંચન અક્ષમ બાળકોને અલગ તારવી શકે છે. વળી, આ સંશોધન પ્રાથમિક શિક્ષણ ક્ષેત્રે નબળા વાંચન કૌશલ્યના નિદાનની જરૂરિયાત માટે ઉચિત ઉપકરણના ઉપયોગ તરફ નિર્દેશ કરે છે.

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ભારતીય ભાષા સંવર્ધનમાં વિદ્યાભારતી, ગુજરાત પ્રદેશ સંલગ્ન વિદ્યાલયોની ભૂમિકા : એક અભ્યાસ

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સારાંશ

રાષ્ટ્રીય શિક્ષણ નીતિ-2020 ભારતીય ભાષાઓને શિક્ષણના દરેક સ્તરે મહત્વપૂર્ણ સ્થાન આપે છે અને તેમના સંવર્ધન માટે સતત પ્રયત્નશીલ છે. આ નીતિ ભારતીય ભાષાઓની સમૃદ્ધિ અને વિવિધતાને જાળવવા અને પ્રોત્સાહન આપવા પર ધ્યાન કેન્દ્રિત કરે છે. માતૃભાષામાં શિક્ષણને પ્રોત્સાહન આપવાનો હેતુ વિદ્યાર્થીઓને કોઈપણ વિભાવનાઓ વધુ સારી રીતે સમજવામાં અને શીખવામાં મદદ કરવાનો છે. ત્રિભાષા સૂત્રનો ઉદ્દેશ્ય બહુભાષાવાદને પ્રોત્સાહન આપવાનો અને રાષ્ટ્રીય એકતાને મજબૂત કરવાનો છે. જેથી ભારતીય ભાષાઓનું સંવર્ધન પ્રાથમિક શિક્ષણથી પ્રારંભ કરીને વિદ્યાર્થી ઉચ્ચ શિક્ષણ મેળવે છે ત્યાં સુધી ભારતીય ભાષાઓમાં શિક્ષણ મળે તો વિદ્યાર્થીઓ વધુ સક્ષમ બનશે. તેમજ રાષ્ટ્રની સંસ્કૃતિ ભાષા દ્વારા જાળવણી થશે. પ્રસ્તુત સંશોધનમાં સંશોધકે ભારતીય ભાષા સંવર્ધન માટે વિદ્યાભારતી, ગુજરાત પ્રદેશ સંલગ્ન વિદ્યાલયોનો અભ્યાસ કર્યો હતો. ભારતીય ભાષા સંવર્ધન સંદર્ભે નીચેની બાબતોમાં વિદ્યાભારતી ગુજરાત પ્રાંત સંલગ્ન શાળાની ભૂમિકાનો અભ્યાસ કરવો જે મુખ્ય હેતુ રહ્યો હતો. ભારતીય ભાષા સંવર્ધન સંદર્ભે શાળાની ભૂમિકા કેવા પ્રકારની છે?, ભારતીય ભાષા સંવર્ધન સંદર્ભે શિક્ષકોની સમજ કેવા પ્રકારની છે?, ભારતીય ભાષા સંવર્ધન સંદર્ભે શિક્ષકો કઈ કઈ પ્રવૃત્તિઓ કરે છે? આ પ્રશ્નોને અનુસરી સંશોધન હાથ ધર્યું હતું. આ સંશોધન વ્યાવહારિક પ્રકારનું સંશોધન હતું. પ્રસ્તુત સંશોધનમાં નમૂના પાસે મુક્તજવાબી પ્રશ્નાવલી દ્વારા પ્રશ્નોના ઉત્તર મેળવવામાં આવ્યા

હતા. આથી પ્રસ્તુત સંશોધન ગુણાત્મક સંશોધન પ્રકારનું હતું. વ્યાપવિશ્વ તરીકે સુરત શહેરની ત્રણ ગુજરાતી માધ્યમની વિદ્યાલયોની પસંદગી કરી હતી. વ્યાપવિશ્વ એ જ નમૂનો હતો. જેમાં આચાર્યો, શિક્ષકોની પસંદગી કરવામાં આવી હતી. ઉપકરણ મુક્તજવાબી પ્રશ્નાવલિની રચના કરી માહિતી એકત્રિત કરવામાં આવી હતી. પ્રસ્તુત સંશોધનમાં એકત્રિત થયેલ માહિતીનું પૃથક્કરણ ગુણાત્મક રીતે કરવામાં આવ્યું હતું. પ્રસ્તુત સંશોધન લેખમાં તારણો મુખ્યત્વે પ્રાથમિક સ્તરેથી લઈ ઉચ્ચત્તર માધ્યમિક સુધી માતૃભાષામાં શિક્ષણ આપે છે. રાષ્ટ્રીય ભાષા હિન્દીને મહત્વ આપી ફરજિયાત હિન્દી ભાષા ભણાવાય છે. સંસ્કૃત ભાષાને પણ એટલું જ પ્રાધ્યાન્ય આપવામાં આવે છે. વિદ્યાર્થીઓમાં વાંચન, લેખન, શ્રવણ અને કથન જેવા ભાષાકીય કૌશલ્યો વિકસાવવા પર વધુ ધ્યાન કેન્દ્રિત કરે છે. ભારતીય ભાષાઓના સમૃદ્ધ સાહિત્ય અને સંસ્કૃતિથી વિદ્યાર્થીઓને પરિચિત કરાવવામાં આવે છે. દરરોજ વંદનામાં વિદ્યાર્થીઓ સંસ્કૃત ભાષામાં શ્લોકોનું પઠન કરે છે. શિક્ષકો પોતાની રુચિ અને ઉત્સાહ દ્વારા વિદ્યાર્થીઓમાં ભાષા પ્રત્યે પ્રેમ અને આદરની ભાવના જગાડે છે. પ્રાદેશિક ભાષાના લેખકો, કવિઓ અને વિદ્વાનોને શાળામાં આમંત્રિત કરીને વિદ્યાર્થીઓ સાથે તેમનો સંવાદ યોજવામાં આવે છે. પ્રાદેશિક ભાષામાં ગુણવત્તાયુક્ત શિક્ષણ પુરું પાડે છે. વિદ્યાર્થીઓને માતૃભાષા અથવા રાષ્ટ્રીય ભાષામાં પોતાની કલા અને વિચારો રજૂ કરવાની તક મળે છે. વિદ્યાભારતી સંલગ્ન શાળાઓ માતૃભાષા આધારિત શિક્ષણ અને ત્રિભાષા સૂત્રને મહત્વ આપીને અસરકારક અમલ કરી રહી છે. વિદ્યાભારતી સંલગ્ન ગુજરાત પ્રાંતના વિવિધ વિભાગોને વર્ષના અંતે શિક્ષકોની તાલીમનું આયોજન થાય છે.

ચાવીરૂપ શબ્દો :

ભારતીય ભાષા, સંવર્ધન, વિદ્યાભારતી ગુજરાત પ્રદેશ, વિદ્યાલય, અભ્યાસ

પ્રસ્તાવના

(પટેલ, ૨૦૦૮, પૃ. ૧૫-૨૮ દ્વારા ઉદ્કૃત) ભારત, એક એવી ભૂમિ જ્યાં અનેક ભાષાઓ અને સંસ્કૃતિઓ એકસાથે ખીલે છે, પોતાની ભાષાકીય વિવિધતા માટે વિશ્વભરમાં આગવી ઓળખ ધરાવે છે. આ ભાષાઓ માત્ર પરસ્પર સંવાદનું સાધન નથી, પરંતુ તે

પ્રત્યેક પ્રદેશની આગવી ઓળખ, ઇતિહાસ અને પરંપરાઓને પણ જીવંત રાખે છે. (ડેવ્લી, ૨૦૦૨, પૃ. ૬૭-૭૨ દ્વારા ઉદ્ધૃત). ભાષાશાસ્ત્રી પ્રો. ગણેશ દેવી નોંધે છે, "ભાષા એ માત્ર વિચારો વ્યક્ત કરવાનું માધ્યમ નથી, પરંતુ તે આપણી વિચારવાની પ્રક્રિયા અને વિશ્વને જોવાની દ્રષ્ટિને પણ આકાર આપે છે" આથી, ભારતીય ભાષાઓનું સંવર્ધન કરવું એ રાષ્ટ્રીય એકતા અને સાંસ્કૃતિક વારસાને જાળવવા માટે અત્યંત મહત્વપૂર્ણ છે.

શિક્ષણ પ્રણાલીમાં ભાષા એક પાયાની ભૂમિકા ભજવે છે. (રાષ્ટ્રીય શિક્ષણ નીતિ - ૨૦૨૦, પૃ. ૧૮-૨૨ દ્વારા ઉદ્ધૃત) રાષ્ટ્રીય શિક્ષણ નીતિ- ૨૦૨૦માં પણ માતૃભાષા આધારિત શિક્ષણના મહત્વ પર ભાર મૂકે છે, કારણ કે તે બાળકોને વધુ સારી રીતે સમજવામાં અને શીખવામાં મદદ કરે છે. (વિદ્યાભારતી, ૨૦૧૫ દ્વારા ઉદ્ધૃત) વિદ્યાભારતી અખિલ ભારતીય શિક્ષણ સંસ્થાન દ્વારા સંચાલિત શાળાઓ ભારતીય સંસ્કૃતિ અને ભાષાઓના પ્રચાર માટે જાણીતી છે. તેઓ ભારતીય ભાષાઓને શિક્ષણના માધ્યમ તરીકે પ્રોત્સાહન આપવાની સાથે સાથે વિદ્યાર્થીઓને અન્ય ભારતીય ભાષાઓથી પરિચિત કરાવવા માટે પણ પ્રયત્નશીલ રહે છે. (શર્મા અને વર્મા, ૨૦૧૦, પૃ. ૯૫-૧૦૮ દ્વારા ઉદ્ધૃત) ભાષાનું જ્ઞાન વિદ્યાર્થીઓને તેમની સંસ્કૃતિ સાથે જોડે છે અને રાષ્ટ્રીય ભાવનાને મજબૂત કરે છે.

આ અભ્યાસ 'ભારતીય ભાષા સંવર્ધનમાં વિદ્યાભારતી સંલગ્ન શાળાઓની ભૂમિકા' પર કેન્દ્રિત છે. આ સંશોધનનો મુખ્ય ઉદ્દેશ્ય એ તપાસવાનો છે કે આ શાળાઓ ભારતીય ભાષાઓના વિકાસ અને પ્રોત્સાહનમાં કેવી રીતે યોગદાન આપે છે. આમાં વિદ્યાર્થીઓમાં ભાષા પ્રત્યે રુચિ કેળવવા માટે ઉપયોગમાં લેવાતી પદ્ધતિઓ, ભાષા શિક્ષણ માટે ઉપલબ્ધ સંસાધનો અને રાષ્ટ્રીય સ્તરે ભાષા સંવર્ધનના તેમના પ્રયાસોનું મૂલ્યાંકન કરવામાં આવશે. (પાલ, ૨૦૦૨, પૃ. ૩૫-૪૦ દ્વારા ઉદ્ધૃત) પ્રોફેસર યશ પાલના જણાવ્યા અનુસાર, "શિક્ષણનો હેતુ માત્ર માહિતી આપવાનો નથી, પરંતુ વિદ્યાર્થીઓમાં જિજ્ઞાસા અને ભાષા

પ્રત્યે લગાવ પેદા કરવાનો પણ છે." આ અભ્યાસ એ સમજવામાં મદદ કરશે કે વિદ્યાભારતી સંલગ્ન શાળાઓ આ ઉદ્દેશ્યને કેટલી હદ સુધી સિદ્ધ કરે છે.

સમસ્યા કથન

ભારતીય ભાષા સંવર્ધનમાં વિદ્યાભારતી, ગુજરાત પ્રદેશ સંલગ્ન વિદ્યાલયોની ભૂમિકા : એક અભ્યાસ

ભારતીય ભાષા :

વિકિપિડિયા(https://gu.wikipedia.org/wiki/ભારતની_ભાષાઓની_સૂચી)

મુજબ ભારત દેશમાં બંધારણના આઠમા પરિશિષ્ટમાં કુલ ૨૨ મુખ્ય ભાષાઓને ભારતની અધિકૃત ભાષાઓ ગણવામાં આવેલી છે.

પ્રસ્તુત સંશોધનમાં ભારતીય ભાષા એટલે દરેક રાજ્યમાં બોલવામાં આવતી ભાષા. ભારતીય સંસ્કૃતિની વિરાસત સમાન દેવનાગરી સંસ્કૃત ભાષા, અન્ય ભાષાઓ અને બોલીઓને ભારતીય ભાષા કહેવાય.

સંવર્ધન :

ભગવદ્ગોમંડલ મુજબ સંવર્ધન એટલે

ઉછેર, ઉછેરી મોટું કરવું તે, પોષણ કરવું તે.

પ્રસ્તુત સંશોધનમાં સંવર્ધન એટલે ભારતીય ભાષાઓનું પોષણ કરવું.

વિદ્યાભારતી, ગુજરાત પ્રદેશ :

સોની એ. (૨૦૨૧), મુજબ,

કાટદરે અને ભીંડે (૧૯૯૩ દ્વારા ઉદ્ધૃત)

પ્રસ્તુત સંશોધનમાં વિદ્યાભારતી એટલે ભારતની શિક્ષણ, સંસ્કૃત અને સંસ્કૃતિનું જતન કરનારી એક સ્વાયત્ત સંસ્થા. વિદ્યાભારતની શિક્ષણયાત્રાનો પ્રારંભ ઇ.સ.૧૯૫૨માં પ્રથમ વિદ્યાલય ઉત્તર પ્રદેશના ગોરખપુરથી થયો. વિદ્યાભારતીનું પૂરું નામ 'વિદ્યાભારતી, અખિલ ભારતીય શિક્ષા સંસ્થાન' છે. ગુજરાત એકમ 'વિદ્યાભારતી, ગુજરાત પ્રદેશ'ના નામે

ઓળખાય છે. વિદ્યાભારતીનો વ્યાપ વધીને ૨૮,૨૯૬ વિદ્યાલય થયો છે, જેમાં ૩૨ લાખ વિદ્યાર્થીઓ શિક્ષણ પ્રાપ્ત કરે છે, જેમાં કાર્યરત આચાર્ય (શિક્ષકો)ની સંખ્યા ૧ લાખ ૨૫ હજાર છે. વિદ્યાભારતીનો મુખ્ય ઉદ્દેશ્ય અધ્યયન, પ્રશિક્ષણ અને સંશોધન છે. તેનો દ્રષ્ટિકોણ ભારતીય જીવનદર્શનના આધારે શિક્ષણ, મનુષ્યનો સર્વાંગીણ વિકાસ અર્થાત્ શરીર, પ્રાણ, મન, બુદ્ધિ, આત્માનો સમ્યક્ વિકાસ સાધવાનો રહ્યો છે. વિદ્યાભારતીનું મૂળ ધ્યેય 'વ્યક્તિ નિર્માણ દ્વારા રાષ્ટ્ર નિર્માણ' છે. વિદ્યાભારતીના ઉદ્દેશ્યો અને કાર્યોનો સંદેશ 'સા વિદ્યા યા વિમુક્તયે' પ્રતિત થાય છે. વિદ્યાભારતી સંલગ્ન શિક્ષણ સંસ્થાઓ મુક્તિ અપાવનાર કેળવણીમાં માને છે, તે જ્ઞાનના દીપકથી ભારતીય સમાજને પ્રકાશિત રાખે છે અધ્યાપન માટે પંચપદી શિક્ષણ પદ્ધતિને અનુસરે છે.

સંલગ્ન :

સાર્થ ગુજરાતી શબ્દકોશ(૨૦૦૭) મુજબ,

"સંલગ્ન એટલે વિ.(સં.) લાગેલું; વળગેલું; ચોટેલું' (૨) ધ્યાનમગ્ન; મશગૂલ."

પ્રસ્તુત સંશોધનમાં સંલગ્ન એટલે વિદ્યાભારતી, અખિલ ભારતીય શિક્ષણ સંસ્થાની સાથે જોડાણ ધરાવતાં પ્રાથમિક વિદ્યાલયો.

વિદ્યાલયો :

ભગવદ્ગોમંડલ (૨૦૦૨)માં 'વિદ્યાલય'ની વ્યાખ્યા નીચે મુજબ દર્શાવેલ છે.

"(સં.વિદ્યા+આલય(સ્થાન)) શાળા : પાઠશાળા"

પ્રસ્તુત સંશોધનમાં પ્રાથમિક વિદ્યાલયો એટલે વિદ્યાભારતી, ગુજરાત પ્રદેશ સંલગ્ન પ્રાથમિક, માધ્યમિક અને ઉચ્ચતર માધ્યમિકનું શિક્ષણ આપતી વિદ્યાલયો.

અભ્યાસ :

દેસાઈ અને શાહ, (૨૦૦૦, પૃ. ૨૩૨ દ્વારા ઉદ્ધૃત) અભ્યાસ એટલે "કોઈ સમસ્યાના

ઉકેલ શોધવામાં લાગી જવું, કોઈ વિષયમાં સંશોધન કરવું કે સંશોધનનું ઊંડાણથી વિવેચન કરવું.”

પ્રસ્તુત સંશોધન લેખમાં અભ્યાસ એટલે ભારતીય ભાષા સંવર્ધનમાં વિદ્યાભારતી, ગુજરાત પ્રદેશ સંલગ્ન વિદ્યાલયોની ભૂમિકાનો અભ્યાસ કરવો.

સંશોધનના હેતુ

પ્રસ્તુત સંશોધનના હેતુઓ નીચે મુજબ હતા.

૧. ભારતીય ભાષા સંવર્ધન સંદર્ભે નીચેની બાબતોમાં વિદ્યાભારતી ગુજરાત પ્રદેશ સંલગ્ન શાળાની ભૂમિકાનો અભ્યાસ કરવો.
 - ભારતીય ભાષા સંવર્ધન સંદર્ભે શાળાની ભૂમિકા
 - ભારતીય ભાષા સંવર્ધન સંદર્ભે શિક્ષકોની ભૂમિકા
 - ભારતીય ભાષા સંવર્ધન સંદર્ભે સમાજની ભૂમિકા
 - ભારતીય ભાષા સંવર્ધન સંદર્ભે વિવિધ પ્રવૃત્તિઓના આયોજનની ભૂમિકા
 - ભારતીય ભાષા સંવર્ધન સંદર્ભે વિદ્યાર્થીઓમાં ભારતીય ભાષાના ગૌરવની ભૂમિકા
 - રાષ્ટ્રીય શિક્ષણનીતિ-૨૦૨૦ અને ભારતીય ભાષા સંવર્ધન

પ્રશ્નો

પ્રસ્તુત સંશોધનના પ્રશ્નો નીચે મુજબ હતા

૧. ભારતીય ભાષા સંવર્ધન સંદર્ભે શાળાની ભૂમિકા કેવા પ્રકારની છે?
૧. ભારતીય ભાષા સંવર્ધન સંદર્ભે શિક્ષકોની સમજ કેવા પ્રકારની છે?
૧. ભારતીય ભાષા સંવર્ધન સંદર્ભે સમાજનું યોગદાન કેવા પ્રકારનું છે?
૨. ભારતીય ભાષા સંવર્ધન સંદર્ભે શિક્ષકો કઈ કઈ પ્રવૃત્તિઓ કરે છે?

૩. ભારતીય ભાષા સંવર્ધન સંદર્ભે શિક્ષકોની ભૂમિકા કેવા પ્રકારની છે?
૪. ભારતીય ભાષા સંવર્ધન સંદર્ભે શિક્ષકો ?
૫. રાષ્ટ્રીય શિક્ષણ નીતિ-૨૦૨૦ અને ભારતીય ભાષા સંવર્ધનને કઈ રીતે મૂલવે છે?

સંશોધન પ્રકાર અને ક્ષેત્ર

પ્રસ્તુત સંશોધન વર્તમાનમાં ભારતીય ભાષા સંવર્ધન સંદર્ભે વિદ્યાભારતી સંલગ્ન શાળાઓના શિક્ષકો કેવા અભિપ્રાયો ધરાવે છે તે તપાસવા માટે સંશોધન હાથ ધરાયું હતું. આ સંશોધન વ્યાવહારિક પ્રકારનું સંશોધન હતું. પ્રસ્તુત સંશોધનમાં નમૂના પાસે મુક્તજવાબી પ્રશ્નાવલી દ્વારા પ્રશ્નોના ઉત્તર મેળવવામાં આવ્યા હતા. આથી પ્રસ્તુત સંશોધન ગુણાત્મક સંશોધન પ્રકારનું હતું. ઉચાટ (૨૦૦૯, પૃ. ૨૮-૩૭)એ જણાવેલ ૧૯ સંશોધન ક્ષેત્રો પૈકી પ્રસ્તુત સંશોધનનું ક્ષેત્ર શિક્ષક અને શિક્ષક પ્રશિક્ષણનું હતું.

વ્યાપવિશ્વ અને નમૂના પસંદગી

પ્રસ્તુત સંશોધનના હેતુઓને ધ્યાનમાં રાખીને વિદ્યાભારતી ગુજરાત પ્રદેશ સંલગ્ન શાળાઓ જેમાં સુરત શહેરની ટી. ડી. વશી શ્રી સરસ્વતી વિદ્યાલય, ઉધના, જી. જી. ઝડફિયા વિદ્યાલય, વરાછા, માધવ સરસ્વતી શિશુમંદિર, જહાંગીરાબાદ એમ કુલ ત્રણ ગુજરાતી માધ્યમની શાળાઓને વ્યાપવિશ્વ તરીકે પસંદ કરવામાં આવી હતી. પ્રસ્તુત સંશોધનમાં વ્યાપવિશ્વ એ જ નમૂનો હતો. જેમાં કુલ ૬૦ શિક્ષકોની નમૂના તરીકે પસંદગી કરવામાં આવી હતી.

ઉપકરણ

પ્રસ્તુત સંશોધનના હેતુઓને ધ્યાનમાં રાખીને ઉપકરણ તરીકે મુક્તજવાબી પ્રશ્નાવલિમાં કુલ ૧૩ પ્રશ્નોની રચના કરી હતી.

માહિતીનું એકત્રીકરણ

પ્રસ્તુત સંશોધન માટેની માહિતી એકત્રિત કરવા માટે સંશોધકે શાળાના આચાર્યશ્રી પાસે અનુમતિ લઈ શિક્ષકો પાસે મુક્તજવાબી પ્રશ્નાવલીમાં ઉત્તરો લખાવી માહિતી એકત્રિત કરી હતી.

માહિતીનું પૃથક્કરણ

માહિતીના પૃથક્કરણ અને અર્થઘટન માટે સંશોધકોએ મુક્તજવાબી પ્રશ્નાવલીના ઉત્તરોનું વારંવાર વાંચન કરેલ. ત્યારબાદ સંશોધનના હેતુઓને અનુરૂપ માહિતી વર્ગીકૃત કરવા નોંધપત્રકની રચના કરી હતી.

પરિણામો - તારણો

મુક્તજવાબી પ્રશ્નાવલીના તારણો

૧. ભારતીય ભાષા સંવર્ધન માટે વિદ્યાભારતી સંલગ્ન શાળાઓની મુખ્ય કામગીરી શું છે?

(૧) પ્રાથમિક સ્તરેથી લઈ ઉચ્ચત્તર માધ્યમિક સુધી માતૃભાષામાં શિક્ષણ આપે છે. (૨) રાષ્ટ્રીય ભાષા હિન્દીને મહત્વ આપી ફરજિયાત હિન્દી ભાષા ભણાવાય છે. (૩) સંસ્કૃત ભાષાને પણ એટલું જ પ્રાધ્યાન્ય આપવામાં આવે છે. (૪) વિદ્યાર્થીઓમાં વાંચન, લેખન, શ્રવણ અને કથન જેવા ભાષાકીય કૌશલ્યો વિકસાવવા પર વધુ ધ્યાન કેન્દ્રિત કરે છે. (૫) ભારતીય ભાષાઓના સમૃદ્ધ સાહિત્ય અને સંસ્કૃતિથી વિદ્યાર્થીઓને પરિચિત કરાવવામાં આવે છે. (૬) શાળાઓમાં ભાષા દિવસની ઉજવણી, નિબંધ સ્પર્ધા, વક્તૃત્વ સ્પર્ધા, કાવ્ય પઠન જેવી વિવિધ પ્રવૃત્તિઓનું આયોજન કરવામાં આવે છે, જેના દ્વારા વિદ્યાર્થીઓને ભાષાનો ઉપયોગ કરવા માટે પ્રોત્સાહન મળે છે. (૭) ભારતીય ભાષાઓના

અસરકારક શિક્ષણ માટે શિક્ષકોને વિશેષ તાલીમ આપવામાં આવે છે.

૨. શાળાકીય અભ્યાસક્રમમાં ભારતીય ભાષાઓને સ્થાન આપવા માટે કઈ રીતે આયોજન થાય છે?

(૧) દરરોજ વંદનામાં વિદ્યાર્થીઓ સંસ્કૃત ભાષામાં શ્લોકોનું પઠન કરે છે. (૨) માતૃભાષામાં પ્રેરક પ્રસંગો રજૂ કરે છે. (૩) વિદ્યાર્થીઓને સંસ્કૃત, હિન્દી, ગુજરાતી ભાષામાં શુદ્ધ ઉચ્ચારણને પ્રાધાન્ય આપવામાં આવે છે. (૪) ભારતીય સંસ્કૃતિની જ્ઞાન પરીક્ષાનું આયોજન કરી માતૃભાષા અને દેવનાગરી ભાષામાં પરીક્ષા લેવામાં આવે છે.

૩. વિદ્યાભારતી શાળાઓમાં ભારતીય ભાષાઓના શિક્ષણ માટે શિક્ષકોની ભૂમિકા શું છે?

(૧) શિક્ષકો વિદ્યાર્થીઓને અન્ય ભારતીય ભાષા શીખવા માટે પ્રેરિત કરે છે અને તેમને યોગ્ય માર્ગદર્શન આપે છે. (૨) ભાષાના વિવિધ પાસાઓનું અસરકારક રીતે શિક્ષણ આપે છે. (૩) શિક્ષકો પોતાની રુચિ અને ઉત્સાહ દ્વારા વિદ્યાર્થીઓમાં ભાષા પ્રત્યે પ્રેમ અને આદરની ભાવના જગાડે છે. (૪) વર્ગખંડમાં અને શાળા સ્તરે ભાષા સંબંધિત સર્જનાત્મક પ્રવૃત્તિઓનું આયોજન કરે છે.

૪. વિદ્યાર્થીઓમાં માતૃભાષા અને પ્રાદેશિક ભાષા પ્રત્યે ગૌરવની ભાવના વિકસાવવા શાળા કયા-કયા પગલાં લે છે?

(૧) શાળામાં વિદ્યાર્થીઓને પોતાની માતૃભાષામાં વાતચીત કરવા માટે પ્રોત્સાહિત કરવામાં આવે છે. (૨) પ્રાદેશિક ભાષાના લોકગીતો, વાર્તાઓ, નાટકો અને સાહિત્ય દ્વારા વિદ્યાર્થીઓને તેમની સંસ્કૃતિથી પરિચિત કરાવવામાં આવે છે. (૩) શાળામાં માતૃભાષા દિવસ અને પ્રાદેશિક ભાષા દિવસની ઉજવણી કરવામાં આવે છે. (૪) પ્રાદેશિક ભાષાના લેખકો, કવિઓ અને વિદ્વાનોને શાળામાં આમંત્રિત કરીને વિદ્યાર્થીઓ સાથે તેમનો સંવાદ

યોજવામાં આવે છે. (૫) નિબંધ સ્પર્ધા, વક્તૃત્વ સ્પર્ધા, કાવ્ય પઠન જેવી પ્રાદેશિક ભાષા સંબંધિત સ્પર્ધાઓનું આયોજન કરવામાં આવે છે.

૫. શાળામાં પ્રાદેશિક અને રાષ્ટ્રીય ભાષાઓનો ઉપયોગ કેવી રીતે થાય છે?

(૧) પ્રાથમિક સ્તરે શિક્ષણનું માધ્યમ સામાન્ય રીતે માતૃભાષા અથવા પ્રાદેશિક ભાષા હોય છે. (૨) શાળા વિદ્યાર્થીઓ અને વાલીઓને પ્રાદેશિક ભાષાના સાંસ્કૃતિક, સામાજિક અને વ્યવહારિક મહત્વ વિશે જાગૃત કરે છે. (૩) પ્રાદેશિક ભાષામાં ગુણવત્તાયુક્ત શિક્ષણ પુરું પાડે છે. (૪) વિદ્યાર્થીઓને માતૃભાષા, સંસ્કૃતિ પ્રત્યે ગૌરવની ભાવના મજબૂત બનાવવામાં આવે છે. (૫) વિદ્યાર્થીઓ અને શિક્ષકો શાળા પરિસરમાં આપસી વાતચીત માટે પ્રાદેશિક ભાષા અને રાષ્ટ્રીય ભાષા(હિન્દી)નો ઉપયોગ કરે છે. (૬) સાંસ્કૃતિક કાર્યક્રમોમાં પ્રાદેશિક અને રાષ્ટ્રીય ભાષાના ગીતો, નાટકો અને અન્ય પ્રસ્તુતિઓનો સમાવેશ થાય છે.

૬. માતૃભાષા અને પ્રાદેશિક ભાષાઓના સંવર્ધન માટે શાળાઓના સાંસ્કૃતિક કાર્યક્રમો કેટલા અસરકારક નિવડે છે?

(૧) વિવિધ તહેવારોને અનુરૂપ કાર્યક્રમો થાય છે તેમાં વિદ્યાર્થીઓની ભાષા અને સંસ્કૃતિ પ્રત્યે રસ-રુચિ જાગે તેવું આયોજન હોય છે. (૨) વિદ્યાર્થીઓને માતૃભાષા અથવા રાષ્ટ્રીય ભાષામાં પોતાની કલા અને વિચારો રજૂ કરવાની તક મળે છે. (૩) શાળાના કાર્યક્રમોમાં વાલીઓ અને સમાજના અન્ય લોકો પણ ભાગ લેતા હોવાથી ભાષા અને સંસ્કૃતિનું મહત્વ સમાજ સુધી પહોંચે છે.

૭. સમાજ વિદેશી ભાષા પ્રત્યે આકર્ષણ ધરાવે છે ત્યારે પ્રાદેશિક ભાષાઓને પ્રોત્સાહન આપવા માટે શાળા કઈ રીતે કામ કરે છે?

(૧) શાળામાં શિક્ષકો વિદ્યાર્થીઓને તેમજ વાલીઓને પ્રાદેશિક ભાષાના સાંસ્કૃતિક, સામાજિક અને વ્યવહારિક મહત્વ વિશે જાગૃત કરે છે. (૨) પ્રાદેશિક ભાષાનું ઉચ્ચ ગુણવત્તાવાળું શિક્ષણ પૂરું પાડવામાં આવે છે, જેથી વિદ્યાર્થીઓ તેમાં નિપુણતા મેળવી શકે. (૩) પ્રાદેશિક ભાષાના શિક્ષણમાં આધુનિક ટેકનોલોજી અને રસપ્રદ પદ્ધતિઓનો ઉપયોગ કરવામાં આવે છે.

૮. વિદ્યાભારતીની શાળાઓમાં શીખવાતા પ્રાચીન ભારતીય સાહિત્ય, ભાષાઓ માટે વધુ જાગૃતિ કઈ રીતે લાવી શકાય છે?

(૧) પ્રાચીન સાહિત્યને વાર્તાઓ, નાટકો, ગીતો અને ચિત્રો દ્વારા રસપ્રદ રીતે વિદ્યાર્થીઓ સમક્ષ રજૂ કરવું જોઈએ. (૨) પ્રાચીન સાહિત્યના મૂલ્યો અને વિચારોને આજના સમય સાથે જોડીને તેનું મહત્વ સમજાવવું જોઈએ. (૩) પ્રાચીન ભાષાઓ અને આધુનિક ભારતીય ભાષાઓ વચ્ચેનો સંબંધ સમજાવવો જોઈએ. (૪) પ્રાચીન સાહિત્ય પર આધારિત ક્વિઝ, ચર્ચા સત્રો અને નાટકની પ્રસ્તુતિઓનું આયોજન કરવું જોઈએ.

૯. વિદ્યાભારતી શાળાઓમાં ભારતીય ભાષાઓના સંવર્ધન માટે નીતિ કે નવો અભિગમ અમલમાં લાવવો હોય તો તમારું શું સૂચન છે?

(૧) શાળાઓમાં આધુનિક સુવિધાઓ સાથેની ભાષા પ્રયોગશાળાઓ સ્થાપવી જોઈએ. (૨) ભારતીય ભાષાઓના શિક્ષણ માટે ડિજિટલ પાઠ્યપુસ્તકો, ઓડિયો-વિડિયો સામગ્રી અને ઓનલાઇન પ્લેટફોર્મનો ઉપયોગ કરવો જોઈએ. (૩) ભારતીય ભાષાઓના શિક્ષણ માટે શિક્ષકોને નિયમિત રીતે તાલીમ કાર્યક્રમો યોજવા જોઈએ. (૪) વિદ્યાર્થીઓને તેમની માતૃભાષામાં વાર્તાઓ, કવિતાઓ અને નિબંધો લખવા માટે પ્રોત્સાહિત કરવા જોઈએ અને તેમના કાર્યને શાળા સ્તરે પ્રકાશિત કરવું જોઈએ.

૧૦. ભારતીય ભાષા સંવર્ધનમાં વાલીઓ અને સમાજનું શું યોગદાન છે?

મુખ્યત્વે વાલીઓનું યોગદાન જોઈએ તો (૧) ઘરમાં બાળકો સાથે તેમની માતૃભાષામાં વાતચીત કરવી. (૨) ઘરમાં ભાષા અને સંસ્કૃતિ સંબંધિત વાતાવરણનું નિર્માણ કરવું. (૩) બાળકોને પ્રાદેશિક ભાષાના પુસ્તકો અને સામયિકો વાંચવા માટે પ્રોત્સાહિત કરવા.

બીજી બાજુ સમાજનું યોગદાન જોઈએ તો (૧) યુવાનોને પોતાની ભાષા અને સંસ્કૃતિનું મહત્વ સમજાવવું. (૨) પ્રાદેશિક ભાષાના સાહિત્ય અને કલાને પ્રોત્સાહન આપવું. (૩) ભાષા અને પોતાની સંસ્કૃતિને લગતા કાર્યક્રમો અને પ્રવૃત્તિઓનું આયોજન કરવું.

૧૧. શું તમને લાગે છે કે શાળાઓ દ્વારા ભારત સરકારની ભાષા સંબંધિત નીતિઓને અસરકારક રીતે લાગુ કરવામાં આવી રહી છે?

(૧) વિદ્યાભારતી સંલગ્ન શાળાઓ માતૃભાષા આધારિત શિક્ષણ અને ત્રિભાષા સૂત્રને મહત્વ આપીને અસરકારક અમલ કરી રહી છે. (૨) રાષ્ટ્રીય શિક્ષણ નીતિનું પાલન ધીમે ધીમે થઈ રહ્યું છે. (૩) ભાષા નીતિઓના વધુ અસરકારક અમલ માટે કેન્દ્ર અને રાજ્ય સરકારો દ્વારા શાળાઓને વધુ સહાયતા અને માર્ગદર્શન આપવાની જરૂર છે.

૧૨. શાળાઓમાં ભારતીય ભાષા સંવર્ધન પ્રવૃત્તિઓમાં હાલના પડકારો કયા છે? આ પડકારોને દૂર કરવા આપનું સુચન જણાવો.

(૧) વિદ્યાર્થીઓ અને વાલીઓમાં અંગ્રેજી જેવી વિદેશી ભાષાનું વધુ આકર્ષણ જોવા મળે છે. (૨) ભારતીય ભાષા કે માતૃભાષામાં શિક્ષણ આપતી સંસ્થાઓ ઘટવા માંડી છે. (૩) વિદેશી ભાષાનું માધ્યમ ચલાવતી શાળાઓમાં વધારો થવા માંડ્યો છે. (૪) ભારતીય

ભાષામાં શિક્ષણ આપવા માટે શિક્ષકો તાલીમ આપવી જરૂરી છે. (૫) વિદ્યાર્થીઓને આકર્ષવા માટે વિવિધ પદ્ધતિઓ દ્વારા ભારતીય ભાષામાં શિક્ષણ આપવું જરૂરી છે.

૧૩. શું વિદ્યાભારતી શાળાઓ અન્ય શાળાઓ માટે ભાષા સંવર્ધનનું મોડેલ બની શકે છે?

(૧) વિદ્યાભારતીની સંસ્થાઓમાં પ્રાથમિક કક્ષાએ જ ભારતીય ભાષામાં શિક્ષણ આપવામાં આવે છે. (૨) સંસ્કૃત ભાષાને વિશેષ પ્રાધાન્ય આપવામાં આવે છે. (૩) રાષ્ટ્રીય ભાષા તરીકે હિન્દી ભાષાને વધુ પ્રાધાન્ય આપી વર્ગખંડમાં અસરકારક રીતે અધ્યાપન થાય છે. (૪) માતૃભાષા અને સંસ્કૃતિના જતન માટે સતત ક્રિયાશીલ રહે છે. (૫) નિયમિતપણે વિદ્યાભારતી સંલગ્ન શાળાઓ વચ્ચે વિવિધ સ્પર્ધાઓનું આયોજન થાય છે. (૬) વિદ્યાભારતી સંલગ્ન ગુજરાત પ્રાંતના વિવિધ વિભાગોને વર્ષના અંતે શિક્ષકોની તાલીમનું આયોજન થાય છે. (૭) ભારતીય ભાષાને પ્રોત્સાહન આપવા વિવિધ પ્રેરણાદાયી કાર્યક્રમોનું આયોજન થાય છે.

ઉપસંહાર :

પ્રસ્તુત સંશોધનમાં ભારતીય ભાષા સંવર્ધનમાં વિદ્યાભારતી ગુજરાત પ્રદેશ સંલગ્ન વિદ્યાલયોની ભૂમિકા સ્પષ્ટ રીતે જણાય છે કે, તે હંમેશા ભારતીયતાને વળગી રહે છે. ભારતની દરેક ભાષાઓનું માન-સન્માન વધારે તે કાર્યક્રમો હંમશા કરતા આવ્યા છે. આજે સમાજમાં માતા-પિતા વિદેશ ભાષા પ્રત્યે આકર્ષણ ધરાવે છે અને પોતાના બાળકોને પણ એ માધ્યમમાં અભ્યાસ કરવા મૂકે છે. પરંતુ બાળક કઈ ભાષા વધુ સારી રીતે સમજે તે મહત્વનું છે. સાથો સાથ ભારતીય સંસ્કૃતિ અને સાહિત્યનું જતન ભારતીય ભાષા કરી રહી છે. જ્યાં સુધી ભાષા જીવે છે ત્યાં સુધી સંસ્કૃતિ અને સાહિત્ય જીવશે તેવી કહેવું ઉચિત છે. ભારતીય ભાષાઓને પોષણ આપવાનું સરહાનીય કાર્ય વિદ્યાભારતી સંલગ્ન વિદ્યાલયો

કરી રહી છે. જેમાં ઉચ્ચત્તમ જ્ઞાન ભારતીય ભાષામાં વિદ્યાર્થીઓને પૂરું પાડવામાં આવે છે.

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The Contribution of Technology in Education

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Abstract

The integration of technology in the education system has become increasingly prevalent in recent years, transforming the way students learn and teachers instruct. This paper explores the multifaceted contributions of technology to the evolving landscape of education. It examines the transformative influence of technology on teaching methodologies, student learning outcomes, and the broader educational ecosystem. The analysis encompasses the benefits of enhanced access to information, personalized learning experiences, and the promotion of collaborative learning environments. Furthermore, the paper addresses the challenges and potential drawbacks inherent in technology integration, while also considering its evolving role in bridging educational inequities. A key focus is on preparing students for the demands of the 21st-century workforce and fostering a lifelong pursuit of knowledge. Finally, the paper offers insights into the future trajectory of technology in education and its potential to shape the future of learning.

Keywords: *Technology, Education*

Introduction

Technology has profoundly reshaped the educational landscape, offering unprecedented opportunities and challenges. From enhancing access to information and fostering personalized learning experiences to bridging geographical barriers and promoting collaborative learning, technology's impact on education is multifaceted and far-reaching. This introduction will explore the diverse ways in which technology contributes to education, examining both its benefits and potential drawbacks. We will consider how technology influences teaching methodologies, student learning outcomes, and the overall educational ecosystem. Furthermore, we will delve into the evolving role of technology in addressing educational inequities, preparing students for the future workforce, and fostering lifelong learning.

The Evolving Role of Technology in Education

Traditionally, education has primarily relied on face-to-face instruction, with textbooks

and other printed materials serving as the main sources of information. However, with the advent and proliferation of technology, the educational landscape has undergone a dramatic transformation. (Stevens & South,2017) highlights how technology has expanded access to educational resources beyond the confines of traditional classrooms. Learners can now tap into a vast network of online resources, connect with experts from around the globe, and engage in collaborative learning experiences irrespective of their geographical location.

The role of technology in education continues to evolve at an accelerated pace. From interactive whiteboards and educational software to online learning platforms and virtual reality tools, technology has become an indispensable component of modern education. (M.H,2019) mentions the use of various media and materials to maximize learning experiences. This shift towards technology-enabled learning has not only changed the way students acquire knowledge but has also redefined the role of educators. Teachers are no longer just disseminators of information; they are now facilitators, mentors, and guides who empower students to navigate the digital world and develop essential 21st-century skills. (Ludhria,2021) emphasizes the use of technology to make learning more engaging and fun, incorporating animations, videos, and games into the educational process. This evolution reflects a broader recognition of the importance of technology in creating dynamic, interactive, and personalized learning experiences that cater to the diverse needs of learners.

The integration of technology in the education system has become increasingly prevalent in recent years, transforming the way students learn and teachers instruct. (Zhang,2014)

Technologies Used in Education

Technology has permeated nearly every facet of modern education, offering a diverse array of tools and resources to enhance the learning process. Here are some key technologies currently utilized in educational settings:

1. Learning Management Systems: Platforms like Canvas, Moodle, and Blackboard provide centralized hubs for course materials, assignments, communication, and grading. They facilitate online learning, blended learning, and even supplement traditional classroom instruction. (Kizilcec,2023) mentions the increasing sophistication of LMS platforms.

2. Interactive Whiteboards: These digital whiteboards offer interactive learning

experiences, allowing teachers to present multimedia content, engage students in collaborative activities, and create dynamic learning environments.

3. Educational Software: A wide range of software applications cater to specific subjects and learning styles. Examples include language learning apps, math tutoring programs, and simulation software for science and engineering.

4. Online Learning Platforms: Platforms like Coursera, edX, and Khan Academy offer access to a vast library of online courses, often taught by experts from leading universities and institutions. These platforms democratize education, making it accessible to learners worldwide.

5. Virtual Reality and Augmented Reality: (Magomadov,2020) discusses the potential of VR and AR in education. These immersive technologies offer unique learning experiences, allowing students to explore virtual environments, interact with 3D models, and engage with content in new and exciting ways.

6. Collaboration Tools: Tools like Google Workspace for Education and Microsoft Teams facilitate communication and collaboration among students and teachers. They enable group projects, online discussions, and real-time feedback.

7. Assistive Technologies: These technologies support students with disabilities, providing personalized learning experiences and ensuring equal access to education. Examples include screen readers, text-to-speech software, and adaptive learning platforms.

8. Mobile Devices: Smartphones and tablets offer portable learning opportunities, allowing students to access educational content, complete assignments, and communicate with teachers anytime, anywhere.

9. 3D Printers: (EduTech Wiki,2009) lists 3D printing as an educational technology. 3D printers enable hands-on learning experiences, allowing students to design and create physical objects, fostering creativity and problem-solving skills.

10. Artificial Intelligence: AI-powered tools are increasingly being used in education for personalized learning, automated grading, and adaptive assessments. (Kizilcec,2023) discusses the growing use of AI in education.

This list is not exhaustive, and the specific technologies used in education vary depending on the educational level, subject matter, and institutional resources. However, it highlights the diverse ways in which technology is transforming the educational landscape and creating new opportunities for learners and educators alike.

Benefits of Technology in Education

Technology integration in education offers numerous benefits that enhance the learning experience for both students and educators:

- 1. Enhanced Access to Information:** Technology provides students with access to a vast repository of information beyond textbooks, including online libraries, educational websites, and multimedia resources. (Kalyani,2024) This expands their learning opportunities and allows them to explore diverse perspectives.
- 2. Personalized Learning:** Technology enables personalized learning experiences tailored to individual student needs and learning styles. (Top 5 Benefits of Technology in the Classroom,2024) Adaptive learning platforms and educational software can adjust the pace and content of instruction to optimize learning outcomes.
- 3. Increased Engagement and Motivation:** Interactive simulations, educational games, and multimedia content make learning more engaging and fun. (Shaji & Nagaraj, 2020) (Technology Can Close Achievement Gaps, Improve Learning,2014) This can increase student motivation and improve knowledge retention.
- 4. Improved Collaboration and Communication:** Technology facilitates communication and collaboration among students, teachers, and parents. (The Importance Of Technology In Education Infographic, 2013) Online platforms and collaboration tools enable group projects, discussions, and real-time feedback.
- 5. Development of 21st-Century Skills:** Technology helps students develop essential skills for the 21st-century workforce, such as digital literacy, problem-solving, critical thinking, and creativity. (Kalyani, 2024) It prepares them for a technology-driven world.
- 6. Flexibility and Accessibility:** Technology enables flexible learning opportunities, allowing students to learn anytime, anywhere. (Kalyani, 2024) Online learning platforms and mobile devices provide access to education regardless of geographical location or time constraints.
- 7. Enhanced Teacher Effectiveness:** Technology provides teachers with tools and resources to enhance their teaching practices. (Shaji & Nagaraj, 2020) Learning management systems, interactive whiteboards, and educational software can streamline instruction, assessment, and communication.

8. **Cost-Effectiveness:** While initial investments in technology can be substantial, technology can lead to long-term cost savings through reduced textbook costs, online resources, and efficient resource management. (Tomar, 2019)
9. **Data-Driven Insights:** Technology provides data and analytics that can inform instructional decisions and improve learning outcomes. (How Technology Is Transforming Teaching and Learning, 2022) Learning analytics can track student progress, identify areas of difficulty, and personalize instruction.
10. **Bridging Educational Gaps:** Technology can help bridge educational gaps by providing equal access to quality education for students in underserved communities or with disabilities. (Technology Can Close Achievement Gaps, Improve Learning, 2014) Online learning platforms and assistive technologies can create more inclusive learning environments.

It's important to note that the successful integration of technology in education requires careful planning, teacher training, and ongoing support. Simply introducing technology into the classroom is not enough; it must be used effectively to achieve its full potential.

Conclusion

The integration of technology in education has fundamentally reshaped the learning process, offering a wealth of opportunities while also presenting unique challenges. From enhancing access to information and promoting personalized learning to fostering collaboration and bridging geographical barriers, technology has become an indispensable tool for both learners and educators. The evolving role of technology in education necessitates a shift in pedagogical approaches, empowering educators to become facilitators, mentors, and guides in the digital age. While technology offers immense potential to enhance learning outcomes and create more engaging and inclusive educational experiences, it is essential to address the potential drawbacks, such as the digital divide and the need for effective implementation strategies. As technology continues to advance at an unprecedented pace, its role in education will undoubtedly become even more profound, shaping the future of learning and preparing students for the demands of the 21st-century workforce and beyond. Looking ahead, it is crucial to prioritize equitable access to technology, foster digital literacy skills, and promote responsible and ethical technology use in education. By embracing the transformative potential of technology while mitigating its potential risks, we can create a future where education is more accessible, engaging, and effective for all learners.

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Innovative Pedagogical Approaches for Early Childhood Care and Education: Integrating NEP 2020

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Abstract

Early Childhood Care and Education plays a crucial role in shaping a child's holistic development. This abstract explores innovative pedagogical approaches in ECCE, emphasizing the integration of India's National Education Policy 2020. The NEP 2020 envisions a restructured curriculum and pedagogy framework (5+3+3+4) that caters to the developmental needs of learners at different stages. This abstract discusses how play-based learning, activity-based learning, and technology integration can be leveraged to create engaging and stimulating learning experiences for young children. It also examines the policy's focus on foundational literacy and numeracy, along with the integration of arts, sciences, and vocational streams. Furthermore, the abstract highlights the importance of teacher training and professional development to effectively implement these innovative pedagogies and achieve the goals outlined in NEP 2020. Finally, it addresses the challenges and opportunities associated with implementing these approaches, emphasizing the need for a holistic and integrated approach to ECCE that aligns with the NEP 2020 framework.

Keywords:

Early Childhood Care and Education (ECCE), Innovative Pedagogical Approaches, NEP-2020

Introduction

Early Childhood Care and Education is widely recognized as a critical period for a child's holistic development, laying the foundation for future learning, social-emotional growth, and overall well-being (Gogoi & Kakoti, 2024). The pedagogical approaches employed during these formative years have a profound impact on shaping a child's cognitive, affective, and psychomotor skills. Traditional pedagogical methods, often characterized by rote learning and didactic instruction, often fall short in meeting the diverse needs of young learners, necessitating a shift towards more innovative and

child-cantered approaches. These innovative approaches recognize the child as an active learner, emphasizing exploration, discovery, and play-based learning.

National Education Policy 2020 acknowledges the significance of ECCE and proposes a transformative framework for education, including a restructured curriculum and pedagogical approach (5+3+3+4). This policy emphasizes the importance of play-based learning, activity-based learning, and the integration of technology to create engaging and stimulating learning experiences. It also underscores the need for strengthening foundational literacy and numeracy skills, along with fostering creativity, critical thinking, and problem-solving abilities. The integration of ECCE within the formal schooling system, as envisioned by NEP 2020, aims to ensure school readiness and provide equitable access to quality early childhood development (Gogoi & Kakoti, 2024). This integration seeks to bridge the gap between preschool education and formal schooling, creating a smoother transition for young learners.

This research paper explores innovative pedagogical approaches in ECCE, focusing on their alignment with the NEP 2020 framework. It examines how play-based learning, activity-based learning, and technology integration can be effectively implemented in ECCE settings to cater to the diverse learning styles and developmental needs of young children. The paper will delve into specific examples of innovative pedagogies, such as the Reggio Emilia approach, Montessori method, and Waldorf education, highlighting their core principles and practices. The paper also discusses the policy's emphasis on foundational literacy and numeracy, and the integration of arts, sciences, and vocational streams into the curriculum. Furthermore, it highlights the crucial role of teacher training and professional development in ensuring the successful implementation of these innovative pedagogies. Well-trained and qualified ECCE professionals are essential for creating stimulating learning environments and fostering positive teacher-child interactions. Finally, the paper addresses the challenges and opportunities associated with adopting these approaches, advocating for a holistic and integrated approach to ECCE that aligns with the vision outlined in NEP 2020 (Gogoi & Kakoti, 2024). This necessitates ongoing dialogue and collaboration among educators, policymakers, and families to refine best practices and address emerging challenges in the field of ECCE (Gogoi & Kakoti, 2024). By fostering a collaborative approach, we can ensure that ECCE programs are responsive to the evolving needs of young children and contribute to their overall development and well-being.

Significance of Pedagogical Approaches in Early Childhood Care and Education

Effective pedagogical approaches are crucial for successful early childhood care and education. Their significance lies in several key areas:

Fostering Holistic Development

- **Integrated Learning:** Well-chosen pedagogical approaches, such as play-based learning, support the integration of various developmental domains. Through play, children develop physical skills, cognitive abilities, social-emotional intelligence, language, and creativity simultaneously. (Kapur, 2019)
- **Individualized Learning:** Pedagogical approaches allow for flexibility and individualization, catering to each child's unique learning style and pace. This ensures that every child has the opportunity to thrive and reach their full potential. (Kapur, 2019)

Creating a Positive Learning Environment

- **Engagement and Motivation:** Engaging pedagogical approaches, like activity-based learning, create a stimulating and enjoyable learning environment. When children are actively involved and interested, they are more likely to learn and retain information. (Kapur, 2019)
- **Reduced Stress and Anxiety:** Play-based and child-centered approaches minimize stress and anxiety in young children, fostering a sense of security and belonging in the learning environment. This positive emotional climate promotes optimal learning and development. (Kapur, 2019)

Building Essential Skills

- **Foundational Skills:** Appropriate pedagogical approaches lay the foundation for essential skills such as literacy, numeracy, problem-solving, and critical thinking. These skills are crucial for future academic success and lifelong learning. (Kapur, 2019)
- **Social and Emotional Skills:** Through interactions with peers and educators in a supportive learning environment, children develop crucial social and emotional skills, such as cooperation, empathy, and communication.

(“PREPARATION OF PRESCHOOL FUTURE SPECIALISTS FOR INNOVATION PROFESSIONALISM,” 2020)

Promoting Long-Term Success

- **School Readiness:** Effective pedagogical approaches prepare children for formal schooling by developing their academic, social, and emotional readiness. This smooth transition to school contributes to greater success in later education. (Arasomwan & Mashiy, 2021)
- **Lifelong Learning:** By fostering a love for learning and exploration in the early years, appropriate pedagogical approaches instil a lifelong passion for knowledge and continuous growth. (Arasomwan & Mashiy, 2021)

Empowering Educators

- **Understanding Child Development:** Pedagogical approaches provide educators with a framework for understanding child development and learning. This knowledge enables them to create developmentally appropriate activities and support each child's individual needs. (Arasomwan & Mashiy, 2021)
- **Effective Teaching Strategies:** A strong understanding of pedagogical approaches equips educators with a range of effective teaching strategies and tools to enhance children's learning experiences. (Arasomwan & Mashiy, 2021)
- **Reflective Practice:** Pedagogical approaches encourage reflective practice among educators, allowing them to continuously evaluate and improve their teaching methods to better meet the needs of their students. (Kapur, 2019)

The significance of pedagogical approaches in ECCE cannot be overstated. They are essential for creating a positive and stimulating learning environment, fostering holistic development, building essential skills, and promoting long-term success for all children.

Pedagogical Approaches for Early Childhood Care and Education with Reference to NEP 2020

The National Education Policy 2020 of India emphasizes a holistic and play-based approach to Early Childhood Care and Education. It recognizes the significance of the foundational years in shaping a child's future learning and development. Here's a

breakdown of the pedagogical approaches recommended:

Play-Based and Activity-Based Learning

- **Central to ECCE:** Play is recognized as the primary pedagogical approach for children aged 3-6. Learning through play allows children to explore, experiment, and discover at their own pace. (Meitei et al., 2024)
- **Activities:** These should be engaging, stimulating, and developmentally appropriate, catering to the child's physical, cognitive, social-emotional, language, and aesthetic domains. (Meitei et al., 2024) Activities can include art, music, storytelling, drama, and outdoor play.
- **Experiential Learning:** NEP 2020 promotes hands-on, experiential learning, allowing children to learn by doing. This approach fosters critical thinking, problem-solving, and creativity. (NEP 2020, 2024)

Foundational Literacy and Numeracy

- **Focus on Basics:** NEP 2020 prioritizes foundational literacy and numeracy skills in the early years. (NEP 2020, 2024)
- **Integrated Approach:** Literacy and numeracy should be integrated into play-based activities, making learning fun and engaging.
- **Language Development:** Activities should focus on developing oral language skills, phonological awareness, and early literacy through storytelling, rhymes, and print-rich environments. (Meitei et al., 2024)
- **Numeracy Development:** Activities should focus on developing number sense, basic operations, spatial awareness, and other core numeracy concepts through games, puzzles, and manipulatives. (Meitei et al., 2024)

Holistic Development

- **Five Domains:** ECCE should focus on the holistic development of the child across five domains: physical, cognitive, social-emotional, language, and aesthetic. (Meitei et al., 2024)
- **Individualized Learning:** Recognizing that each child learns at their own pace, NEP 2020 promotes individualized learning and assessment.

- **Inclusive Education:** NEP 2020 emphasizes inclusive education, ensuring that all children, regardless of their background or abilities, have access to quality ECCE. (NEP 2020: SCHOOL EDUCATION | Service Environment and Culture, 2020)

Creating a Stimulating Learning Environment

- **Safe and Engaging Spaces:** NEP 2020 highlights the importance of creating safe, inclusive, and stimulating learning environments. (NEP 2020: SCHOOL EDUCATION | Service Environment and Culture, 2020)
- **Indoor and Outdoor Play Areas:** Well-equipped indoor and outdoor play areas are essential for facilitating meaningful play experiences. (Meitei et al., 2024)
- **Resource-Rich Environments:** Classrooms should be resource-rich, with age-appropriate books, toys, and learning materials.

Role of the Educator

- **Facilitator:** The educator's role is to act as a facilitator, guiding and supporting children's learning through play and activities. (Meitei et al., 2024)
- **Observation and Assessment:** Educators should regularly observe and assess children's progress, using formative assessment methods to understand their learning needs and adapt their teaching accordingly. (Shukla et al., 2023)
- **Collaboration with Parents and Community:** NEP 2020 encourages collaboration between educators, parents, and the community to create a supportive learning ecosystem.

By adopting these pedagogical approaches, ECCE programs can effectively implement the vision of NEP 2020 and provide a strong foundation for children's future learning and development.

Conclusion

This exploration of innovative pedagogical approaches in Early Childhood Care and Education, viewed through the lens of India's National Education Policy 2020, underscores the transformative potential of child-cantered, play-based, and activity-based learning. By embracing these innovative pedagogies, ECCE can effectively cater

to the diverse learning styles and developmental needs of young children, fostering holistic development and preparing them for future success. The integration of technology, while presenting both opportunities and challenges, offers exciting possibilities for enhancing learning experiences and personalizing education.

The NEP 2020 framework provides a roadmap for reimagining ECCE, emphasizing foundational literacy and numeracy, while also promoting creativity, critical thinking, and problem-solving skills. The policy's focus on integrating arts, sciences, and vocational streams into the curriculum enriches the learning experience and prepares children for a rapidly changing world. However, the successful implementation of these innovative approaches hinges on the availability of well-trained and qualified ECCE professionals. Investing in teacher training and professional development is crucial for creating stimulating learning environments and fostering positive teacher-child interactions.

Moving forward, ongoing dialogue and collaboration among educators, policymakers, and families are essential for refining best practices and addressing the emerging challenges in the field of ECCE. A collaborative approach ensures that ECCE programs remain responsive to the evolving needs of young children and contribute meaningfully to their overall development and well-being. By embracing innovation and prioritizing the holistic development of young learners, we can create a brighter future for generations to come.

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In Teacher Education Training Field Uses of Special Method- A Reflective Study

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Summary

In the field of teacher training, innovative experiments are being carried out to develop trainees. Efforts to provide real experience of practical tasks have been successful. But, it is not possible to provide more active education in theoretical matters without the use of special methods.

It is necessary to have the knowledge of identifying special methods, knowing how to implement them practically, adapting special methods according to the age and interests of the trainees, etc. It is very important to select methods according to the subject matter. If trainees are taught using special methods, their latent powers are developed. They participate in group discussions, debates, are motivated to do self-study, are curious to acquire new knowledge, learn to solve problems, learn to create new examples and narrate stories in a rhythmic manner, can study at their own pace, and can develop more insight by reflecting.

Key words :

Special Method, Teacher Education, Reflective Study

Introduction

In the field of teacher training, various tasks are carried out considering the structure of the trainees. In which both theoretical and practical aspects are woven. It is possible to give real experience of practical tasks. But, it is difficult to teach theoretical matters easily. In the modern era, some methods and techniques have become useful for teaching these theoretical matters.

Prof. Bining and Bining, in their book 'Teaching the social studies in secondary schools', have pointed out the methods and said, "Methodology should be conceived as a dynamic function of education and not as static aspect of the process of teaching."

When education is given to trainees using specific methods, it has been found to be interesting, simple, insightful and competency-based. What are these specific methods? Moreover, it is essential to have an idea of which specific method is considered

appropriate according to the content. Considering this, the researcher has undertaken a research.

Objectives of research

1. To know specific methods useful in the field of teacher training.
2. To know the principles for selecting specific methods useful in the field of teacher training.
3. To know the opinions of trainees, professors and principals of specific methods useful in the field of teacher training.

Importance of research

In the present research, trainees will become aware of various methods, gain an understanding of which method can be used depending on the subject matter, etc., and will also be motivated to use specific methods.

Research Delimitation

The present research included only two B.Ed. Colleges affiliated to Shri Govind Guru University. In which only the second year trainees, teachers and principals of the year 2022-23 were included.

Research Method

The survey method was used in the presented research.

Population & Sampling

In the present research, all the B.Ed. colleges affiliated to Shri Govind Guru University became the Population of this research. Out of which two B.Ed. colleges were selected through the method of random sampling. Out of which a total of 50 second year trainees, 10 professors and 2 principals were included.

Research Tools

The research used Interview for principals and professors and questionnaires for trainees.

Data collection and Data analysis

In the present research, the researcher collected information by visiting the college in person. The information obtained was analyzed qualitatively.

Findings of Research

➤ **Specific methods useful in the field of teacher training**

❖ **Verbal Methods :**

(1) **Narrative Discussion Method**

In this method, the teacher sometimes presents the content issues through narration or lecture and sometimes involves the students in discussion. Thus, both narration and discussion are used. In this method, the unit should be divided into sub-topics. The teacher should plan which topic is to be explained through narration and which topic is to be explained through discussion. In order to use this method well, the necessary educational tools should be used and the necessary K.P. work should also be done along with the discussion. Trainees usually use this method to a greater extent.

(2) Discussion Methods

(I) Group Discussion

This method follows collaborative thinking. In group discussion, the entire class is divided into groups according to the needs of the problem issue. There are as many groups as there are issues. Each group can have 4 to 8 members. A group leader is appointed in each group. One of the group members acts as a reporter. The group leader ensures that the discussion does not deviate from the topic. The reporter takes note of the discussion and prepares a report. The report is presented. Various aspects of the unit are presented to the entire class from different perspectives. The student self-study, becomes active, and increases involvement in the learning process. The main idea in this method is 'investigating important information from different perspectives'.

(II) Debate

A debate can be used to make teaching easier and more effective. A debate can be held in front of the class or the school community. Students should prepare in advance about an issue of class education. Some students should debate in favor and some against. Two sides should be formed. A student from among the students in the class should be given the responsibility of chairman. Each student should present a five to seven minute speech in front of the class in turn. Thus, separate arrangements can be made for those speaking in favor and those speaking against.

(III) Panel Discussion

For the purpose of clarifying a debatable topic, a panel of capable students freely discusses the topic in front of the class and exchanges ideas. The number of members of the panel is not fixed, but it is considered appropriate to have a panel consisting of a chairman and four to five other members. The topic for discussion in the panel must be debatable. The panel members come prepared with the topic in advance.

(IV) Open Forum

This discussion is informal and free. The problem of the country or the world is discussed without any kind of constraint. In this discussion, there is no president or chairman. There are no time or other constraints. The discussion is informal. The audience also participates in the discussion. Ideas are exchanged. Everyone presents their ideas in a democratic manner with self-discipline. This method brings spontaneity and naturalness in the class. An individual can present his own ideas on the problem. Free discussion can take place in a free atmosphere.

(3) Self-study Method

The self study method is similar to the planning method but is a group study method formed on a different basis. According to the American writer Nelson L. Bossing, independent study is an activity of self-study. Self study is a study activity that takes place in and outside the classroom. Study becomes effective through self study.

❖ Mathematical Methods :

(1) Mathematical Aspect

One aspect of education is the mathematical aspect. Mathematics is very useful for explaining the principles of science or psychology. Principles are useful for understanding the banking business. This method is very useful for explaining mathematical theorems, science experiments, economic laws, budgets as well as psychological experiments.

(2) Algebraic

Formulas are presented to explain the rules. It is very useful for solving equations and calculating examples in subjects like mathematics, fundamentals of accounting, statistics etc. Keynes's economics, the formula of price relativity of demand is related to the seed mathematics method. It is also very useful for solving equations.

(3) Geometric Aspect

Knowledge of geometry is required to draw diagrams and charts. In mathematics, drawing various figures, angles, graphs is useful. In economics, drawing diagrams like demand-supply line, fixed-variable cost etc., geometric aspect is useful. Geometry is used extensively in graphs and analysis in higher fields.

❖ Group study Methods :

(1) Supervised Study Method

In 1916, Prof. A. L. Holquest of the University of Cincinnati in America gave this method. He published a book called 'Supervised Study'. In it, he asserted that if a student

studies by himself under the supervision of a teacher, he also gets proper training in how to study along with acquiring knowledge.

This method is a developed form of the self-study method. In this method, the student studies by himself under the supervision and guidance of teachers. The student learns through whatever activity he does. The student always prefers to learn by his own effort. While learning through self-effort, intuition develops, the student acquires education at his own pace according to individual differences. Therefore, he is self-satisfied.

(2) Work Shop

A workshop is a systematic programme of group study which is characterised by a focus on the specific concerns and problems of those involved, as distinguished from formal courses whose content is typically determined by the Subject-Matter, organisation or by the instructor. Democratic Planning under the leadership of a director is an additional characteristic of work-shops often consult-ants or specialists in the field of study are obtained for help.

(3) Seminar Method

When more than one person comes together to discuss an idea, problem or issue, to understand its different aspects, to clarify its nature, to find cause-effect relationships or to get the gist of the subject, problem or idea by exchanging ideas, the discussion is called a seminar. It is better if there are 15 to 20 students to hold a discussion in a seminar. Each group has a chairman, an initiator and a reporter. An attempt is made to get the gist of the discussion issue through mutual reflection and cooperative expression.

❖ Subject Based Method

(1) Comparative Method

In the teaching of various subjects, the teaching method that uses such an approach when comparing a word, concept, object, material, tool, situation, event, occasion, person or his actions with others is called comparative method. The element of similarity and difference is inherent in comparison. In comparison, the extent of comparison is small in other subjects. It is useful to show the difference between objects or things that are opposite to each other but related in some way.

(2) Documentary Method

The documentary method is especially important for education like history and geography, where necessary documentary evidence is available in various subjects.

Education can be made effective by using documentary evidence to discuss the people's life of that time. Documentary evidence method holds an important place in history education. In the modern era, articles written on paper and in ancient times on copper plates or stones are the main sources of history.

(3) Project Method

The great American pragmatist educationist John Dewey is the one who gave the original idea of project method from the limitations of the noisy classroom education. This pragmatist educationist John Dewey presented the idea of education through action, education through experience. Dewey started a school in Chicago in 1897 to experiment with education.

(4) Problem solving method

Problem solving is a conceptual process. The conceptual process arises from a confusion, doubt or problem on a subject matter. The understanding of the subject matter is confusing or some issues are doubtful while some are problematic. Small groups are formed in the class. Ideas are exchanged about the problem. Information is collected, ideas are checked, interpretation is done and thus a solution to the problem is found.

(5) Inductive - Deductive Approach

The inductive method is a method of deriving rules by generalizing from examples. The teacher using the inductive method presents many examples that have similarities to a single subject before the students. The students are asked to study all those examples carefully and find the similarities in each example through thought and logic. The students find and state a specific thing found in all the examples. That becomes a rule, truth or formula.

The deductive method uses the psychological principle of 'going from the general to the specific,' 'from the abstract to the concrete,' or 'from the unknown to the known.' In this method, the teacher first tells the students a formula, rule, principle, or truth. Students use it to find examples or solutions to problems.

(6) Role Play Method

In the role-playing method, the content of the teaching is presented through the acting of a single character. If necessary, more than one character can be added to the role-playing. Many things in education can be explained through practical examples from everyday in life. If such examples are presented through the acting of characters,

students gain knowledge with joy, getting relief from the hectic teaching work.

➤ **Principles for selecting specific methods useful in the field of teacher training**

I. Principle of Motivation

Motivation is an essential element in the process of education. Through it, interest can be created in the students. When interest is awakened, the student becomes ready for education. The principle of motivation should be considered while choosing various methods. The method should be chosen which provides motivation to the students in education.

II. Principle of Learning by Doing

Great educators have considered the principle of learning by doing to be a very important principle in education. According to them, students learn a lot through doing, and the things learned through this are permanent. It is also a psychological truth that children are active by nature. Therefore, this principle must be given a place while choosing teaching methods to keep students active.

III. Principle of Individualization

According to some educationists, one of the aims of education is to develop the personality of the child. Because every child is different in interests, activities, aptitudes, strengths, attitudes, etc. In this way, there are individual differences among the students. Therefore, methods that can develop the personality of each person with these individual differences should be selected for education.

IV. Principle of Correlation

Education has a close relationship with many other subjects. Psychologists have also proven that students acquire knowledge of any subject in a correlated form instead of acquiring it independently. Therefore, only methods that can establish a relationship with the subjects of living education should be chosen.

V. Principle of Linking with Life

The methods of education can make the activities of life easier and smoother. Therefore, it is necessary to have a connection with life. According to Dewey, education is life itself. Therefore, the methods of education must have a connection with all the activities of life. Education can bring about changes in the economic life of the student, he can organize his economic activities or various economic transactions properly. The student uses the truths and principles of various subjects throughout his life.

VI. Principle of Socialization

Education has a great impact on social life. Some educationists are of the opinion that the first aim of education is to develop sociality in students through education. By developing the qualities of sociality, the student becomes a useful citizen of the society. Moreover, the progress of the society can be measured only by the economic condition and cultural development of its members. Therefore, while selecting various methods for economics education, methods that develop sociality qualities in students should be given place.

➤ Opinions of trainees, professors and principals on specific methods useful in the field of teacher training

❖ Trainees' opinions

- The Narrative Discussion method, which is the oldest traditional method, is the most widely used method when giving lessons.
- Methods like group discussions and discussion meetings make learning active, the subject matter is understood quickly and is remembered for a long time.
- Self-study allows all trainees to learn according to their own ability and can study freely at their own pace.
- Mathematical subjects, especially algebraic patterns and geometric figures, become more interesting and easier when taught using a specific method.
- Methods like workshops develop the creative power of trainees and eliminate stage fright.
- Interesting studies can be conducted when there is support in the form of charts, pictures or documents while giving lessons.
- When assigned to discuss projects or new issues, they gain new knowledge, work cooperatively, and learn things like critical writing.
- Through the use of specific methods, the habit of self-reflection and self-study develops, and trainees play an active role.
- The intuition to create new examples, easily understand rules and principles develops.
- Methods like role play method and storytelling method develop acting skills, confidence, and courage, and can achieve more active learning.

❖ Opinions of professors and principals

- There is an old and well-known method known as Chock and Talk. Which is considered as a basis for the trainees to use other methods.
- By using a special method like group discussion, students remain active, join in the discussion and their personality flourishes.
- In verbal methods, trainees discuss their ideas freely, while discussing with their friends, their confidence and reasoning power also develop.
- Not all trainees from all fields take interest in mathematical subjects. It can be made easier through a special method. Geometric figures are especially useful for understanding graphs.
- With special methods, trainees can do self-study at their own pace and according to their intuition.
- They gain new knowledge to examine any event, situation or situation from a different perspective.
- Students gain more active knowledge when the teacher teaches using a special method using some support, evidence or visible object rather than teaching verbally.
- When a student creates projects on his own, rather than listening and watching, he learns everything and acquires skills.
- Solving problems and exchanging ideas are also useful for the trainees in their daily lives.
- Through special methods, the trainees develop their imagination, reasoning, self-confidence, independent thinking and various other abilities quickly.

Conclusion

Thus, in the field of teacher training, trainees are formed keeping in mind all aspects. We got an idea about the specific method to facilitate both theoretical and practical aspects. We also got to know the principles of which method should be chosen according to the content. We also saw what views the trainees, teachers and principals have about the specific methods. Thus, the specific methods have made a unique contribution in the formation of trainees in the field of teacher training.

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National Education Policy 2020: Inclusive Education: Recommendation & Implication

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Abstract:

An innovative and forward-thinking education policy is essential for every nation, as education plays a crucial role in advancing both economic growth and social development. The NEP 2020 aims to close social disparities in access, participation and learning outcomes within school education, and this initiative will be integrated into all education sector development programs. It will lead to a fundamental change in India's education system, transforming it into an enlightened, modern, progressive, and equitable framework. The Inclusive Education policies ensured the platform for the development of education for all for further development and growth in all walks of life. The reasons for the requirement of the introduction of inclusive education were analysed in detail by the expert committee of NEP 2020 and suggested a good amount of measures to reach the needy.

Keyword: NEP 2020, Paradigm shift Quality education, equitable and inclusive education This paper is divided in to six sections:

Section:1 Introduction:

The New Education Policy aims to provide quality education for all. Education is the potential tool for achieving sustainable development by facilitating inclusion in regular stream of education and equality for the learners. The learners are provided with new and equal opportunities to get admitted, acquire knowledge, share information and attain academic performance in the educational institutions in the regular stream from school to Higher education, despite their inherent barriers.

Education is a fundamental right, and along with education facilities, one must refrain from discrimination based on sex or gender. As a developing country our fundamental duty has to arrange education for all. We will fail as a developing country if education system is still not being accessible to each individual in every corner of the country. Inclusive education is no longer an advantage; it is the need of the present. For a developing country like India, education is the most priority aspect of growth.

Inclusive Education in NEP 2020

At the starting of discussion about Inclusive Education, National Education Policy 2020 (NEP 2020) has stated that “Education is the single greatest tool for achieving social justice and equality. Inclusive and equitable education – “while indeed an essential goal in its own right – is also critical to achieving an inclusive and equitable society in which every citizen has the opportunity to dream, thrive and contribute to the nation.” As per education system should be such that “no child loses any opportunity to learn and excel because of circumstances of a birth or background.” In this regard this education policy has suggested some important recommendations as per the level of education system.

Chapter 6 contains the recommendations regarding Inclusive Education at the level of school education. NEP 2020 named this chapter as “Equitable and Inclusive Education: learning for all.”

Chapter 14 contains the recommendations regarding inclusive education at the level of higher education. NEP 2020 named this chapter as “Equity and Inclusion in Higher Education.”

Inclusive means in which

- Based on gender identities - mainly female and transgender individuals.
- Based on Socio-cultural identities - Scheduled Castes, Scheduled Tribes, Minorities and OBCs.
- Based on geographical identities - Village Students, Students from small towns, Students from Aspirational Districts.
- Based on Disabilities - Physical Disabilities, Mental Disabilities and Various Learning Disabilities.
- Based on Socio-Economic Conditions - Migrant Communities, Low-income households, Children in vulnerable situations, Children of victims of trafficking, Orphans, Child beggars in urban areas, Urban Poors etc.

Section:2 Review of Literature

Dr. Joseph K Thomas, (2022) India’s New National Educational Policy, In the book the writer has try to simplify and decode the National Policy 2020 proposals on curriculum, courses and medium of instruction etc. The writer has mentioned in the book that the NEP 2020 has given more important on the Indian-centric education system which contributes directly to transforming our nation iin to an equitable,

inclusive and vibrant knowledge society by offering high quality education to all.

Dr. Kashab Chandra Mandal, (2022) National Educational Policy 2020. The Key to Development in India. In the book the writer deals primarily with the National Education Policy 2020 of India. The author has made an attempt to highlight the provisions of the latest National Education Policy in comparison with some best education systems in the world such as the USA, the UK, and Finland. The comparative analysis with these countries has made this book unique and interesting to read. The examination of elementary as well as secondary education of Japan, and the best practices of Finnish schools and government have opened up a new door of knowledge to the readers. This book has been written mainly for students, teachers, guardians, and other stakeholders, who are actually going to benefit from the National Education Policy 2020. The author mentioned that India's future growth and genuine sustainable development can only be achieved through the proper implementation of the NEP2020.

Prof. Raj Shree Dhar, (2021) , NEP 2020 Conception of a Modern Knowledge Society. The author has mentioned in this book that the National Education Policy (NEP) 2020 is aimed at transforming India's education system into a modern, progressive and equitable one. The new policy focuses on improving poor literacy and numeracy outcomes associated with primary schools, reducing dropout levels in middle and secondary schools and introducing the multi-disciplinary approach in the higher education system. Besides, the policy also lays emphasis on early childhood education, restructuring curriculum and pedagogy, reforming the examination process and investing in teacher training. Although the NEP 2020 aims to bring a holistic change in the education system of India, there are substantial challenges, both quantitative and qualitative, in implementing the reforms. This book intends to show a Concepts, Approaches and Challenges of NEP 2020.

Section : 3 Research Methodology

This study adopts a qualitative research approach, relying on an extensive review of literature, policy documents, and scholarly articles related to inclusive education and NEP-2020. Data is gathered from reputable sources such as government publications, academic journals, and international organizations' reports. The analysis is conducted using review of the documents related NEP 2020 to identify key themes, trends, and insights pertaining to inclusive education in the context of NEP-2020. The objectives of the study are To Know the principles of inclusive education outlined in

NEP-2020, To explore the aspects of inclusive education in NEP 2020 and to know the recommendation and implication. In this paper the recommendations regarding inclusive education suggested by national education policy 2020 have been discussed.

Section 4: Recommendation of the Policy

➤ Recommendations For Socio-Economically Disadvantaged Groups (SEDGs) NEP 2020

To specifically address their educational needs, the NEP created a new social group called SEDG, combining gender identity, socio-cultural identity, geographic identity, disability and socio-economic status. The policy bases much of its intent on building inclusion around these groups. As mentioned earlier, these groups have high dropout rates due to various factors ranging from lack of (geographical) accessibility to tribal communities, education systems for socio-cultural identity categorization to historical exclusion of communities. Recognizing their special needs, NEP 2020 recommends a series of policies and plans such as targeted scholarships, conditional cash transfers to encourage parents to send their children to school, providing of bicycles for transportation that have worked in the past to increase enrolment, to make more Representation.

➤ Recommendations For School Education

The NEP 2020 confirms all the recommendations made by the RPwD Act 2016 regarding school education. The policy has given top priority to enable regular schooling process for children with disabilities from primary level to higher education. Children with moderate to severe disabilities will have the option of regular or special schooling (NEP 2020, Part-I, Section 6.10).

➤ Recommendations for SCs, STs' Students

Children from tribal communities, historically or geographically Scheduled Tribes, face certain barriers and difficulties; need to be provided with various programmatic interventions on a more ongoing basis for their upliftment. Even by developing some special measures to provide those children, so that they can have access to this intervention and ensure it for them. Then they can't get a chance to think that education is irrelevant to their life. All possible efforts will be provided to those children, belonging to Scheduled Castes, so that the access, participation and learning outcomes of them will be continued without any barrier, as a major goal. Because lack of access to quality schools, poverty, social mores and language have had a harmful

effect on rates of enrollment and retention. Special hostels will be provided in certain areas to increase the participation of SC, ST children in school education. To increase their participation, bridge courses will be arranged in school education. Financial assistance will be provided in the form of scholarships as well as fee waivers to meritorious and talented students, mainly at the secondary education level. Also, such financial assistance will be provided for their proper enrollment in higher education.

➤ **Recommendations for OBCs And Minorities**

As a major target, other backward class (OBC) children who are socially and educationally backward should be given special and prominent attention to increase their access, participation, learning outcomes in school education. This principle recognizes the importance of several programmatic interventions currently in place and also the provision of these interventions in schools and higher education for the educational development of minority groups or communities, mainly those who are educationally under represented.

➤ **Recommendations Regarding Women Education**

According to the National Education Policy 2020 recommendations have been suggested for women education. These are as follows; Bicycles will be given to girls to increase their participation in school education, so that they can easily go to school. Then the parents will send their girl child to school without any financial burden. For equitable and quality education, the Government of India will create a fund called "Gender Inclusion Fund" and this fund will be available to each state. But during implementation, the priorities will be determined by the central government such as; For Sanitization, Toilet, Conditional Fund Transfer, Bicycle etc. With this implementation of the "Gender-Inclusion Fund", all states will strive to encourage all girl children to access school education. Quality education will be provided to girls not only for the present generation but also to raise the level of education of future generations. For their advancement in education, policies and plans will be designed in the best way as they can access quality education without any hindrance.

➤ **Recommendations For the Children With Special Needs (CWSN)**

For children with special needs or Divyang, this policy has been recognized to provide them with access to quality education according to their diverse needs as well as providing opportunities for important proactive processes to improve their education. That will be it the same is provided as other children.

➤ **Recommendations for Transgender Students**

It will be the same in terms of objectives to be implemented by the states for these students. In a nutshell, this policy related to “Gender-Inclusion Fund” aims to reduce as well as eliminate any form of gender disparity mainly in the context of access to education, be it for or against female students or Transgender students. Just like female students, transgender students will be provided with "gender-inclusion funds" so that they can easily access quality education.

➤ **Recommendations for the Children with Disabilities**

This policy emphasized the Rights of Persons with Disabilities (RPWD) Act 2016 and reiterated that children with and without disabilities will continue their education together. For their education, the most appropriate and appropriate teaching-learning strategies will be adopted to meet their diverse learning needs. Ensuring the inclusion of such children in the Early Childhood Care and Education (ECCE) and schooling system will be given top priority. Ensure full participation of children with disabilities in the regular school education system from primary level to higher education. RPWD (2016) Act to ensure barrier-free access for all children with disabilities. Updated and appropriate technology-based tools and other devices must be developed to ensure full participation in the classroom. Also teaching learning materials will be developed adequately and language appropriate, i.e., “textbooks in accessible formats such as large print and braille”, so that they can easily enter the classroom and easily engage with their teachers and peers. Special educators with cross-disability training will be recruited to provide barrier-free education. In the context of teaching Indian Sign Language and other basic subjects using Indian Sign Language, the high quality module will be developed by the National Institute of Open Schooling (NIOS). Special attention should be paid to the safety and security of the children. Provision of regular and special schools will be affirmatively provided to those children with benchmark disabilities as per their choice. Home based education will be provided to children who are unable to go to school.

➤ **Recommendations Regarding School Centric Education**

This policy recommended that as per the nature and features of such type of schools, education will be provided- For quality teaching, teachers' competence needs to be developed through adaptation and pedagogical practices. Libraries need to be strengthened and appropriate quality reading material ie: books, journals need to be

made more available Necessary teaching-learning materials should be made more readily available. Also, laboratories in such schools need to be strengthened and updated. The policy recommends that such schools be encouraged to preserve their traditions and educational techniques. Also, to enhance the education of such school children the National Curriculum Framework for Secondary Education (NCFSE), subjects and learning areas will be integrated, so that children can easily access higher education. Financial assistance will be provided as per the need of such schools to introduce language, science, social science, mathematics and other relevant disciplines. Students of such schools must be encouraged to appear for state or other board examinations conducted by the National Testing Agency (NTA), so that they can easily enroll themselves in higher education.

➤ **Recommendations Regarding Curriculum**

While developing National Curriculum Framework (NCF) consultation program with expert organizations like National Institute of DEPwD (Department of Empowerment of Persons with Disabilities), must be organized which will be confirmed by NCERT. More knowledge of different cultures, religions, languages, gender identities etc" must be included in the school curriculum to develop respect for diversity. Any kind of bias should be removed from the school curriculum. More relevant materials will be included that are more useful to all communities. With the help of well-trained teachers, social workers and counselors, students will be sensitized to the new school culture and an inclusive school curriculum will be developed. This curriculum will include humanistic values such as; "Respect for all persons, compassion, tolerance, human rights, gender equality, non- violence, global citizenship, inclusion and equality."

➤ **Recommendations Regarding Teacher Education**

Teacher education programs will develop teaching strategies for these groups for teachers to ensure the improvement of those groups. Also, the teacher education program will have gender and underserved group sensitization programs. Teacher education programs should include awareness programs about children with specific disabilities as well as specific learning disabilities.

➤ **Recommendations For Higher Education**

According to this principle, provision of quality educational opportunities to students should be given top priority, enrollment in higher education, individual

development as well as community development at large should be ensured. Hence, the policy emphasizes equitable access to quality higher education for all students with a special focus on SEDGs. For achieving the purpose and overcoming the barriers, this policy recommended some additional actions which will be taken by all the Governments as well as Higher Education Institutions. These are as follows; Further financial assistance, various scholarships will be provided to students of public or private higher education institutions, mainly SEDGs. To facilitate access to higher education opportunities and scholarships, the government will conduct some outreach programs for SEDGs. According to the needs of the current education system, the government will develop technological tools for maximum participation and better learning outcomes. The government will arrange or create appropriate financial funding, government funding for the education of SEDGs. To ensure a higher Gross Enrollment Ratio (GER), the government will set necessary and clear targets for SEDG. The government will regulate the admission process in Higher Education Institutions (HEIs) by ensuring gender balance. Government will ensure access to higher education by establishing more high quality HEIs for SEDGs as needed, mainly in aspirational districts and special education zones. Some steps must be taken by Higher Education Institutions (HEIs) HEIs will conduct bridge courses for educationally disadvantaged students for their academic improvement. For such students who need socio-emotional and academic support, HEIs will provide suitable counselling programs and mentoring programs for them, so that they can easily continue their education. Discrimination of any kind will be strictly prohibited in HEIs and there will be strict anti-harassment rules for appropriate education systems. HEIs will increase the employability of higher education programs. HEIs will develop and include more degree courses along with previous courses that will be taught in Indian languages or bilingually. HEIs will develop its infrastructure and facilities in such a way that it becomes accessible to students, such as those who use wheel chairs and which becomes friendly to children with other disabilities. HEIs will also conduct some outreach programs similar to the government regarding higher education opportunities and scholarships for students. HEIs will provide inclusive admission procedures HEIs will make the curriculum more inclusive. HEIs will reduce the cost of various fees, so that students have the opportunity to pursue higher education without any financial burden. HEIs will provide more financial aid and more scholarships for socio-economically disadvantaged

students.

Section:5 Implementation

The policy not only lays down some recommendations but also emphasizes its implementation coherently and systematically. During implementation, various organizations at both central and state levels will take the lead, such as; MHRD, CABE, NCERT, SCERT, NTA, State Governments, State Education Departments, Ministry of Education, Boards, HEIs, Regulatory Bodies of Schools, Higher Education Regulatory Bodies, etc. Satisfactory implementation of these policies will require human resources, infrastructural resources, and financial resources from both central and state levels in time. It also requires "careful analysis and review" to assess the results of the implementation of these policies. For better implementation of these policies, some Implementation Committees will be formed with experts on the aforesaid subjects in consultation with the relevant Ministries at both the Central and State levels. Each recommendation made should be implemented through several steps. Urgent action should be taken according to the priority of recommendations. Proper and careful planning should be done for the effective implementation of these policies. The Center and the States should jointly monitor and implement these policies cooperatively.

Section:6 Conclusion

If we want to grow as a nation, it is our moral responsibility to make education accessible to every child regardless of disability. India, being a country of diversity, always sees these variations as an opportunity, so now is the time to change the mindset of people and see every disability as a special ability. That is to focus on what these children can do well rather than focusing on what they cannot do. From segregation to inclusion, the inclusive education system in India overcomes several hurdles. Viewing disability as a special ability requires a change in mindset. Finally, the Government of India came up with a policy that contains minute details. The New Education Policy 2020 will prove to be a catalyst for inclusive education if implemented with proper planning. This will change

the paradigm of inclusive education. All the aspects discussed above will lead to effective and quality education for children. This will help bridge the gap between expectations and the reality of inclusive education.

If these policies are discussed and followed in letter and spirit by all stakeholders, the benefits are noticed like the light at the end of the tunnel seen by us.

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Extent Of Awareness Regarding The Features Of Tour Applications Among Youth

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ABSTRACT

The rapid adoption of digital technology among the youth has transformed the way they engage with tour applications, making trip planning, booking, and exploration more seamless than ever before. This study examines the extent of awareness among youth regarding the features of tour applications. With advancements in technology, tour applications now offer personalized recommendations, real-time updates, virtual tours, and integrated payment systems, catering to the tech-savvy expectations of the younger generation. Youth increasingly rely on these applications for itinerary planning, cost comparisons, and sharing travel experiences, marking a significant shift from traditional tour practices. Data was collected from 60 respondents through a structured questionnaire using a simple random sampling technique. The research is descriptive in nature and highlights key factors influencing the adoption and utilization of tour applications by the youth. The findings of the study will provide valuable insights for application developers, tour companies, and policymakers to design user-friendly and feature-rich platforms tailored to the needs of the younger demographic. This study also underscores the importance of fostering digital literacy among youth to ensure optimal use of technological advancements in the tour industry. Furthermore, the research contributes to the academic discourse by offering a detailed understanding of the role of digital tools in shaping tour behaviours, thereby encouraging future innovations and strategies in the tourism sector.

Keywords:

Youth, Extent of awareness, Tour applications, Features of tour application

INTRODUCTION

In earlier times, offline booking was the main way people made travel arrangements before the internet became widely available. Travelers would visit travel agencies in person, call hotels, or go to ticket counters to book trains, buses, or flights. This method was important because it allowed people to talk directly to agents or staff, ask questions,

and confirm their plans face- to-face. Travelers often received physical tickets, receipts, or booking confirmations, which made the process feel reliable and secure. Offline booking was especially useful for those living in areas without internet or for travellers who were unfamiliar with online systems. It also allowed people to negotiate prices or get personalized recommendations directly from experts. Even today, offline booking remains helpful in places where online services are not available or when people prefer the reassurance of talking to a real person while making travel arrangements.

Young travelers have a distinctive and diverse set of preferences when it comes to travel, which sets them apart from other age groups. One key aspect is their choice of companions and the reasons for their journeys. Unlike older demographics, youth often travel with friends or for experiences like adventure or cultural immersion rather than traditional sightseeing. Their enthusiasm for visiting new and unconventional destinations reflects a desire for exploration and novelty, driving them to seek out unique experiences and experiment with different activities.

Moreover, the evolving nature of youth preferences is evident in their openness to new ideas and willingness to embrace change. As they gain knowledge and accumulate experiences, their attitudes, needs, likes, and dislikes evolve accordingly. This continual growth and adaptation shape their travel choices, leading to a dynamic and ever-changing set of preferences over time.

Youth are generally tech-savvy, constantly connected, and highly reliant on features of tour applications for planning and experiencing their journeys. Tour applications designed for this audience should prioritize features such as seamless user interfaces, real-time updates, and social media integration. These features facilitate ease of use and instant access to information, which are essential for youth who value spontaneity and immediacy. Additionally, incorporating interactive elements like augmented reality tours, gamification, and personalized recommendations can enhance engagement and provide a more immersive travel experience. The youth also prioritize cost-effective travel options, so applications offering budget-friendly deals, detailed expense tracking, and peer reviews can greatly appeal to them. Moreover, the use of features in tour applications has also transformed how youth engage with destination information and cultural experiences. Through features like augmented reality, virtual tours, and interactive guides, young travellers can delve deeper into local culture, history, and traditions, enriching their travel experiences with educational and memorable moments.

This digital immersion fosters a deeper appreciation for diversity and fosters cultural understanding among the youth, contributing to more meaningful and responsible tourism practices. The integration of tour applications in tourism has revolutionized the way youth perceive, plan, and experience travel, offering a blend of convenience, personalization, and cultural immersion that aligns with their digital-native lifestyles.

Tour application features have become essential tools for modern travellers, addressing a wide range of needs and significantly enhancing the travel experience. These applications simplify complex travel planning by providing all necessary information in one place, such as booking options for accommodations, transport, and activities. They save time and effort with features like automated itinerary generators, real-time updates, and AI-based personalized recommendations. Cost efficiency is another major benefit, as price comparison tools and exclusive discounts enable travellers to manage their budgets effectively. Additionally, tour applications improve safety and navigation through real-time tracking, GPS-enabled maps, and access to emergency services, ensuring a secure and hassle-free journey. Features like language translation, currency converters, and cultural insights help travellers connect with local environments, making their experiences more immersive and enriching. Furthermore, eco-conscious options like carbon footprint trackers promote sustainable travel practices. By consolidating convenience, personalization, and safety, tour applications have become indispensable companions for travellers, transforming how people explore the world.

The use of features in tour applications among youth is justified by several factors that enhance their travel experiences. Features of tour applications offer convenience and accessibility, allowing young travellers to plan and manage their trips anytime and anywhere, without the need for extensive research or physical guidebooks. This convenience factor aligns well with the digital-native lifestyle of youth, who are accustomed to using technology for various tasks.

Tour applications provide a wide range of features that cater to different aspects of travel, such as booking accommodations, finding attractions, navigating unfamiliar destinations, and accessing real-time information and updates. These features empower youth with control and choice, enabling them to customize their trips according to their preferences and interests, thereby enhancing their overall satisfaction and engagement with the travel experience.

Additionally, it also facilitates connectivity and social interaction among youth,

allowing them to stay connected with friends, share experiences through social media, and receive recommendations and tips from fellow travellers or locals. This interconnectedness fosters a sense of community and belonging, making the travel experience more immersive and enjoyable for youth.

Despite these benefits, youth also encounter challenges and problems when using tour applications in tourism. These include information overload and decision fatigue due to the abundance of travel apps available, connectivity issues in areas with poor internet coverage, concerns about data privacy and security, and the potential distraction and over-reliance on digital devices during travel experiences.

Tour applications offer significant advantages in enhancing the travel experiences of youth, addressing the associated challenges is crucial to ensuring a seamless and enjoyable experience in tourism. This requires continuous improvements in app design, reliable connectivity solutions, enhanced data security measures, and promoting responsible and mindful usage of digital tools among young travellers.

The Review of literature showed that a study was conducted on Tutunea (2016) conducted research on “Mobile applications for tourism. Study regarding their use by Romanians” where the aim of the study was to investigate the utilization of mobile applications for tourism among Romanians. “Mobile Application for Tourism: The Case of Egypt” research was conducted by Hussein (2020) study was explored the use of mobile applications for tourism in Egypt. Impact of travel Applications in Changing the Tourist Experience by Dias (2021) which focused on the impact of technology on the tourist experience. The review of literature showed that even though many researches were done in the field of travel and tourism, youth tourism, Mobile applications, impact of technology, but there was a dearth of research focusing on knowledge, use and problems experienced by youth while using features of tour application, hence the present study was undertaken.

OBJECTIVES

1. To explore the extent of awareness regarding the features of tour applications among youth.

METHODOLOGY

The research design for the present study was descriptive in nature. The sampling method used for the study was a purposive sampling. The sample comprised 60 youth. The tool used to collect the data was quantitative data collection technique through the

structured questionnaire. The response structure used to find out awareness regarding the features of tour applications among youth was in terms of "Yes" and "No". The scores from 2 and 1 were ascribed to the responses in awareness scale. The scale was subjected to establishment of content validity and reliability. The scale consisted of statements which reflected wheather the respondents were aware of different features of tour applications. The reliability of scale was 0.93

MAJOR RESULTS OF THE STUDY

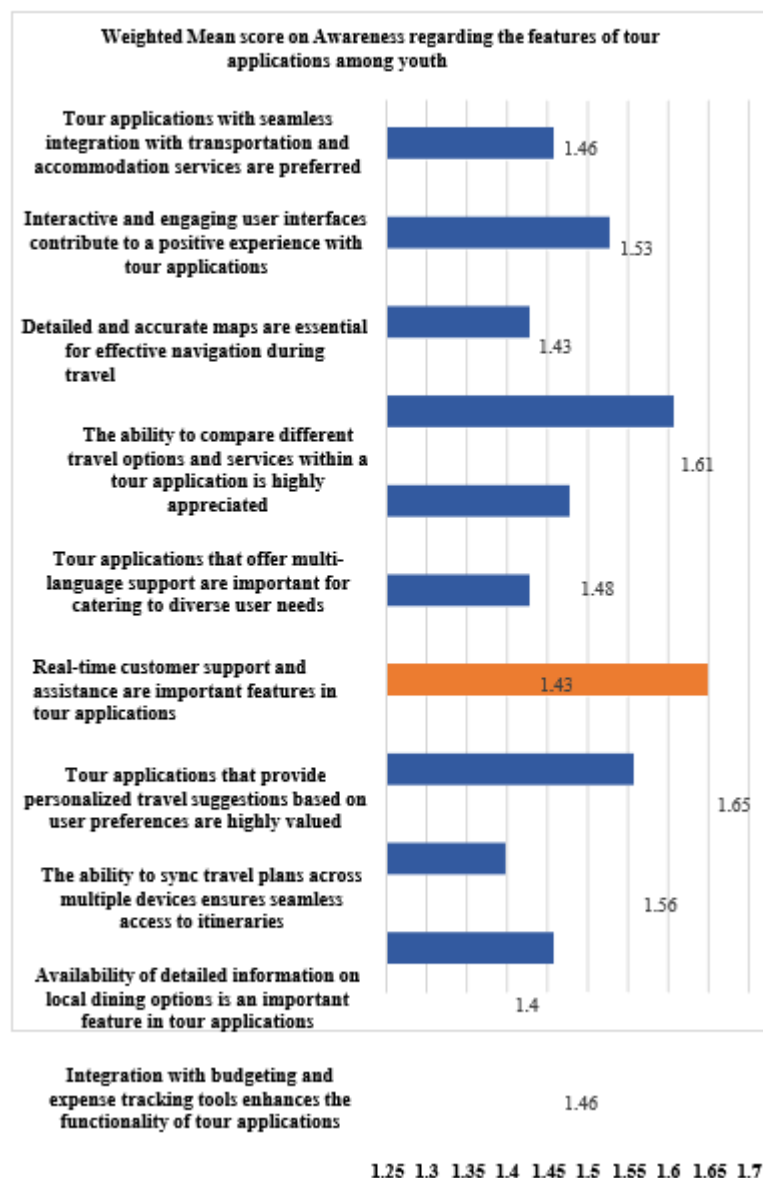


Fig:1 Weighted mean score on awareness regarding the features of tour applications among youth.

This graph is based on weighted mean of the respondents. Total ten questions

were asked to the respondents. In this graph we assessed the awareness regarding the features of tour applications among youth. The response structure was "Yes" and "No" which was coded was 2 and 1. The respondents highly agreed to the statement that tour applications that provide personalized travel suggestions based on user preferences are highly valued. The results in this section are shown according to the frequency and weighted mean scores that were derived from each statement. As a result, the conclusions are described by the data evaluation.

CONCLUSION

In conclusion, the study on the extent of awareness regarding the features of tour applications among youth provides valuable insights into the relationship between technology and travel- related knowledge within this demographic. The research highlights key findings on how aware youth are of the functionalities and benefits offered by tour applications and their role in enhancing travel planning and experiences.

The findings of this study will be also useful to for youth, including travel application developers, tourism organizations, and educational institutions. By understanding the extent of awareness of tour applications, these youth can develop targeted strategies to increase familiarity with tour application features. This could involve user-friendly designs, educational campaigns, and promotional efforts to ensure that young users can fully leverage the capabilities of these applications, ultimately improving their travel experiences.

Additionally, the study contributes to the broader understanding of youth engagement with travel technology, emphasizing the importance of digital literacy and access in shaping travel behaviour. By addressing the gaps in awareness, the travel and technology industries can empower youth to make informed decisions, encouraging greater adoption and utilization of innovative tools.

Overall, the study underscores the importance of raising awareness and providing resources to enhance the knowledge and use of tour applications among youth. Continued research and collaboration among youth will be essential to meeting the evolving needs of this tech-savvy demographic in the ever-changing landscape of travel and tourism.

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The Role of AI in Inclusive Education: Addressing the Needs of Diverse Learners

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Abstract

Inclusive education strives to provide equal opportunities for all students, regardless of their learning abilities or backgrounds. As educational systems become more diverse, addressing the unique needs of learners through personalized approaches has become essential. Artificial Intelligence (AI) offers transformative potential in supporting inclusive education by providing tools that cater to the individual needs of diverse learners. This paper explores how AI can enhance inclusive education by addressing the needs of students with disabilities, learning difficulties, and other marginalized groups. It examines the role of AI in creating personalized learning experiences, improving accessibility, and ensuring equity in education. Additionally, the study analyses the alignment between AI and India's National Education Policy (NEP) 2020, which emphasizes inclusive and equitable access to education. The paper concludes by highlighting the potential benefits, challenges, and ethical considerations in using AI for inclusive education.

Objectives

- To define inclusive education and highlight its importance in meeting the needs of diverse learners.
- To explore the role of Artificial Intelligence (AI) in supporting the inclusion of learners with different abilities, disabilities, and learning needs.
- To examine how AI technologies can contribute to personalized learning and enhance accessibility for diverse learners in the classroom.
- To correlate the use of AI with the goals of India's National Education Policy (NEP) 2020, focusing on equity, accessibility, and quality.
- To analyse the benefits and challenges of integrating AI into inclusive education systems.
- To provide recommendations for the ethical and effective integration of AI in inclusive education.

Importance of this Study

Inclusive education is central to the development of educational systems that cater to the needs of every learner, irrespective of their background, ability, or challenges. As educational diversity increases globally, addressing the needs of diverse learners—whether they have physical disabilities, cognitive challenges, or come from varied linguistic or cultural backgrounds—has become a priority for educators and policymakers. This study is important because it sheds light on the potential of Artificial Intelligence (AI) as a transformative tool in supporting inclusive education. By focusing on AI's role, the study aims to bridge the gap between technological advancements and educational practices, providing insights on how AI can help ensure that all students receive a quality education. The study also highlights the alignment between AI and the National Education Policy (NEP) 2020, an important milestone in India's education reforms.

Concept of Inclusive Education

Inclusive education refers to the practice of educating all students in mainstream schools, regardless of their diverse learning needs, disabilities, or socio-economic backgrounds. It is based on the belief that all students should have equal access to learning opportunities and that the curriculum should be adapted to meet the diverse needs of every learner. The goal is not just to integrate students with disabilities into regular classrooms, but to create a learning environment that accommodates the academic, social, and emotional needs of all learners.

Key elements of inclusive education include:

- Equity and access to education for all students, including those with special needs, learning disabilities, and from marginalized communities.
- Differentiated instruction, where teaching methods and materials are adapted to cater to various learning styles, abilities, and paces.
- Supportive learning environments, including the use of assistive technologies, individualized education plans, and collaborative teaching methods.
- Inclusive education not only benefits students with special needs but also promotes tolerance, empathy, and diversity in the classroom, preparing all students for a more inclusive society.

The Need for Diverse Learners

The term "diverse learners" refers to students who differ in their cognitive abilities, cultural backgrounds, socio-economic status, language skills, and emotional or social development. These differences necessitate a flexible and adaptive approach to education. Diverse learners include:

1. **Students with Disabilities:** Learners with physical, sensory, intellectual, or emotional disabilities often face barriers to accessing conventional educational practices. Inclusive education ensures that these students have access to necessary supports, such as assistive technologies, adapted curriculum, and individualized teaching strategies.
2. **Students with Learning Disabilities:** Learners with conditions such as dyslexia, ADHD, and other learning disorders require specific teaching methods, technologies, and support mechanisms to ensure they are not excluded from the learning process.
3. **Culturally and Linguistically Diverse Learners:** Students from different cultural or linguistic backgrounds may face challenges in understanding the curriculum or engaging in class activities. Differentiated teaching strategies, language support, and cultural sensitivity can help these students fully participate in the educational process.
4. **Gifted and Talented Learners:** These students may require more challenging and enriched learning opportunities. Inclusion in the classroom means ensuring that gifted students are also supported through differentiated and advanced learning experiences.
5. The growing diversity in classrooms demands an education system that is capable of adapting to the varied needs of students. Meeting these needs effectively ensures that all learners can participate meaningfully and achieve success.

AI in Inclusive Education

Artificial Intelligence offers transformative solutions to address the needs of diverse learners in inclusive education. AI technologies provide the means to create adaptive, personalized learning environments that cater to the individual needs of every student. Some key applications of AI in inclusive education include:

1. **Personalized Learning:** AI can tailor learning content and activities based on the unique learning profiles of students. For example, AI-driven platforms can analyse a student's learning pace, strengths, and areas for improvement, offering personalized recommendations and adapting the difficulty of lessons.
2. **Assistive Technologies:** AI-powered assistive tools, such as speech-to-text, text-to-speech, and automatic captioning, make learning more accessible for students with disabilities. For example, AI can help visually impaired students by reading text aloud or converting it into braille.
3. **Adaptive Learning Systems:** AI-based adaptive learning platforms dynamically adjust the content, pacing, and sequence of lessons based on real-time assessments of student progress. These systems ensure that students receive the appropriate level of challenge, which promotes engagement and retention.
4. **Language Support:** AI can provide real-time language translation and support for students from non-native language backgrounds. Natural language processing (NLP) tools can also simplify complex texts, making content more accessible to all learners.
5. **Data Analytics for Educators:** AI can provide teachers with valuable data-driven insights into student performance. By analyzing data from tests, assignments, and class participation, AI can help educators identify learning gaps and tailor their teaching strategies accordingly.
6. **Virtual Assistants:** AI-based virtual assistants can offer real-time support to students, answering questions, guiding them through learning tasks, and providing immediate feedback.

Correlation with NEP 2020

The National Education Policy (NEP) 2020 in India emphasizes making education accessible, equitable, and inclusive for all students, regardless of their background or ability. The policy aligns closely with the potential of AI in transforming inclusive education in the following ways:

1. **Equity and Inclusion:** NEP 2020 stresses the importance of ensuring that no child is left behind, particularly those from disadvantaged communities, including children with disabilities. AI can help achieve this by personalizing

learning experiences and providing assistive technologies that support students with varying needs.

2. **Personalized Learning:** The policy advocates for more individualized learning pathways for students, allowing for a more tailored educational experience. AI can play a central role in realizing this vision by providing adaptive learning environments and customized educational content.
3. **Technology Integration:** NEP 2020 calls for the integration of technology into education to enhance learning outcomes and foster inclusivity. AI tools and platforms can be used to implement the technological vision of NEP by ensuring that educational resources are accessible to all, regardless of their physical or cognitive challenges.
4. **Teacher Empowerment:** NEP emphasizes the need for professional development for teachers to equip them with the necessary skills to use technology effectively. AI-based platforms can help in this regard by offering data-driven insights into student performance and providing teachers with tools for enhancing their pedagogical strategies.

Benefits and Challenges of AI in Inclusive Education

Benefits:

Accessibility: AI-based tools make learning accessible for students with disabilities by offering assistive technologies, such as voice recognition, closed captioning, and content translation.

Personalization: AI enables customized learning experiences, providing each student with lessons tailored to their abilities, preferences, and progress.

Scalability: AI can be deployed across different regions, making inclusive educational resources available to schools in remote or under-resourced areas.

Efficiency: AI can reduce the administrative burden on teachers, allowing them to focus more on student engagement and teaching.

Challenges:

Ethical Concerns: The use of AI raises issues regarding data privacy, algorithmic bias, and fairness, which need to be addressed to ensure equitable access and outcomes.

Access to Technology: Not all schools, especially in rural or economically disadvantaged areas, have access to the necessary infrastructure or resources to implement AI-driven solutions effectively.

Teacher Training: Teachers must be adequately trained to use AI tools effectively, which may require significant investment in professional development.

Resistance to Change: There may be resistance from educators and stakeholders who are hesitant to adopt AI technologies in traditional educational settings.

Conclusion

The integration of Artificial Intelligence (AI) in inclusive education has the potential to address the diverse needs of learners, promote equity, and ensure accessibility in classrooms. By offering personalized learning experiences, providing assistive technologies, and supporting teachers with real-time data, AI can create an educational environment that accommodates all students, including those with disabilities, learning difficulties, and linguistic or cultural challenges. The alignment of AI with the objectives of the National Education Policy (NEP) 2020, which emphasizes inclusion, equity, and quality education, further highlights its potential to transform the educational landscape in India. However, to maximize the benefits of AI in inclusive education, careful attention must be given to ethical considerations, data privacy, and the equitable distribution of technological resources. With thoughtful implementation and continuous professional development, AI can help build a more inclusive and accessible educational system for all learners.

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ઉચ્ચત્તર માધ્યમિક શાળાના મદદનીશ શિક્ષકોના કાર્યસંતોષ પર

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સારાંશ

પ્રસ્તુત અભ્યાસનો મુખ્ય ઉદ્દેશ ઉચ્ચત્તર માધ્યમિક શાળામાં અભ્યાસ કરાવતા શિક્ષકો વ્યવસાયમાં કેટલો મનોભાર અનુભવે છે તથા કેટલો કાર્ય સંતોષ ધરાવે છે તે જાણવાનો હતો. આજકાલ શિક્ષકોને ભણાવવાના કામ કરતા બીજા અનેક કામો કરવા પડે છે. આજે શિક્ષકોને વર્ગખંડનો ભાર અને બીજા કામ નો ભાર સતત રહેતો હોય છે. જેથી શિક્ષકો સતત મનોભારનો સામનો કરતા હોય છે. જેની અસર વિદ્યાર્થીઓના અભ્યાસ પર અને પોતાના સ્વાસ્થ્ય પર પડતી હોય છે. આ શિક્ષકો પોતાના વ્યવસાયમાં કેટલો તણાવ અનુભવે છે તે જાણવા માટે નખત્રાણા તાલુકાના ઉચ્ચત્તર માધ્યમિક શાળામાં અભ્યાસ કરાવતા શિક્ષકો પર વ્યવસાયિક તણાવ પરના આ સંશોધન હાથ ધરવામાં આવ્યું હતું. આ સંશોધનમાં નિદર્શ તરીકે 42 સ્ત્રી શિક્ષકો અને 50 પુરુષ શિક્ષકોને સરળ યાદચ્છિક પદ્ધતિ વડે પસંદ કરવામાં આવ્યા હતા. આ શિક્ષકોના વ્યવસાયિક તણાવ માપવા માટે ૧) ડૉ.જી.એસ.પટેલ રચિત શિક્ષકો માટે મનોભાર માપદંડ ૨) ડૉ.આર.એસ.પટેલ રચિત શિક્ષક કાર્યસંતોષ માપદંડ નો ઉપયોગ કરવામાં આવ્યો હતો. પ્રસ્તુત અભ્યાસમાં માહિતી પૃથ્થકરણ માટે માઈક્રોસોફ્ટ એક્સેલ નો ઉપયોગ કરવામાં આવ્યો છે. અભ્યાસના પરિણામો દર્શાવે છે કે મધ્યમ કાર્યસંતોષ અને નિમ્ન કાર્યસંતોષ ધરાવતા શિક્ષકોના

વ્યાવસાયિક તણાવ વચ્ચે સાર્થક તફાવત જોવા મળે છે. આમ, ઉચ્ચત્તર માધ્યમિક શાળાના શિક્ષકોમાં વ્યાવસાયિક તણાવ પર તેમના કાર્યસંતોષની અસર જોવા મળી હતી.

આવીરૂપ શબ્દો:

મનોભાર, કાર્યસંતોષ

પ્રસ્તાવના

વર્તમાન સમય એ તંગદીલીનો સમય છે. દરેક વ્યક્તિ સમયની સાથે સ્પર્ધા કરવામાં વ્યસ્ત છે. પોતાની શક્તિઓ કરતા પણ વધુ અપેક્ષાઓનો ભાર લઈને માનવી જીવન જીવી રહ્યા છે. આ અપેક્ષાઓની આપૂર્તિએ માનવીના મનમાં સંઘર્ષ પેદા કરે છે અને આ સંઘર્ષથી માનવી તણાવ જેવી સમસ્યાઓનો ભોગ બને છે. આજના પ્રગતિશીલ અને ઝડપથી બદલાતા જતાં માહિતી યુગમાં શિક્ષણ એક આવશ્યક અને અનિવાર્ય જરૂરિયાત બનતી જાય છે. રોજ રોજ થતા નવા આવિષ્કારોથી દિન-પ્રતિદિન વિશ્વ સાંકડું બની રહ્યું છે. આજનો ઝડપી અને વૈજ્ઞાનિક યુગ ચિંતાઓથી ભરેલો છે તેમ કહી શકાય. દરેક વ્યક્તિના જીવનમાં સફળતા મેળવવા માટે સતત ચિંતિત હોય છે અને આ ચિંતાને કારણે તે તણાવ અનુભવે છે. આજની શિક્ષણ પદ્ધતિમાં શિક્ષકો ઉપર અભ્યાસક્રમનું ભારણ તેમજ કાર્ય અંગેનો ભાર વધ્યો છે. અસમાન પગાર ધોરણ, અસમાન કાર્ય, અસંતોષની લાગણી તેમજ સાથી મિત્રો તરફથી અસંતોષ મળે છે જેને પરિણામે શિક્ષકો તણાવ અનુભવે છે. જેની અસર તેના વ્યવસાયિક સંતોષ પર જોવા મળે છે. આ બધી બાબતોની શિક્ષકોના કાર્યસંતોષ પર કોઈ અસર થાય છે ખરી? આ બધી બાબતોને કારણે શિક્ષક જે તણાવ અનુભવે છે તેના કારણે તેની કાર્ય કરવાની શૈલીમાં કોઈ પરિવર્તન આવે છે ખરું? આવા અનેક અનઉત્તર પ્રશ્નોના ઉત્તર મેળવવાની જિજ્ઞાસા સહજ પ્રસ્તુત અભ્યાસ હાથ ધરવામાં

આવેલ છે.

અભ્યાસના હેતુઓ

પ્રસ્તુત અભ્યાસના હેતુઓ નીચે મુજબ હતા.

૧. ઉચ્ચત્તર માધ્યમિક શાળાના મદદનીશ શિક્ષકોના મનોભારની કક્ષા નક્કી કરવી.
૨. ઉચ્ચત્તર માધ્યમિક શાળાના મદદનીશ શિક્ષકોના કાર્યસંતોષની કક્ષા નક્કી કરવી.
૩. ઉચ્ચત્તર માધ્યમિક શાળાના મદદનીશ શિક્ષકોના મનોભારનો તેમના કાર્યસંતોષના સંદર્ભમાં અભ્યાસ કરવો.
૪. ઉચ્ચત્તર માધ્યમિક શાળાના મદદનીશ શિક્ષકોના મનોભારનો તેમની જાતિના સંદર્ભમાં અભ્યાસ કરવો.

અભ્યાસની ઉત્કલ્પનાઓ

- HO₁ ઉચ્ચત્તર માધ્યમિક શાળાના મદદનીશ પુરુષ અને સ્ત્રી શિક્ષકોના મનોભારના પ્રાપ્તિઓની સરાસરીઓ વચ્ચે સાર્થક તફાવત નહીં હોય.
- HO₂ ઉચ્ચત્તર માધ્યમિક શાળાના ઉચ્ચકક્ષા અને નિમ્ન કક્ષાનો કાર્યસંતોષ ધરાવતા મદદનીશ શિક્ષકોના મનોભારના પ્રાપ્તિઓની સરાસરીઓ વચ્ચે સાર્થક તફાવત નહીં હોય.
- HO₃ ઉચ્ચત્તર માધ્યમિક શાળાના ઉચ્ચકક્ષા અને મધ્યમ કક્ષાનો કાર્યસંતોષ ધરાવતા મદદનીશ શિક્ષકોના મનોભારના પ્રાપ્તિઓની સરાસરીઓ વચ્ચે સાર્થક તફાવત નહીં હોય.
- HO₄ ઉચ્ચત્તર માધ્યમિક શાળાના મધ્યમ કક્ષા અને નિમ્ન કક્ષાનો કાર્યસંતોષ ધરાવતા મદદનીશ શિક્ષકોના મનોભારના પ્રાપ્તિઓની સરાસરીઓ વચ્ચે સાર્થક તફાવત નહીં હોય.

અભ્યાસ હેઠળના ચલો

પ્રસ્તુત અભ્યાસના ચલો નીચે મુજબ હતા.

સ્વતંત્ર ચલ: મનોભાર

પરતંત્ર ચલ: કાર્ય સંતોષ: ઉચ્ચ કાર્યસંતોષ, મધ્યમ અને નિમ્ન કાર્ય સંતોષ

પરિવર્તક ચલ: જાતિ: સ્ત્રી, પુરુષ

અંકુશિત ચલ: સૂચનાનું માધ્યમ, ધોરણ

આંતરવર્તી ચલ: સ્વ-પ્રેરણા

નિદર્શ

પ્રસ્તુત અભ્યાસ માટે નખત્રાણા તાલુકામાં ગુજરાતી માધ્યમની ઉચ્ચત્તર માધ્યમિક શાળામાં અભ્યાસ કરાવતા મદદનીશ શિક્ષકોમાં 42 સ્ત્રી શિક્ષકો અને 50 પુરુષ શિક્ષકો ને નિદર્શ તરીકે લેવામાં આવ્યાં હતા. મદદનીશ શિક્ષકોની પસંદગી સરળ યાદચ્છિક નમૂના દ્વારા કરવામાં આવી હતી.

સંશોધન પદ્ધતિ

પ્રસ્તુત અભ્યાસનો હેતુ ઉચ્ચતર માધ્યમિક મદદનીશ શિક્ષકોનો મનોભાર અને તેમનો કાર્ય સંતોષ જાણવાનું છે આ માટે સર્વેક્ષણ પદ્ધતિ સૌથી વધારે અનુકૂળ હોવાથી સર્વેક્ષણ પદ્ધતિ દ્વારા સંશોધન કાર્ય હાથ ધરેલ હતો.

સંશોધનનું ઉપકરણ

સંશોધન ઉપકરણ પસંદગી એ સંશોધન માટે કરોડરજ્જુ સમાન છે. સંશોધનના ઉપકરણની પસંદગી સંશોધન સમસ્યા પર આધાર રાખે છે. પ્રસ્તુત અભ્યાસમાં ઉચ્ચતર માધ્યમિક શાળાના મદદનીશ શિક્ષકોના વ્યાવસાયિક મનોભાર અને કાર્યસંતોષ અભ્યાસ કરવાનો હોવાથી નીચે મુજબ ઉપકરણનો ઉપયોગ ગુગલ ફોર્મની મદદથી કરવામાં આવેલ હતો.

૧. ડૉ. જી. એસ. પટેલ રચિત શિક્ષકો માટે મનોભાર માપદંડ.

૨. ડૉ. આર. એસ. પટેલ રચિત શિક્ષક કાર્યસંતોષ માપદંડ.

માહિતી એકત્રીકરણ

સંશોધન માટે યોગ્ય પદ્ધતિ પસંદ કર્યા પછીથી માહિતીના એકત્રીકરણનો વિચાર

કરવાનો રહે તેમાંથી ક્યાંથી, કેવી રીતે, કેટલી માહિતી મેળવવી તે બાબત વિચારવાની રહે છે. પ્રસ્તુત અભ્યાસમાં નખત્રાણા તાલુકામાં ઉચ્ચત્તર માધ્યમિક શાળામાં અભ્યાસ કરાવતા મદદનીશ શિક્ષકોને નમૂનાના પાત્રો તરીકે લીધા હતા. અભ્યાસ અંગેની જરૂરી માહિતી આપી તૈયાર કરેલ ગુગલ ફોર્મ ભરવા અંગેના સૂચનો આપેલ અને નમૂનાના પાત્રો માટે વોટ્સઅપ ગ્રુપ બનાવેલ હતું આ ગ્રુપમાં (૧).ડો. જી. એસ. પટેલ રચિત શિક્ષકો માટે મનોભાર માપદંડ અને (૨).ડો. આર. એસ .પટેલ રચિત શિક્ષક કાર્યસંતોષ માપદંડના બનાવેલ ગુગલ ફોર્મની લીંક મોકલાવી હતી તેમજ શિક્ષકોને તેમની અનુકુળતાએ આ ગુગલ ફોર્મમાં જરૂરી સાચી માહિતી આપવા અનુરોધ કરવામાં આવેલ હતો.

માહિતીનું પૃથક્કરણ અને અર્થઘટન

માહિતી એકત્રીકરણ કરવાથી સંશોધનનું કાર્ય પૂર્ણ થતું નથી. ગમે તેટલી માહિતી હોય પરંતુ તેનું યોગ્ય પૃથક્કરણ અને અર્થઘટન કરવામાં ન આવે તો તેનો કોઈ જ હેતુ રહેતો નથી માહિતી વડે સંશોધનના હેતુઓ સિદ્ધ થયા કે કેમ? તેમજ અભ્યાસની ઉત્કલ્પનાઓ કેટલી સિદ્ધ થઈ તે જાણી શકાય છે. અભ્યાસમાં સમવિષ્ટ ચલો જાતિ, અનુભવ અને કાર્યસંતોષ પ્રમાણે તેમની સારણીઓ તૈયાર કરવામાં આવી હતી. પ્રાપ્ત કરેલ માહિતીના આધારે, અભ્યાસની ઉત્કલ્પનાઓના આધારે અને અર્થઘટન માટે કમ્પ્યુટરના માઈક્રોસોફ્ટ એક્સેલ પ્રોગ્રામની મદદથી ગણતરી કરવામાં આવી હતી. માહિતીની તુલનાત્મક રજૂઆત કરવા માટે આલેખ તૈયાર કરવામાં આવ્યા હતા.

સંશોધનના તારણો

(૧) પુરુષ શિક્ષકો અને સ્ત્રી શિક્ષકોની મનોભાર વચ્ચે સાર્થક તફાવત જોવા મળે છે.

સ્ત્રી શિક્ષકોની સરખામણીમાં પુરુષ શિક્ષકો ઓછો મનોભાર અનુભવે છે. આમ,

શિક્ષકોના મનોભાર પર જાતિની અસર જોવા મળી હતી.

- (૨) એક વર્ષથી ઓછો અને એક વર્ષથી વધુ અનુભવ ધરાવતા શિક્ષકોના મનોભાર વચ્ચે સાર્થક તફાવત જોવા મળ્યો છે. તેથી કહી શકાય કે મનોભારની બાબતમાં એક વર્ષ કે તેથી ઓછો અનુભવ ધરાવતા શિક્ષકો એક વર્ષથી વધુ અનુભવ ધરાવતા શિક્ષકોની સરખામણીમાં વધુ મનોભાર અનુભવે છે.
- (૩) ઉચ્ચ કાર્ય સંતોષ અને નિમ્ન કાર્યસંતોષ ધરાવતા શિક્ષકોના મનોભાર વચ્ચે સાર્થક તફાવત જોવા મળે છે. તેથી કહી શકાય કે, મનોભારની બાબતમાં ઉચ્ચ કાર્યસંતોષ ધરાવતા શિક્ષકો કરતા નિમ્ન કાર્યસંતોષ ધરાવતા શિક્ષકોમાં મનોભાર વધુ જોવા મળે છે. આમ, ઉચ્ચતર માધ્યમિક શાળાના શિક્ષકોમાં મનોભાર પર તેમના કાર્યસંતોષની અસર જોવા મળી હતી.
- (૪) ઉચ્ચ કાર્યસંતોષ અને મધ્યમ કાર્યસંતોષ ધરાવતા શિક્ષકોના વ્યાવસાયિક તણાવ વચ્ચે સાર્થક તફાવત જોવા મળતો નથી. તેથી કહી શકાય કે, વ્યવસાયિક તણાવની બાબતમાં ઉચ્ચ કાર્યસંતોષ ધરાવતા શિક્ષકો અને મધ્યમ કાર્યસંતોષ ધરાવતા શિક્ષકોમાં મનોભાર એક સમાન જોવા મળે છે. આમ, ઉચ્ચતર માધ્યમિક શાળાના શિક્ષકોમાં મનોભાર પર તેમના કાર્યસંતોષની અસર જોવા મળતી નથી.
- (૫) મધ્યમ કાર્યસંતોષ અને નિમ્ન કાર્યસંતોષ ધરાવતા શિક્ષકોના મનોભાર વચ્ચે સાર્થક તફાવત જોવા મળે છે. તેથી કહી શકાય કે, મનોભારની બાબતમાં મધ્યમ કાર્યસંતોષ ધરાવતા શિક્ષકો કરતા નિમ્ન કાર્યસંતોષ ધરાવતા શિક્ષકોમાં મનોભાર વધુ જોવા મળે છે. આમ, ઉચ્ચતર માધ્યમિક શાળાના શિક્ષકોમાં મનોભાર પર તેમના કાર્યસંતોષની અસર જોવા મળી હતી.

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Inclusive and Innovative methods of Assessment in Education: Challenges and Way out

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Abstract

For Teacher Educators, assessment in modern Era is not confined to Grading and Reporting but it is Assessment for learning and execution. And hence it has vast subjects, performance and areas to deal with. This paper addresses prospective innovative assessment practices; assessment challenges faced in innovative practices and aspire to take up these challenges by offering practical guidelines for dealing with them in daily assessment practices

1. Prospective Assessment: Include Self-assessment in School Internship, practical papers(seminar/exhibition), Theory paper with realistic approach

Challenge: To establish a shift from obsolete tests to more authentic assessments

Way-out: This requires the development of assessments that observe student teachers' performance in situations that to be similar to the current and future teaching practice as much as possible.

2. Innovative Assessment: student teachers involved in assessment process at all level

Challenge: to increase student teachers' involvement in assessment by handing over the responsibilities of assessor from teacher educator to student teacher

Way-out: Prepare student-teachers for self-assessment and retrospection. As their prime responsibilities is to assess their students in schools.

3. Prospective Assessment: assessment by student teachers, self for teacher educators and assessment by self, mentor and peer for student teachers

Challenge: teacher educators critically evaluate the quality of their own assessments and equip student teachers with the skills to do so in their own future practice as well.

Way-out: give maximum support to student in carrying out assessment as well

as provide them that space while they are in school.

For teacher educators, this means that they need to equip student teachers with assessor skills, like developing appropriate assessment criteria, tool and giving adequate feedback on student performance. Because assessment is a insubstantial issue and many important educational decisions are based on assessment outcomes, it is important to assure the quality of assessment.

Key words: Prospective Innovative Assessment, Practical and Theory Part, school Internship

Challenges, self and Peer Assessment, Challenges in Innovative Assessment, student teachers' involvement, skill infusion, quality of assessment

Introduction

Facilitating quality education to the future generations is the pious duty on the shoulders of teachers working at different levels of Education in any country. The yardstick to measure the quality varies from physical entities to the human ones, due to the complex nature of quality and entity itself. But the great intellectuals devoted precious time in defining, creating, bringing, measuring and evaluating the quality of processes and products with different degrees of approximations. The success and glory of an organization is the outcome of the individuals working collectively, effectively and efficiently, for the preset goals, with good amount of devotion and passion with futuristic perspective.

Like Individuals' performance is the central part to organization, a teacher's performance is central to the educational institution in particular education system in general. Moreover, future Teacher' assessment in modern Era is not confined to Grading and Reporting but it is Assessment for learning and execution. And hence it has vast subjects, performance and areas to deal with. As preparing becoming teacher you have great responsibility on your shoulders to asses and study your students' Performance in different aspect. In new policy also it has been envisaged that test core concepts and skills along with higher order capacities at school level under assessment and stage-specific, subject-specific programme to prepare teachers from Foundational to Secondary stage with inputs of all subjects including arts, sports, vocational education, and special education. Students assessed not only on academic aspects but also on broad capacities and dispositions. Hence it is very much clear that assessment of future teacher need to be channelized in such a way that all above aspects are covered

keeping in mind that they will also be skillful in assessment. So, first let's have bird's eye view on assessment system in India till now.

Table 1
Education commissions, method of Learning and Assessment in India

Period	Method of Learning	Assessment
Ancient India (Vedic Period 5th century BC)	• Listening, Contemplation, and concentrated contemplation were some new methods of exploring the way of learning. • The teachers used the storytelling methods to teach the students. • Students used to ask questions about the topics taught by the teachers and these topics were discussed and then answered to the students.	• The students got plenty of knowledge through seminars and debates conducted at frequent intervals. • The system focuses on the all-round development of students. • More emphasis was given to practical knowledge rather than theoretical knowledge.
Medieval Period Mughal Period	• Orals, discussions, and recitations of the lesson taught were the main methods of learning at that age. • Aim was Reading and writing and to reform the scripts. Teach systematically, first knowledge of alphabets, then words-knowledge, and then sentence formation.	• More emphasis was given on practical education. • There was no half-yearly or annual examination fixed for students, but the students were evaluated based on practical situations of life.

Modern era (Wood/ Hunter/ Sadler Hartog/ Sergeant/ Wardha Scheme/ Zakir Hussain	• The whole curriculum of a student is divided into three sections primary, secondary, and graduation • Formal system of education	• Oral testing, written test, public examination • Internal and external assessment
Independence Radhakrishna Commission Muddaliar Commission	• Major aim is to provide functional literacy • 3R need to be achieved • Like modern era schools' education was divided into three parts • Formal system of education prevailed	• Oral and written test, public examination, Question paper based on blue print • Internal and external assessment • Continuous and comprehensive evaluation, Competency-based (LO) assessment
Post- Independence Kothari Commission Muddaliar commission NPE 1968 NEP 1986 POA 1992 NKC	• Universalization of education was the motto • Formal system of education prevailed • De-emphasizing memorization • Use of grades in place of marks • Introduction of semester system from secondary stage in a phased manner. • centralized spot evaluation	• Introduction of multiple-choice questions, question banks in different subjects, analysis of answer scripts for common errors and mechanical processing of examination results, transparency in examination • Continuous & comprehensive evaluation • Competency based assessment, school-based assessment (SBA)

National Education Policy 2020

The objective of new Education Policy announced by Ministry of Human Resource Development is to bring in changes in the current desertion 34-year-old policy in school and higher education system. National Education Policy 2020 (NEP 2020) is more practical in approach and creative in understanding country's education scenario. And therefore, more emphasis is given to the creativity and innovation with personality development of the students rather than expecting students to score high by cramming without basic understanding of the concept. The level of studies has been put in simple and focused categories as 5+3+3+4 in school education, where from class 6 onwards vocational training starts will give them practical experiences at early stage. From class 8 to 12 they can choose courses of their interest and it will provide them the platform to pursue specialization in that subject at higher education level. The duration of all graduation will be four years where students can master their respective subjects. Moreover, for Teacher Education NEP 2020 suggests teachers' preparation is an activity that requires multidisciplinary perspectives and knowledge, formation of dispositions and values, and development of practice under the best mentors. Further, envisage that teachers must be grounded in Indian values, languages, knowledge, ethos, and traditions including tribal traditions and being well-versed in the latest advances in education and pedagogy.

Aims of Assessment as per NEP 2020:

Assessment must

- be regular, formative and competency-based,
- promote learning and development of students,
- focus on 'assessment for learning',
- Test higher-order skills (analysis, critical thinking and conceptual clarity etc.),
- Help entire schooling system in revising continuously teaching-learning processes to optimize learning.

Hence, it is necessary to develop assessment practice which caters NEP 2020 aims of assessment and assessment processes followed so far in Indian Education for betterment of learners and knowledge generation. This paper addresses prospective innovative assessment practices; assessment challenges faced in innovative practices and aspire to take up these challenges by offering practical guidelines for dealing with them in daily

assessment practices.

Prospective Assessment

The under-graduate's curriculum in Education is primarily divided in three parts for two-year course and assessment of student teachers in these three parts is as follows.

Table 2
Proposed Inclusive & Innovative Assessment procedures for different courses at B.Ed. level

Section	Courses	Assessment procedures
A: Perspective in Education(PE)	PE 1: Childhood and Growing Up PE 2: Contemporary India and Education PE 3: Learning and Teaching PE 4: Gender, School and Society PE 5: Knowledge and Curriculum PE 6: Creating an Inclusive School PE 7: Health, Yoga and Physical Education	• Presentation based on case study, sociometry, anecdote writing, attitude and aptitude of students from different background towards learning, teaching learning process observed at school at different schools with personal inputs based on your analysis • Critique writing in the form Analysis of content from reviewed books, movies, diaries written by teachers, commissions and committees reports, their suggestions v/s practices, content analysis from text book regarding gender bias, stereotypes, relevancy of example, texts etc. Report writing of Practical work done at school; games, sports, competition organized, days celebration, prayer talk, dealt with special child at school, asana-yoga done, medical checkup camp organized, facilities for differently able child in school, resources utilization
B: curriculum	CPS 1: Language across the Curriculum CPS 2&3: Pedagogy of two School Subjects (Part I &II) Social Sciences, Urdu,	• Small scale research work under CPS1 for language interpretation, examples given in textbook, content based like one word with different meanings same way one meaning

	Biological Science, Hindi Physical Science, English, Mathematics, Sanskrit CPS 4: Assessment for Learning	but different words like synonyms, etc. • Discussion forum on learning language vis-à-vis local language, role and importance of local language v/s standard language, Action research on daily problems faced by teachers, students, administrators, curriculum and textbook with timetable, different background people, evaluation patterns and achievement of students, etc
C: Engagement with the Field	Tasks and Assignments that run through all the courses as indicated in the semester wise distribution of the syllabus School Internship Courses designed for Enhancing Professional Capacities (EPC) EPC 1: Reading and Reflecting on Texts EPC 2 : Arts in Education EPC3 : Understanding ICT and Its Application EPC 4 : Understanding the Self	• Assignments: projects on school resource and reports, subject and course related reporting • School diary: school observation in written form regarding its functionality and practice, evaluation and achievement reporting, preparation of teaching learning and evaluation material related reporting in diary for future support, official work like uploading of students' data on portal and enrolling them on different sites as part of centralized process • Survey on students' achievement, teaching styles, their interests, • Case study of special student/deprived student/gifted student/ teacher's work/ administrator's work/ institution • Practice teaching in school shaving skill set and different methods and approaches • Feedback as part of their practical work and also to learn how to assess others and self in different situations • Innovative Practice at School in terms of teaching, evaluation, conducting assembly, competition, timetable...

Viva voce	All three section	• It has been conducted in all three sections and here in student-teachers should be involved at primary level • At final stage teacher educator, Head of the institution and subject expert (external) should conduct.

For any system it is evident that appraisal from different appraiser is necessary; also Vedas are complementing this fact by

आचार्यात्पादमादत्ते पादंशिष्यः स्वमेधया।
सब्रह्मचारिभ्यः पादंपादं कालक्रमेणच॥

(One fourth from the teacher, one fourth from own intelligence, one fourth from classmates, and one fourth only with time.) So, in proposed assessment this conviction has been put forth.

Form above table 2, it is evident that students are being assessed in different aspects with many practical as well as innovative techniques. It includes

1. Self-assessment in Theory paper with realistic approach (section A and B), Practical papers for professional growth and School Internship (Section C).
2. Innovative assessment where in student-teachers are involved in preparation of tool, process of assessing and in scoring.
3. Teacher educators' and student teachers' assessment by self and others means assessment by student teachers, self for teacher educators; and assessment by self, mentor and peer for student teachers

For above three assessment tools are given in Table 2. Performing these action needs lots of preparation on teacher educators' part as they need to focus on objective of the subject with creative assessment techniques and standard of the learner with local needs. It will be challenge for teacher educators to cater the needs of learner with pace of advancement in the education sector after commencement of NEP 2020.

Assessment challenges faced in Inclusive & Innovative practices

1. To establish a shift from obsolete tests to more authentic assessments
 - a. Shift from Paper-pencil test to apparent, realistic, futuristic and skill-based assessment needs lots of preparation.
 - b. Assessment involves rigorous efforts from teacher educator
 - c. Assessment involves knowledge from all around regarding subject as different perspectives are involved in it.
 - d. Teacher educators also need to prepare for this invention in assessment.

- e. Technology and online learning with assessment aspect need to consider which needs altogether different skill set to deal with technological gadgets and techno savvy skills on the part of assessor and assesses.
2. To increase student teachers' involvement in assessment by handing over the responsibilities of assessor from teacher educator to student teacher
 - a. Student teachers are not well equipped with tools
 - b. Students need to practice in setting question papers, preparing meaningful questions, awareness about the subject topics, difficulty levels of questions
 - c. Students need to well aware about different type of assessment techniques
 - d. More practice in classroom should be given to student for assessment
 - e. It is not only preparing questions but also evaluating answers is considered under assessment
 - f. Students should have idea about grading and marking as assessor
3. Teacher educators critically evaluate the quality of their own assessments and equip student teachers with the skills to do so in their own future practice as well.
 - a. The assessment done by educators should be reliable as it will be compared with evaluation done by their peers and self-evaluation made by student-teachers.
 - b. It is indeed a challenge to make your own self at check on every point to establish its validity.
 - c. It has great impact on students as you are going to be trend setter as student-teachers are learning from you and then will be implement in their profession.
 - d. The values here you inculcate in student-teachers through your behaviors and taught imbibed with subjects will give fruitful results to maintain quality of education.
 - e. It is the biggest challenge to make whole process transparent with maintaining quality at all the level of assessment.

Way-out for challenges faced in Proposed Inclusive & Innovative Assessment practices

1. This requires the development of assessments that observe student teachers' performance in situations that to be similar to the current and future teaching practice as much as possible. Also, Teachers must be grounded in Indian values, languages, knowledge, ethos, and traditions including tribal traditions, while also

being well-versed in the latest advances in education and pedagogy so that they can assess their students with these qualities.

2. Prepare student-teachers for self-assessment and retrospection. It will help them to learn through their mistakes by own and reach out to the required outcome. Also, teacher can provide good example of being ideal teacher and human being to their students by transforming their behavior and practicing value imbibed personality portrayal as per the requirement of society. Further student-teachers need to be well aware about their prime responsibilities that to assess their students in schools without bias.
3. Give maximum support to student in carrying out assessment as well as provide them that space while they are in school. Also teach them how to Provide mentorship, inspire learners, Nurture healthy curiosity in learners, create meaningful learning experiences, leveraging technology to support learning, Mediating and liaising, Researching learning strategies.

Conclusion

NEP 2020 has brought significant changes in Education system, leading in revamping of the whole system, wherein Teacher Education enacts as a torch bearer. The process of the system reflects to be efficient only with a productive output, which in turn is measured by a reliable and optimizing assessment. Hence this paper has elaborately written innovative assessment techniques and skills to be developed in future teachers to meet end point. It is always difficult to start afresh, as it needs heaps of energy while in pipeline but when it is streamlined and its worth appreciated then satisfaction of gratitude makes your past tender experiences idyllic. So, initial pain taken by Teacher Educators will give assurance of optimal results.

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NEP-2020 અંતર્ગત ઇન્સપાયર એવોર્ડ-માનાંક અને ગણિત-વિજ્ઞાન પ્રદર્શનની સર્જનાત્મક પ્રવૃત્તિનો અભ્યાસ

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સારાંશ

NEP-2020 પ્રમાણે આજે પ્રવૃત્તિમય શિક્ષણ દ્વારા સર્જનાત્મક, રચનાત્મક અને ક્રિયાત્મક કાર્ય કરવાથી બાળકોને ખૂબ જ શિક્ષણમાં ફાયદો થયો છે. સંશોધકે આ માટે પ્રાથમિક શાળા સયાજીગામ, તા.ઉચ્છલ, જિ.તાપીમાંથી ઇન્સપાયર એવોર્ડ-માનાંક અને ગણિત-વિજ્ઞાન પ્રદર્શનની સર્જનાત્મક પ્રવૃત્તિનો અભ્યાસ કર્યો અને એક વખત રાષ્ટ્રીય કક્ષાએ, સતત સાતમી વખત રાજ્યકક્ષાએ અને બે વખત ઝોન કક્ષા સુધીની સફળતા પ્રાપ્ત કરી છે. શાળાના બાળકોને કેન્દ્ર કક્ષાથી રાષ્ટ્રીય કક્ષા સુધી કેવી રીતે તૈયાર કરવું તે ઇનોવેશન શાળાની સિદ્ધિ માટે ખૂબ જ ભાગ ભજવે છે. આજે NEP 2020માં દર્શાવ્યા પ્રમાણે આ સર્જનાત્મક પ્રવૃત્તિ દ્વારા બાળકોને ગણિત-વિજ્ઞાન પ્રદર્શનમાં ભાગ લે તો આવી સફળતા મેળવીને નવી શિક્ષણ નીતિને સિદ્ધ કરી શકાય. NEP-2020 અંતર્ગત આવા ઇનોવેશન દ્વારા નવીન અને ક્રાંતિકારી ફેરફારો લાવી શિક્ષણમાં સુધારો કરી શકાય.

પ્રસ્તાવના :

બધા બાળકો કુદરતી રીતે શીખવા માટે તત્પર અને સક્ષમ હોય છે. બાળકો સહજ રીતે શીખતા હોય છે અને તેઓ પોતાની પ્રવૃત્તિ દ્વારા જ જ્ઞાન મેળવે છે. બાળકો પોતાની આસપાસનું વાતાવરણ પ્રકૃતિ, વસ્તુઓ અને લોકો સાથે પરસ્પરના વ્યવહાર અને ભાષા દ્વારા ઘણું બધું શીખતા હોય છે. તેઓ નવા વિચારોને તેમના પદાર્થ અને પ્રવૃત્તિઓ અંગેના

અગાઉના જ્ઞાન અને વિચારો સાથે જોડી પોતાના જ્ઞાનમાં વધારો કરે છે.

વિજ્ઞાન અને ગણિતમાં રચનાત્મકતા અને આવિષ્કારિતાને પ્રોત્સાહિત કરવા માટે એન.સી.એફ. - ૨૦૦૫ (NATIONAL CURRICULUM FRAME WORK - 2005) માં પ્રવૃત્તિઓ, પ્રયોગો અને તકનિકી મોડ્યુલ્સને મહત્વ આપવામાં આવેલ છે. તે વિવિધ માધ્યમોના પ્રસારણ જેમ કે શાળા (કેન્દ્ર), તાલુકો, જિલ્લો, રાજ્ય અને રાષ્ટ્રીય કક્ષાએ ગણિત અને વિજ્ઞાન પ્રદર્શનના કાર્યક્રમ દ્વારા વિવિધ પ્રકારની પ્રવૃત્તિઓના અમલીકરણ કરીને પ્રોત્સાહિત કરે છે.

NCERT અને MHRD - NEW DELHI દ્વારા દર વર્ષે વિદ્યાર્થીઓ, શિક્ષકો અને સામાન્ય લોકોમાં ગણિત અને વિજ્ઞાન શિક્ષણની લોકપ્રિયતા વધારવા માટે NCERT દ્વારા જવાહરલાલ નહેરુ રાષ્ટ્રીય ગણિત અને વિજ્ઞાન પ્રદર્શન અને MHRD NIF – INDIA દ્વારા INSPIRE AWARD – MANAK અંતર્ગત વિજ્ઞાન પ્રદર્શનનું આયોજન કરવામાં આવે છે.

ગુજરાત રાજ્યમાં પ્રાથમિક શાળાઓના વિદ્યાર્થીઓ વિજ્ઞાન અને ગણિત વિષયની મદદથી ગણિત અને વિજ્ઞાન પ્રદર્શનમાં ભાગ લઈ આ સમગ્ર કાર્યક્રમ વિશે જાણે તે જરૂરી છે.

આ માટે પ્રસ્તુત સંશોધનમાં સંશોધક શિક્ષણમાં ગણિત અને વિજ્ઞાન પ્રદર્શનના કાર્યક્રમ દ્વારા બાળવૈજ્ઞાનિક વિદ્યાર્થીઓ, માર્ગદર્શક શિક્ષકો અને તેની શાળાઓએ કેટલે અંશે સિદ્ધિ મેળવે તે જાણવા માટે આ સંશોધન હાથ ધરવામાં આવ્યું હતું.

શીર્ષક :

“NEP-2020 અંતર્ગત ઇન્સપાયર એવોર્ડ-માનાંક અને ગણિત-વિજ્ઞાન પ્રદર્શનની

સર્જનાત્મક પ્રવૃત્તિનો અભ્યાસ”

શીર્ષકમાં સમાવિષ્ટ શબ્દનો અર્થ :

NEP-2020 : NATIONAL EDUCATION POLICY - 2020

ઇન્સપાયર એવોર્ડ-માનાંક : 'ઇનોવેશન ઇન સાયન્સ પર્સ્યુટ ફોર ઇન્સ્પાયર્ડ રિસર્ચ' (INSPIRE-ઇન્સપાયર) સ્કીમ એ ભારત સરકારના ડિપાર્ટમેન્ટ ઓફ સાયન્સ એન્ડ ટેકનોલોજી (DST)ના મુખ્ય કાર્યક્રમો પૈકી એક છે. ઇન્સપાયર એવોર્ડ - MANAK, DST દ્વારા નેશનલ ઇનોવેશન ફાઉન્ડેશન – ઇન્ડિયા (NIF), DSTની સ્વાયત્ત સંસ્થા સાથે ચલાવવામાં આવી રહ્યો છે, જેનો ઉદ્દેશ્ય 10-15 વર્ષની વય જૂથના અને ધોરણ 6 થી 10માં અભ્યાસ કરતા વિદ્યાર્થીઓને પ્રોત્સાહિત કરવાનો છે.

ગણિત : પ્રાથમિક શાળામાં ભણાવવામાં આવતો એક વિષય.

વિજ્ઞાન : પ્રાથમિક શાળામાં ભણાવવામાં આવતો એક વિષય.

ગણિત અને વિજ્ઞાન પ્રદર્શન : ગણિત અને વિજ્ઞાન પ્રદર્શન એટલે કે ગણિત અને વિજ્ઞાન વિષયને લગતા મોડેલ કે કૃતિ બનાવી પ્રદર્શનમાં રજૂ કરવામાં આવે છે. જેમાં શાળાનાં ગણિત વિજ્ઞાન શિક્ષકના માર્ગદર્શન હેઠળ ગણિત વિજ્ઞાન વિષયમાં રસ ધરાવતા વિદ્યાર્થીઓને કૃતિ રજૂ કરવા માટેનો કાર્યક્રમ.

ગણિત-વિજ્ઞાન પ્રદર્શનની શાળામાં થયેલ સર્જનાત્મક પ્રવૃત્તિનો અભ્યાસની માહિતી :

ગણિત-વિજ્ઞાન પ્રદર્શનમાં ભાગ લેવા પહેલાની સમસ્યા :

- ❖ બાળકોને ગણિત વિજ્ઞાન પ્રદર્શનનાં મોડેલ બનાવવામાં મુશ્કેલી પડે છે.
- ❖ કૃતિનું પ્રેઝન્ટેશન માટેની તૈયારી કરવામાં બાળકો મુશ્કેલી અનુભવે છે.
- ❖ બાળવૈજ્ઞાનિક તરીકે બાળકો ભાગ લેવા માટે તૈયાર થતાં ન હતા.

- ❖ ગણિત વિજ્ઞાન પ્રદર્શનમાં બાળવૈજ્ઞાનિકોનો સંતોષકારક સહકાર મળતો ન હતો.
- ❖ શરૂઆતનાં વર્ષ 2014-15માં અમારી શાળાની કૃતિ કેન્દ્ર કક્ષા સુધી જ પહોંચી હતી. તેથી આ ઇનોવેશન હાથ ધર્યું.

ગણિત-વિજ્ઞાન પ્રદર્શનનું વર્ણન અને સર્જનાત્મક પ્રવૃત્તિની અમલવારીની માહિતી :

- ❖ સૌપ્રથમ બાળકોને શાળાના પ્રાર્થના સંમેલનમાં ધોરણ 6 થી 8 ના બધા જ બાળકોને આવતો નવતર વિચાર કે મોડેલ લખીને વિચાર રજૂ કરવા માટે કહ્યું હતું.
- ❖ મોડેલ બનાવવાનું હોવાથી ઘર કે ઘરની આસપાસ પડેલી નકામી ચીજ વસ્તુઓ જેવી કે પ્લાસ્ટિકની બોટલ, લાકડાની પટ્ટી, ખીલી, સ્ક્રૂ, લેઝર ટોચ, વગેરે વસ્તુઓ ભેગી કરવામાં આવી હતી.
- ❖ ગણિત વિજ્ઞાન પ્રદર્શન માટે મોડેલ બનાવવાની તાલીમ આપવામાં આવી અને કૃતિ બનાવવામાં આવી. જેમ કે DIGITAL MICROSCOPE AND LASER MICROSCOPE, SALT WATER BATTERY, DIGITAL FUEL METER, ALL SIDE ROTATE CRAFT, SOLAR IRON SHOP, WIRELESS EV CAR, HIGHWAY ROAD AND EV STATION વગેરે.
- ❖ બાળકોને કૃતિનું પ્રેઝન્ટેશનની સ્પર્ધા રાખી બાળવૈજ્ઞાનિક તરીકે પસંદ કરવામાં આવે છે.
- ❖ આ કૃતિ ગણિત વિજ્ઞાન પ્રદર્શનમાં અને INSPIRE AWARD –MANAK SCIENCE EXHIBITIONમાં પ્રદર્શિત કરવામાં આવે છે. જેથી કૃતિ બનાવવાનો સમયની બચત થઈ અને સરળતાથી બાળકોમાં સર્જનાત્મક શક્તિનો વિકાસ થયો.

ગણિત-વિજ્ઞાન પ્રદર્શનનું પરિણામ :

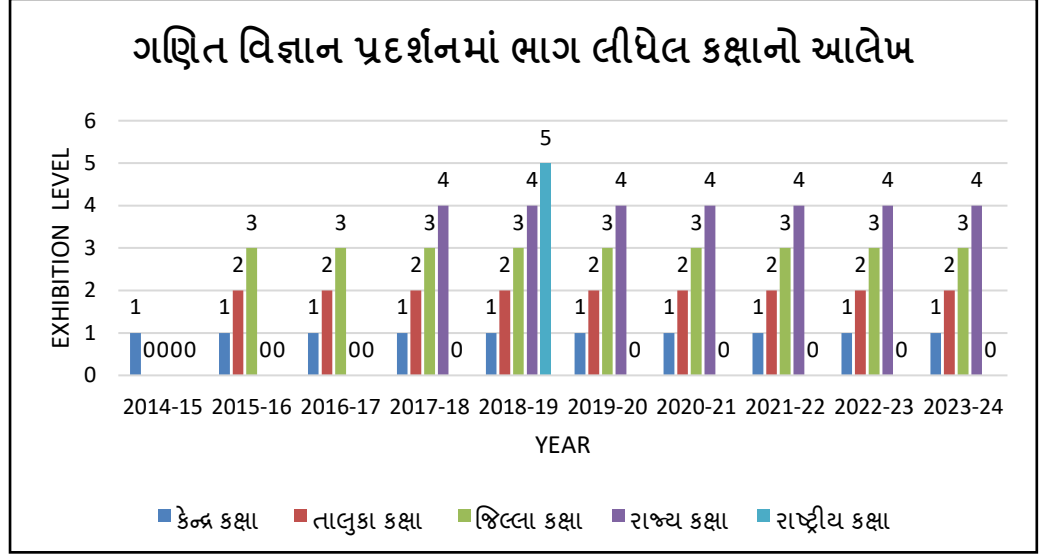
- ❖ બાળકો જાતે જ કૃતિ બનાવતા થયા.
- ❖ બાળવૈજ્ઞાનિકોની પ્રેઝન્ટેશન સ્કીલનો વિકાસ થયો.
- ❖ બાળકોની ભાગીદારીને કારણે કૃતિ બનાવવામાં સમયની બચત થવા લાગી.
- ❖ ગણિત વિજ્ઞાન પ્રદર્શન અને INSPIRE AWARD –MANAK SCIENCE EXHIBITION માં રાષ્ટ્રીય કક્ષા સુધી મેળવેલ સિદ્ધિ જાણી શક્યા.
- ❖ વેસ્ટમાંથી બેસ્ટ બનાવેલી કૃતિ એ રાષ્ટ્રીય કક્ષાએ પસંદગી પામી. જે સમગ્ર તાપી જિલ્લામાંથી પ્રથમ વખત INSPIRE AWARD –MANAK SCIENCE EXHIBITION માં રાષ્ટ્રીય કક્ષાએ પસંદગી થનાર કૃતિ બની તથા શિક્ષક અને વિદ્યાર્થીનીનું તાપી જિલ્લાના કલેક્ટરશ્રી, તાપી જિલ્લાના અધિકારીશ્રીઓ દ્વારા પ્રમાણપત્ર અને ટ્રોફી આપી સન્માન કરવામાં આવ્યું.
- ❖ દર વર્ષની સિદ્ધિઓને સમાચાર પત્રકો સંદેશ, દિવ્ય ભાસ્કર, ધબકાર-સુરત વગેરેમાં દર વર્ષે નોંધ લેવામાં આવી અને GCERT દ્વારા પ્રસિદ્ધ થતું મેગેઝીન “જીવન શિક્ષણ” માં માર્ચ 2019ના અંકમાં ફોટોગ્રાફ આવેલ હતો.
- ❖ વર્ષ 2019-20માં તાપી જિલ્લાનો એજ્યુકેશનલ ઇનોવેશન ફેસ્ટિવલ 2020 એ પ્રાથમિક શાળા ડોલારા, તા.વ્યારા, જિ.તાપી મુકામે યોજાયો હતો. જેમાં સમગ્ર ઇનોવેશનમાં મારું આ ઇનોવેશન પ્રથમ નંબર મેળવી રાજ્ય કક્ષાએ DIET AHMEDABAD મુકામે ભાગ લીધેલ હતો.
- ❖ વર્ષ 2019-20 માં શાળાની સમગ્ર કામગીરી માટે તાપી જિલ્લામાં તાલુકા શ્રેષ્ઠ શિક્ષક એવર્ડ કેબિનેટ મંત્રી શ્રી ઇશ્વરભાઈ પરમારના હસ્તે એનાયત કરેલ હતો.

- ❖ ગુજરાત રાજ્ય પ્રાથમિક શિક્ષક સંઘ દ્વારા પ્રસિદ્ધ થતું મેગેઝીન “ શિક્ષક જ્યોત ” માં ઓક્ટોબર 2020 ના અંકમાં તાપી જિલ્લામાં તાલુકા શ્રેષ્ઠ શિક્ષક એવોર્ડના ફોટોગ્રાફ આવેલ હતો.
- ❖ NATION TEACHER AWARD 2020-21માં જિલ્લામાં પ્રથમ આવી રાજ્ય કક્ષા સુધી પસંદગી પામી હતી.
- ❖ NATIONAL ICT AWARD 2020-21 માં ગુજરાત રાજ્યનાં 6 શિક્ષકોમાં પસંદગી પામી હતી.
- ❖ સાંદીપની ગુરુ ગૌરવ એવોર્ડ આપી પ.પૂ.ભાઈશ્રી રમેશભાઈ ઓઝા તરફથી સન્માનિત કરી ભાવપૂર્જન કરવામાં આવ્યું હતું.

ગણિત-વિજ્ઞાન પ્રદર્શનમાં પહેલાની અને પછીની સ્થિતિની તુલના :

- ❖ પહેલાની સ્થિતિમાં શાળાની કૃતિ ગણિત વિજ્ઞાન પ્રદર્શનમાં
 - વર્ષ 2014-15 માં - કેન્દ્રકક્ષા સુધી જ પહોંચી હતી.
- ❖ તે પછીની સ્થિતિમાં શાળાની કૃતિ ગણિત વિજ્ઞાન પ્રદર્શનમાં
 - વર્ષ 2015-16માં -જિલ્લાકક્ષાએ
 - વર્ષ 2016-17માં- જિલ્લાકક્ષાએ
 - વર્ષ 2017-18માં- રાજ્યકક્ષાએ (STATE LEVEL)
 - વર્ષ 2018-19માં - રાષ્ટ્રીયકક્ષાએ (NATIONAL LEVEL)
 - વર્ષ 2019-20માં- રાજ્યકક્ષાએ (STATE LEVEL)
 - વર્ષ 2020-21માં- રાજ્યકક્ષાએ (STATE LEVEL)
 - વર્ષ 2021-22માં- રાજ્યકક્ષાએ (STATE LEVEL)

- વર્ષ 2022-23માં- રાજ્યકક્ષાએ (STATE LEVEL) અને ઝોન કક્ષાએ (ZONE LEVEL)
- વર્ષ 2023-24માં- રાજ્યકક્ષાએ સાયન્સ સીટી મુકામે 3 પ્રોજેક્ટ (STATE LEVEL) અને ઝોન કક્ષાએ (ZONE LEVEL)



અભ્યાસના તારણો :

ઇન્સપાયર એવોર્ડ-માનાંક અને ગણિત-વિજ્ઞાન પ્રદર્શનની સર્જનાત્મક પ્રવૃત્તિઓ કરવાથી બાળકોના વૈજ્ઞાનિક અભિગમોનો વિકાસ થયો અને પ્રવૃત્તિમય વાતાવરણ શાળાના વર્ગખંડમાં ઊભું કરી થયું. જેથી બાળકોને વિજ્ઞાન વિષયની સર્જનાત્મક પ્રવૃત્તિ અને ઇન્સપાયર એવોર્ડ-માનાંક અને ગણિત-વિજ્ઞાન પ્રદર્શનની સર્જનાત્મક પ્રવૃત્તિઓ વિશે વધારે માહિતગાર થયા. આ શાળામાંથી ઇન્સપાયર એવોર્ડ-માનાંક અને ગણિત-વિજ્ઞાન પ્રદર્શનની સર્જનાત્મક પ્રવૃત્તિઓથી એક વખત રાષ્ટ્રીય કક્ષાએ, સતત સાતમી વખત રાજ્ય કક્ષાએ અને બે વખત ઝોન કક્ષા તથા જિલ્લા સુધીની સફળતા પ્રાપ્ત કરી હતી. તેથી આ સંશોધન પરથી બાળકો, શિક્ષકો, અને શાળાના તમામ સભ્યોને પ્રોત્સાહન પૂરું પાડ્યું હતું.

અભ્યાસના ફલિતાર્થો:

શાળાના વિદ્યાર્થીઓ અને શાળાના શિક્ષકો દ્વારા આ ઉમદા કાર્યની નોંધ જી.સી.ઇ.આર.ટી. ગાંધીનગર દ્વારા થતાં ઇન્સપાયર એવોર્ડ-માનાંક અને ગણિત-વિજ્ઞાન પ્રદર્શનની પ્રવૃત્તિ શાળામાં ખૂબ જ સરસ રીતે થાય તેની માહિતી મળી હતી. આ શાળામાંથી ઇન્સપાયર એવોર્ડ-માનાંક અને ગણિત-વિજ્ઞાન પ્રદર્શનની સર્જનાત્મક પ્રવૃત્તિઓ કરાવવામાં આવે તેવી બીજી શાળામાં આ પ્રવૃત્તિ કરવાથી વિદ્યાર્થીઓને પ્રવૃત્તિનું જ્ઞાન આપી શકાય. તેથી આ સંશોધન શાળાને ઉપયોગી થાય છે.

ઉપસંહાર :

ઇન્સપાયર એવોર્ડ-માનાંક અને ગણિત-વિજ્ઞાન પ્રદર્શનની સર્જનાત્મક પ્રવૃત્તિનો અભ્યાસ કરવાથી શાળામાં મળેલ ગણિત-વિજ્ઞાન પ્રદર્શનમાં સફળતાથી દેશની તમામ શાળામાં બાળકોને સર્જનાત્મક પ્રવૃત્તિ કરાવી NEP 2020 અંતર્ગત પ્રવૃત્તિમય શિક્ષણ આપી મૂલ્યો સિદ્ધ કરી શકાય.

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ઇન્ટરનેટ દ્વારા ગણિત વિજ્ઞાન વિષયની વેબસાઇટનો ઉપયોગ.

વિજ્ઞાન પ્રવાહના વિદ્યાર્થીઓની પરીક્ષા વિષયક ચિંતાનો તેમની શૈક્ષણિક

સિદ્ધિના સંદર્ભમાં અભ્યાસ

ધાંધા મિતલ હિરાલાલ

રિસર્ચ સ્કોલર, હેમચંદ્રાચાર્ય ઉત્તર ગુજરાત યુનિવર્સિટી, પાટણ

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સારાંશ

પ્રસ્તુત અભ્યાસનો મુખ્ય ઉદ્દેશ્ય વિજ્ઞાન પ્રવાહના વિદ્યાર્થીઓની પરીક્ષા વિષયક ચિંતાનો તેમની શૈક્ષણિક સિદ્ધિ પર કેવી અસર કરે છે. તે જાણવાનો હતો. આ માટે ભુજ તાલુકાની ઉચ્ચતર માધ્યમિક શાળામાં અભ્યાસ કરતા ધોરણ 11 અને 12ના વિજ્ઞાન પ્રવાહના વિદ્યાર્થીઓને સહેતુક પસંદ કરેલ હતા. જેમાં ગ્રામીણ વિસ્તારની 5 શાળાઓ અને શહેરી વિસ્તારની 5 શાળાઓ એમ કુલ 10 શાળાનો સમાવેશ કરવામાં આવ્યો હતો. જેમાં નિર્દેશમાં 200 વિદ્યાર્થીઓનો સમાવેશ કરવામાં આવ્યો હતો. ઉપકરણ તરીકે સ્વરચિત ઉપકરણ પરીક્ષા ચિંતા માપદંડનો ઉપયોગ કરવામાં આવ્યો હતો. માહિતી પૃથ્થકરણમાં પરીક્ષા ચિંતા માપદંડના વિધાનનું ગુણાંકન કરીને, વિજ્ઞાન પ્રવાહના વિદ્યાર્થીઓના શૈક્ષણિક સિદ્ધિના પ્રથમ પરીક્ષાના ગુણો આધારે મળેલા પ્રાપ્તિઓ પરથી આવૃત્તિ વિતરણ તૈયાર કરી સહસબંધ(C) અને કાયવર્ગ (χ^2) શોધવામાં આવ્યા હતા અને તેના પરથી ઉત્કલ્પનાઓની ચકાસણી કરવામાં આવી હતી.

પ્રસ્તાવના

આજના સ્પર્ધાત્મક યુગમાં શિક્ષણક્ષેત્રે અનેક સમસ્યા ઊભી થતી જોવા મળે છે. વિદ્યાર્થીઓની અનેક સમસ્યાઓમાં સૌથી મોટી જો કોઈ તેમને ચિંતા સતાવતી જોવા મળે

તો તે છે પરીક્ષામાં નાપાસ થવાની. ઉપરાંત વાલીઓ અને શિક્ષકોની વધુ પડતા સારા માર્ક્સની અપેક્ષાઓના દબાણની વિદ્યાર્થીઓના માનસ પર ઘેરી અસર પડે છે. તેથી તેને પરીક્ષાની ચિંતા સતત સતાવ્યા કરે છે. પરિણામે વિદ્યાર્થીઓ ક્યારેક આત્મહત્યા કરવા પણ પ્રેરાય છે. આજે સમાચાર પત્રોમાં વાંચતા જ હોઈએ છીએ કે પરીક્ષા આવવાના થોડા દિવસ પહેલા જ ઘણા વિદ્યાર્થીઓ આત્મહત્યા કરતા હોય છે, તો કોઈ પરીક્ષાનું પેપર ખરાબ જવાના કારણે પણ કરતા હોય છે, તો ઘણા વિદ્યાર્થીઓ પરીક્ષામાં ધાર્યું પરિણામ ન આવતા આત્મહત્યા કરતા હોય છે, અને અમુક વિદ્યાર્થીઓ નાપાસ થવાના કારણે આત્મહત્યા કરતા હોય છે. આવી ઘટના બને છે ત્યારે ઘણું જ દુઃખ થાય છે. એક સ્વૈચ્છિક સંસ્થાએ કરેલ સર્વેક્ષણ અનુસાર બોર્ડની પરીક્ષામાં ફેલ થયા બાદ 2024ના વર્ષમાં 2600 વિદ્યાર્થીઓએ આત્મહત્યા કરી હતી. આજ કારણે જો અગાઉથી જાણી લેવામાં આવે કે વિદ્યાર્થીઓ કેટલી ચિંતા અનુભવે છે તો તેમને યોગ્ય માર્ગદર્શન આપી તેમની ચિંતામાં ઘટાડો કરી તેમના આત્મવિશ્વાસમાં વધારો કરી શકાય અને આત્મહત્યાના બનાવો પર શક્ય એટલો અંકુશ મેળવી શકાય. આ બાબતોને ધ્યાનમાં લઈને અભ્યાસ કે નીચે જણાવેલ પરીક્ષા વિશે ચિંતા વિશેની સમસ્યા પસંદ કરી છે.

અભ્યાસના હેતુઓ

- (1) વિજ્ઞાન પ્રવાહના વિદ્યાર્થીઓની પરીક્ષા વિષયક ચિંતા જાણવી.
- (2) વિજ્ઞાન પ્રવાહના વિદ્યાર્થીઓની શૈક્ષણિક સિદ્ધિની કક્ષા જાણવી.
- (3) ગ્રામ્ય અને શહેરી વિસ્તારના વિજ્ઞાન પ્રવાહના વિદ્યાર્થીઓની પરીક્ષા વિષયક ચિંતા અને તેમની શૈક્ષણિક સિદ્ધિ વચ્ચેનો સંબંધ તપાસવો.

(4) ગ્રામ્ય વિસ્તારના વિજ્ઞાન પ્રવાહના વિદ્યાર્થીઓની પરીક્ષા વિષયક ચિંતા અને તેમની શૈક્ષણિક સિદ્ધિ વચ્ચેનો સંબંધ તપાસવો.

(5) શહેરી વિસ્તારના વિજ્ઞાન પ્રવાહના વિદ્યાર્થીઓની પરીક્ષા વિષયક ચિંતા અને તેમની શૈક્ષણિક સિદ્ધિ વચ્ચેનો સંબંધ તપાસવો.

અભ્યાસની ઉત્કલ્પનાઓ

H₀₁ વિજ્ઞાન પ્રવાહના વિદ્યાર્થીઓની પરીક્ષા વિષયક ચિંતા અને તેમની શૈક્ષણિક સિદ્ધિ વચ્ચે સાર્થક સંબંધ નહીં હોય.

H₀₂ ગ્રામ્ય વિસ્તારના વિજ્ઞાન પ્રવાહના વિદ્યાર્થીઓની પરીક્ષા વિષયક ચિંતા અને તેમની શૈક્ષણિક સિદ્ધિ વચ્ચે સાર્થક સંબંધ નહીં હોય.

H₀₃ શહેરી વિસ્તારના વિજ્ઞાન પ્રવાહના વિદ્યાર્થીઓની પરીક્ષા વિષયક ચિંતા અને તેમની શૈક્ષણિક સિદ્ધિ વચ્ચે સાર્થક સંબંધ નહીં હોય.

H₀₄ ગ્રામ્ય વિસ્તારના વિજ્ઞાન પ્રવાહના છોકરાઓની પરીક્ષા વિષયક ચિંતા અને તેમની શૈક્ષણિક સિદ્ધિ વચ્ચે સાર્થક સંબંધ નહીં હોય.

H₀₅ ગ્રામ્ય વિસ્તારની વિજ્ઞાન પ્રવાહની છોકરીઓની પરીક્ષા વિષયક ચિંતા અને તેમને શૈક્ષણિક સિદ્ધિ વચ્ચે સાર્થક સંબંધ નહીં હોય.

H₀₆ શહેરી વિસ્તારની વિજ્ઞાન પ્રવાહના છોકરાઓની પરીક્ષા વિષયક ચિંતા અને તેમને શૈક્ષણિક સિદ્ધિ વચ્ચે સાર્થક સંબંધ નહીં હોય.

H₀₇ શહેરી વિસ્તારની વિજ્ઞાન પ્રવાહની છોકરીઓની પરીક્ષા વિશે ચિંતા અને શૈક્ષણિક સિદ્ધિ વચ્ચે સાર્થક સંબંધ નહીં હોય.

સમસ્યાનું ક્ષેત્ર

Fifth Survey of Research in Education Vol. I & vol II (1997) આ સર્વેમાં 1988 થી 1992 સુધીના ભારતમાં શિક્ષણમાં થયેલા પી.એચડી અને સંશોધન પ્રોજેક્ટ ના શીર્ષકો 37 સંશોધન ક્ષેત્રોમાં વર્ગીકૃત કરીને રજૂ કરવામાં આવ્યા છે. આ સંશોધન ક્ષેત્રોની યાદી મુજબ પ્રસ્તુત સંશોધનનું ક્ષેત્ર શૈક્ષણિક મનોવિજ્ઞાન અને ઉચ્ચ શિક્ષણ છે.

સંશોધનનો પ્રકાર

સંશોધન અભ્યાસ દ્વારા શું મેળવવાનો લક્ષ્ય છે તેના આધારે સંશોધનના ત્રણ પ્રકાર પાડવામાં આવ્યા છે. મુલગત સંશોધન, વ્યાવહારિક સંશોધન અને ક્રિયાત્મક સંશોધન. પ્રસ્તુત સંશોધન એ વ્યવહારિક પ્રકારનો સંશોધન છે.

સંશોધન પદ્ધતિ

સંશોધનશાસ્ત્રના નિષ્ણાંતો સંશોધન પદ્ધતિને મુખ્ય ત્રણ વિભાગમાં વહેંચે છે. ઐતિહાસિક સંશોધન પદ્ધતિ, વર્ણાત્મક સંશોધન પદ્ધતિ અને પ્રાયોગિક સંશોધન પદ્ધતિ. પ્રસ્તુત સંશોધન માટે વર્ણનાત્મક સંશોધન પદ્ધતિઓ માંની એક સંશોધન પદ્ધતિ શાળાકીય સર્વેક્ષણનો ઉપયોગ કરવામાં આવ્યો છે.

વ્યાપવિશ્વ અને નિદર્શ

વ્યાપવિશ્વ એટલે સંશોધકને જેને લગતી માહિતી અપેક્ષિત છે તે એકમોની કુલ સંખ્યા, જેના માટે સંશોધન પરિણામોનું સામાન્યીકરણ કરવામાં આવે છે. તે લોકો, બનાવો, વસ્તુઓ વગેરેનો જૂથ માહિતી મેળવવા માટે સંશોધક જેમાંથી પ્રતિનિધિતરૂપ નાનો ભાગ પસંદ કરે તે જૂથ. સંશોધક જેના વિશે સંશોધન અભ્યાસ કરે તે જૂથ. આમ, અભ્યાસકે પ્રસ્તુત અભ્યાસ માટે ભુજ તાલુકાની ઉચ્ચતર માધ્યમિક શાળામાં

અભ્યાસ કરતા ધોરણ 11 અને 12ના વિજ્ઞાન પ્રવાહના વિદ્યાર્થીઓ પસંદ કરેલ હતા જેમાં ગ્રામીણ વિસ્તારની 5 શાળાઓ અને શહેરી વિસ્તારની 5 શાળાઓ એમ કુલ 10 શાળાનો સમાવેશ થાય છે. જેમાં નિર્દેશમાં 200 વિદ્યાર્થીઓનો સમાવેશ કરવામાં આવ્યો હતો.

ઉપકરણની રચના

પ્રસ્તુત સંશોધનમાં ઉપકરણ તરીકે સ્વચિત્ર ઉપકરણ પરીક્ષા ચિંતા માપદંડનો ઉપયોગ કરવામાં આવ્યો છે.

માહિતી એકત્રીકરણની પ્રવિધિ

માહિતી એકત્રીકરણ માટે ભુજ તાલુકાની સહૈતુક પસંદ કરેલી 5 ગ્રામ્ય અને 5 શહેરી વિસ્તારની વિજ્ઞાનપ્રવાહની કુલ 10 શાળાઓમાં જઈને વિદ્યાર્થીઓના પ્રતિચારો મેળવીને માહિતી એકત્રિત કરવામાં આવી છે.

માહિતી પૃથ્થકરણની રીત

માહિતીનું પૃથ્થકરણ એટલે માહિતી સમજી શકાય અને અર્થઘટન કરી શકાય તેવા સ્વરૂપમાં સંગઠિત કે વર્ગીકૃત કરવી. માહિતી પૃથ્થકરણમાં પરીક્ષા ચિંતા માપદંડની વિધાનનું ગુણાકાર કરીને, વિજ્ઞાન પ્રવાહના વિદ્યાર્થીઓના શૈક્ષણિક સિદ્ધિના પ્રથમ પરીક્ષાના ગુણો આધારે મળેલા પ્રાપ્તિાંકો પરથી આવૃત્તિ વિતરણ તૈયાર કરી સહસંબંધ(C) અને કાયવર્ગ (χ^2) શોધવામાં આવ્યા અને તેના પરથી ઉત્કલ્પનાઓની ચકાસણી કરવામાં આવી હતી.

અભ્યાસના તારણો

સંશોધકને માહિતીના પૃથ્થકરણ દ્વારા પ્રાપ્ત થયેલ તારણો નીચે મુજબ છે.

H₀₁ વિજ્ઞાન પ્રવાહના વિદ્યાર્થીઓની પરીક્ષા વિષયક ચિંતા અને તેમની શૈક્ષણિક સિદ્ધિ

વચ્ચે સાર્થક સંબંધ નહીં હોય

પૃથ્થકરણના પરિણામોનું અર્થઘટન કરતા ઉપરોક્ત ઉત્કલ્પનાનો અસ્વીકાર થાય છે. આથી કહી શકાય કે વિજ્ઞાન પ્રવાહના વિદ્યાર્થીઓની શૈક્ષણિક સિદ્ધિ અને તેમની પરીક્ષા ચિંતા પરસ્પર સંબંધિત છે. તેમજ બંને રાશિ વચ્ચેનો સહસંબંધ નહિવત છે.

H₀₂ ગ્રામ્ય વિસ્તારના વિજ્ઞાન પ્રવાહના વિદ્યાર્થીઓની પરીક્ષા વિષય ચિંતા અને તેમની શૈક્ષણિક સિદ્ધિ વચ્ચે સાર્થક સંબંધ નહીં હોય.

પૃથ્થકરણના પરિણામોનું અર્થઘટન કરતા ઉપરોક્ત ઉત્કલ્પનાનો અસ્વીકાર થાય છે. આથી કહી શકાય કે ગ્રામ્ય વિસ્તારના વિજ્ઞાન પ્રવાહના વિદ્યાર્થીઓની શૈક્ષણિક સિદ્ધિ અને તેમની પરીક્ષા ચિંતા પરસ્પર સંબંધિત છે. તેમજ બંને રાશિ વચ્ચેનો સહસંબંધ નહિવત છે.

H₀₃ શહેરી વિસ્તારના વિજ્ઞાન પ્રવાહના વિદ્યાર્થીઓની પરીક્ષા વિષયક ચિંતા અને તેમની શૈક્ષણિક સિદ્ધિ વચ્ચે સાર્થક સંબંધ નહીં હોય.

પૃથ્થકરણના પરિણામોનું અર્થઘટન કરતા ઉપરોક્ત ઉત્કલ્પનાનો સ્વીકાર થાય છે. આથી કહી શકાય કે શહેરી વિસ્તારના વિજ્ઞાન પ્રવાહના વિદ્યાર્થીઓની પરીક્ષા ચિંતા અને શૈક્ષણિક સિદ્ધિ પરસ્પર સંબંધિત નથી. તેમ જ બંને રાશિ વચ્ચેનો સહસંબંધ નહિવત છે.

H₀₄ ગ્રામ્ય વિસ્તારના વિજ્ઞાન પ્રવાહના છોકરાઓની પરીક્ષા વિષયક ચિંતા અને તેમની શૈક્ષણિક સિદ્ધિ વચ્ચે સાર્થક સંબંધ નહીં હોય.

પૃથ્થકરણના પરિણામોનું અર્થઘટન કરતા ઉપરોક્ત ઉત્કલ્પનાનો સ્વીકાર થાય છે. આથી કહી શકાય કે ગ્રામ્ય વિસ્તારના વિજ્ઞાન પ્રવાહના છોકરાઓની પરીક્ષા ચિંતા અને તેમની શૈક્ષણિક સિદ્ધિ પરસ્પર સંબંધિત નથી. તેમજ બંને રાશિ વચ્ચેનો સહસંબંધ

નહિવત છે.

H₀₅ ગ્રામ્ય વિસ્તારની વિજ્ઞાન પ્રવાહની છોકરીઓની પરીક્ષા વિષયક ચિંતા અને તેમને શૈક્ષણિક સિદ્ધિ વચ્ચે સાર્થક સંબંધ નહીં હોય.

પૃથ્થકરણના પરિણામોનું અર્થઘટન કરતા ઉપરોક્ત ઉત્કલ્પનાનો અસ્વીકાર થાય છે. આથી કહી શકાય કે ગ્રામ્ય વિસ્તારની વિજ્ઞાન પ્રવાહની છોકરીઓની પરીક્ષા ચિંતા અને તેમની શૈક્ષણિક સિદ્ધિ પરસ્પર સંબંધિત છે. તેમજ બંને રાશિ વચ્ચેનો સહસંબંધ નહિવત છે.

H₀₆ શહેરી વિસ્તારની વિજ્ઞાન પ્રવાહના છોકરાઓની પરીક્ષા વિષયક ચિંતા અને તેમને શૈક્ષણિક સિદ્ધિ વચ્ચે સાર્થક સંબંધ નહીં હોય.

પૃથ્થકરણના પરિણામોનું અર્થઘટન કરતા ઉપરોક્ત ઉત્કલ્પનાનો સ્વીકાર થાય છે. આથી કહી શકાય કે શહેરી વિસ્તારના વિજ્ઞાન પ્રવાહના છોકરાઓની પરીક્ષા ચિંતા અને તેમની શૈક્ષણિક સિદ્ધિ પરસ્પર સંબંધિત નથી. તેમજ બંને રાશિ વચ્ચેનો સહસંબંધ નહિવત છે.

H₀₇ શહેરી વિસ્તારની વિજ્ઞાન પ્રવાહની છોકરીઓની પરીક્ષા વિશે ચિંતા અને શૈક્ષણિક સિદ્ધિ વચ્ચે સાર્થક સંબંધ નહીં હોય.

પૃથ્થકરણના પરિણામોનું અર્થઘટન કરતા ઉપરોક્ત ઉત્કલ્પનાનો સ્વીકાર થાય છે. આથી કહી શકાય કે શહેરી વિસ્તારની વિજ્ઞાન પ્રવાહની છોકરીઓની પરીક્ષા ચિંતા અને તેમની શૈક્ષણિક સિદ્ધિ પરસ્પર સંબંધિત નથી. તેમજ બંને રાશિ વચ્ચેનો સહસંબંધ નહિવત છે.

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NEP-૨૦૨૦ના સંદર્ભમાં કચ્છ જિલ્લાના શિક્ષકોના સ્માર્ટ ક્લાસની ઉપયોગિતા અંગેના અભિપ્રાયોનો અભ્યાસ

નીતા જે. મકવાણા

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સારાંશ

આજના આ માહિતી અને પ્રત્યાયનના યુગમાં દરેક ક્ષેત્રમાં આધુનિકતા આવી છે. નવી સંશોધનોના કારણે માહિતી તકનીકીનો વિકાસ આજે ખૂબ ઝડપથી થઈ રહ્યો છે. કચ્છ જેવા અંતરિયાળ અને વિશાળ વિસ્તાર ધરાવતા જિલ્લામાં શિક્ષણની ગુણવત્તા સુધારવામાં સ્માર્ટ ક્લાસની ખૂબ જરૂરી છે. આજ બાબતને ધ્યાનમાં રાખીને સરકારશ્રી દ્વારા ગુજરાતની તમામ સરકારી શાળાઓમાં જ્ઞાનકુંજ પ્રોજેક્ટ અંતર્ગત સ્માર્ટ ક્લાસરૂમ વિકસાવવામાં આવ્યા છે. આ પ્રોજેક્ટ અંતર્ગત કચ્છની માધ્યમિક શાળાઓમાં વિદ્યાર્થીલક્ષી અને તેમના વિકાસમાં તે ઉપયોગી સાબિત થાય તે માટે આ સંશોધન હાથ ધરવામાં આવ્યું છે.

પ્રસ્તુત સંશોધનમાં કચ્છ જિલ્લાની માધ્યમિક શાળાઓના શિક્ષકોનો સ્માર્ટ ક્લાસની ઉપયોગિતાના સંદર્ભમાં ગૂગલ ફોર્મમાં તેમના અભિપ્રાયો સંદર્ભે ઉપકરણ તરીકે સ્વરચિત રૂપ વિધાનો વાળી પંચબિંદુ અભિપ્રાયાવલી તૈયાર કરીને કચ્છ જિલ્લાના શિક્ષકોના વોટ્સઅપ ગ્રૂપમાં મોકલાવીને તેમના અભિપ્રાયો મેળવવામાં આવ્યા હતા. પ્રાપ્ત માહિતીનું પૃથક્કરણ કાઠ વર્ગ કસોટી દ્વારા કરવામાં આવ્યું હતું. સ્માર્ટ ક્લાસની ઉપયોગિતા સંદર્ભમાં પ્રાપ્ત અભિપ્રાયો પરથી જાણવા મળ્યું કે, સ્માર્ટ ક્લાસના ઉપયોગથી શિક્ષણને અસરકારક બનાવી શકાય, પ્રેક્ટિકલ જ્ઞાનથી વંચિત રહવું,

સંચાલનમાં મેહનત અને આવડતની જરૂરિયાત અનિવાર્યતા જોવા મળી. જાતિ સંદર્ભે સ્ત્રીઓની સરખામણીમાં પુરુષ શિક્ષકો સ્માર્ટ ક્લાસ ઉપકરણોનો ઉપયોગ વધારે કરે છે, જ્યારે સ્ત્રીઓની સંખ્યા વધારે જાણવા મળી હતી.

ચાવીરૂપ શબ્દો :

NEP-૨૦૨૦, કચ્છ જિલ્લો, શિક્ષકો, સ્માર્ટ ક્લાસ, અભિપ્રાયો, અભ્યાસ

૧.૧ પ્રસ્તાવના

21મી સદીનો સમાજ અપેક્ષા રાખે છે કે તમામ બાળકો વિવેચનાત્મક રીતે વિચારવા, સમસ્યાઓ હલ કરવા અને સર્જનાત્મક બનવા માટે તૈયાર રહે. પ્રવર્તમાન સમયમાં કચ્છ જેવા અંતરિયાળ અને બોર્ડર પર આવેલા જિલ્લાના લોકોની પણ એ અપેક્ષા રહે કે તેમનું બાળક સમય સાથે તાલ મેળવીને વિશ્વમાં સર્જાયેલા સ્પર્ધાત્મક વાતાવરણમાં ટકી રહે. આ બાબત પર ધ્યાન આપીને સરકાર શ્રી દ્વારા જ્ઞાનકુંજ જેવા સ્માર્ટ ક્લાસરૂમને પ્રોત્સાહન આપતા પ્રોજેક્ટને સાર્વત્રિકરૂપે લાગુ પાડ્યો છે ત્યારે આપણે એ જાણવું આવશ્યક બને કે આ સ્માર્ટ ક્લાસરૂમ શું બોર્ડર પર, રણ વિસ્તારમાં કે દરિયાકિનારે વસતા છેવાડાના ગામડાઓના બાળકો માટે ખરેખર ઉપયોગી બને છે કે માત્ર એક સજાવટની વસ્તુની જેમ પડ્યો રહે છે ? શું ખરેખર આ સ્માર્ટ ક્લાસો દ્વારા શિક્ષકોમાં તેમનો કાર્યસંતોષ દેખાય છે કે માત્ર સરકારે આપ્યું ને તેનો ઉપયોગ કરવો પડે તેવું બને છે?

સ્માર્ટ ક્લાસના ઉપયોગ દ્વારા આજે તૈયાર કરાયેલા શિક્ષકોનું જ્ઞાન , કૌશલ્ય, ક્ષમતાઓ અને પ્રતિબદ્ધતા વિદ્યાર્થીઓની ભાવિ પેઢી માટે શું શક્ય છે તે આકાર આપશે અને જાણ કરશે. ટેકનોલોજીમાં સામાન્ય રીતે શિક્ષણમાં પ્રવેશ, ગુણવત્તા અને

અસરકારકતા વધારવાની અને ભારતમાં વધુ ને વધુ સારા શિક્ષકોના વિકાસને સક્ષમ કરવાની ક્ષમતા છે. સ્માર્ટ ક્લાસરૂમ એ શિક્ષણ પ્રણાલીમાં શિક્ષકોની કાર્યસ્થિતિ સુધારવા માટે એક મહત્વપૂર્ણ વાહન છે. શિક્ષકોને શિક્ષણકાર્યમાં તકનીકી એકીકરણની મદદની જરૂર છે. જેના વડે શૈક્ષણિક કાર્યોમાં ક્રાંતિ લાવી શકાય.

પ્રવર્તમાન સમયમાં માનવજીવનના દરેક ક્ષેત્રમાં દરેક તબક્કે ટેકનોલોજીનો ઉપયોગ થઈ રહ્યો છે. એમાં કોઈ શંકા નથી કે શૈક્ષણિક ટેકનોલોજી એ જાણકાર સમાજના નિર્માણ માટેનો મુખ્ય આધાર છે. આ અદ્યતન શૈક્ષણિક ટેકનોલોજી સહાયો દ્વારા ગ્રામીણ અને અંતરિયાળ વિસ્તારોમાં રહેતી વ્યક્તિ પણ પ્રવર્તમાન સમયની સાથે ચાલીને જ્ઞાન મેળવી શકે છે અને પોતાના ધ્યેયો સિદ્ધ કરી શકે છે. પ્રસ્તુત અભ્યાસમાં કમ્પ્યુટર, ઇન્ટરનેટ, પ્રોજેક્ટર, ઇન્ટરએક્ટિવ બોર્ડ, PC અને લેપટોપ કનેક્શન, ટચ/કંટ્રોલ પેનલ, ઓડિયો સિસ્ટમ, રેકોર્ડિંગ સિસ્ટમ જેવાં સાધનો તથા G-shala, G-shala+, GeoGebra, અને OpenBoard જેવાં કમ્પ્યુટરના સૉફ્ટવેર વગેરેને સ્માર્ટ ક્લાસ અંતર્ગત ધ્યાને લેવામાં આવ્યા છે.

૧.૨ ચાવીરૂપ શબ્દોની સમજ

સ્માર્ટ : બુદ્ધિમાન, ચપલ, શીઘ્રબુદ્ધિ, હોશિયાર

ક્લાસ : વર્ગ, ધોરણ

- સાર્થ ગુજરાતી જોડણીકોષ (૧૯૬૯)

“સ્માર્ટ ક્લાસ એ એવા ક્લાસ છે કે જેમાં વર્તમાન સમયની દરેક પ્રકારના ઉચ્ચ ગુણવત્તા યુક્ત ICT ના સાધનોનો સમાવેશ કરવામાં આવેલ હોય છે. પરંપરાગત વર્ગખંડમાં આપવામાં આવતા અનુભવો કરતાં સ્માર્ટક્લાસ દ્વારા કરાવવામાં આવતું

અધ્યયન અધ્યાપન કાર્યએ વધારે મૂર્ત અનુભવોયુક્ત, ગુણવત્તાયુક્ત હોય છે.”

- Critical Understanding of ICT (2015)

“અભિપ્રાયાવલી એટલે અભિપ્રાય કે વલણો કઢાવવા માટે તૈયાર કરેલી પ્રશ્નાવલિ કે સંશોધનિકા તે વસ્તુલક્ષી કસોટી જેવી નથી હોતી, પણ એથી ઉલટું અભિપ્રાય આપનારની આત્મલક્ષિતા પર નિર્ભર હોય છે.”

-ડો. કે. જી. દેસાઈના મત મુજબ

પ્રસ્તુત અભ્યાસમાં સ્માર્ટ ક્લાસ એટલે ટેકનોલોજીથી ચાલતો વર્ગખંડ. જેમાં, કમ્પ્યુટર, ઇન્ટરનેટ, પ્રોજેક્ટર, ઇન્ટરએક્ટિવ બોર્ડ, PC અને લેપટોપ કનેક્શન, ટચ/કંટ્રોલ પેનલ, ઓડિયો સિસ્ટમ, રેકોર્ડિંગ સિસ્ટમ જેવાં સાધનો તથા G-shala, G-shala+, GeoGebra, અને OpenBoard જેવાં કમ્પ્યુટરના સોફ્ટવેર વગેરેનો સમાવેશ થાય છે.

૧.૩ અભ્યાસનું સીમાંકન

૧. પ્રસ્તુત અભ્યાસમાં સ્વ રચિત અભિપ્રાયાવલીનો ઉપયોગ કરવામાં આવ્યો હતો. ઉપકરણની મર્યાદા એ અભ્યાસની મર્યાદા બનશે.
૨. પ્રસ્તુત અભ્યાસમાં શિક્ષકોના અભિપ્રાયો તેમની જાતિ અને શૈક્ષણિક લાયકાતના સંદર્ભમાં પ્રાપ્ત માહિતીના ટકાને આધારે જોવામાં આવેલ છે.
૩. નમૂનો કચ્છ જિલ્લાના શિક્ષકો પૂરતો મર્યાદિત હતો. ગૂગલફોર્મ દ્વારા માહિતી મેળવવામાં આવી હતી.
૪. પ્રસ્તુત અભ્યાસમાં સ્માર્ટ ક્લાસની ઉપયોગિતા અંગેના ખ્યાલોનો જ અભ્યાસ કરવામાં આવ્યો છે. જે અભિપ્રાયાવલીના રૂપ વિધાનો પૂરતો જ મર્યાદિત હતો.

૧.૪ અભ્યાસના હેતુઓ

૧. સ્માર્ટ ક્લાસની ઉપયોગિતા અંગેના શિક્ષકોના અભિપ્રાયો જાણવા.
૨. સ્માર્ટ ક્લાસની ઉપયોગિતા અંગેના શિક્ષકોના અભિપ્રાયો તેમની જાતિના સંદર્ભમાં જાણવા.
૩. સ્માર્ટ ક્લાસની ઉપયોગિતા અંગેના શિક્ષકોના અભિપ્રાયો તેમની શૈક્ષણિક લાયકાતના સંદર્ભમાં જાણવા.

૧.૫ અભ્યાસની ઉત્કલ્પનાઓ

૧. સ્માર્ટ ક્લાસની ઉપયોગિતા અંગે શિક્ષકોના અભિપ્રાયોમાં વિવિધ (૨૫) વિધાનોના સંદર્ભમાં કોઈ અર્થસૂચક તફાવત નહિ હોય.

૧.૬ સંશોધન યોજના

૧.૬.૧. સંશોધનનું ક્ષેત્ર

પ્રસ્તુત સંશોધનમાં શૈક્ષણિક ટેકનોલોજીના સ્માર્ટ ક્લાસનો ઉપયોગ કરવાનો હોવાથી આ સંશોધનનો સમાવેશ શૈક્ષણિક ટેકનોલોજીના ક્ષેત્રમાં થાય છે.

૧.૬.૨. સંશોધનનો પ્રકાર

પ્રસ્તુત સંશોધનમાં સંશોધકે સ્માર્ટ ક્લાસરૂમની ઉપયોગિતા અંગે શિક્ષકોના અભિપ્રાયો જાણવાનો ઉપક્રમ રાખ્યો હોવાથી આ સંશોધન વ્યાવહારિક અને સંખ્યાત્મક પ્રકારનું ગણવામાં આવ્યું છે.

૧.૬.૩. સંશોધનની પદ્ધતિ

કોઈપણ સંશોધનનું હાર્દ તેની સંશોધન પદ્ધતિ હોય છે.

પ્રસ્તુત સંશોધનમાં સંશોધકે સ્માર્ટ ક્લાસરૂમની ઉપયોગિતા અંગે શિક્ષકોના અભિપ્રાયો જાણવાના હોવાથી સર્વેક્ષણ પદ્ધતિ પસંદ કરી છે. સર્વેક્ષણ પદ્ધતિની સમજ

આપતા જ્યોર્જ મૌલી કહે છે કે –“The primary goal of the survey is the is the investigation of the present status of phenomenal”

૧.૬.૪. વ્યાપ-વિશ્વ

પ્રસ્તુત સંશોધનનું વ્યાપ વિશ્વ વર્ષ ૨૦૨૪-૨૫ માં કચ્છ જિલ્લામાં માધ્યમિક શાળાઓમાં શૈક્ષણિક કાર્ય કરાવતા શિક્ષકો બને છે.

૧.૬.૫. નિદર્શ

નિદર્શની પસંદગી અંગે કોચરન પોતાના પુસ્તકમાં જણાવે છે કે –“In every branch of science we lack the resource of to study more than phenomena that might advance our knowledge”

પ્રસ્તુત અભ્યાસમાં નિદર્શ તરીકે વર્ષ ૨૦૨૪-૨૫માં કચ્છ જિલ્લામાં માધ્યમિક શાળામાં શૈક્ષણિક કાર્ય કરાવતા ૨૧૪ શિક્ષકોની સહેતુક રીતે પસંદગી કરવામાં આવી હતી.

પ્રસ્તુત અભ્યાસમાં કચ્છ જિલ્લાના માધ્યમિક શાળામાં શૈક્ષણિક કાર્ય કરાવતા જે શિક્ષકોએ ગૂગલફોર્મ ભર્યા હતા તે શિક્ષકો જ આ અભ્યાસમાં નિદર્શ તરીકે સમાવિષ્ટ કરેલા હતા.

૧.૬.૬. ઉપકરણ

પ્રસ્તુત અભ્યાસમાં ઉપકરણ તરીકે સ્વ-રચિત પંચબિંદુ અભિપ્રાયાવલીનો ઉપયોગ કરવામાં આવ્યો હતો. જે પ્રારંભિક અભિપ્રાયાવલી કુલ ૩૬ વિધાનોવાળી હતી, જેમાં તજજ્ઞોના અભિપ્રાયો બાદ કુલ ૨૫ વિધાનો રાખવામાં આવ્યા હતા.

અભિપ્રાયાવલીમાં કુલ ૨૫ વિધાનોના અભિપ્રાયો મેળવવામાં આવ્યા હતા.

૧.૬.૭. માહિતી એકત્રીકરણ

સંશોધક દ્વારા તૈયાર કરેલ અભિપ્રાયાવલીને ગૂગલફોર્મ મારફતે કચ્છ જિલ્લાના શિક્ષકો સુધી પોહચાડવામાં આવી હતી. ત્યારબાદ મળેલા અભિપ્રાયોનું એક્સેલ શીટમાં એકત્રીકરણ કરવામાં આવ્યું હતું.

૧.૬.૮. અંકશાસ્ત્રીય પ્રયુક્તિ

ગૂગલફોર્મ દ્વારા પ્રાપ્ત માહિતીના પૃથકકરણ માટે પ્રત્યેક વિધાનોના સંદર્ભમાં કાઈ વર્ગ શોધવામાં આવ્યો હતો અને તેના ઉપયોગથી ઉત્કલ્પનાઓની ચકાસણી કરવામાં આવી હતી.

જાતિ અને શૈક્ષણિક લાયકાતના ચલ અંગેની માહિતીના વિશ્લેષણ માટે સાદી ટકાવારીનો ઉપયોગ કરવામાં આવ્યો હતો.

૧.૬.૯. ઉત્કલ્પનાઓની ચકાસણી

પ્રસ્તુત અભ્યાસના પરિણામોની ચકાસણી કરવા પ્રયોજકે કાઈવર્ગ કસોટી દ્વારા શૂન્ય ઉત્કલ્પનાની ચકાસણી કરી હતી.

૧.૬.૧૦. પ્રાપ્ત માહિતીનું અર્થઘટન

સ્માર્ટ ક્લાસની ઉપયોગિતા અંગેના શિક્ષકોના અભિપ્રાયોમાં વિધાન ક્રમાંક – 1, 2, 4, 7, 8, 10, 11, 13, 14, 17, 18, 20, 22 અને 25નો અસ્વીકાર થતો નથી. વિધાન ક્રમાંક – 3, 5, 6, 9, 12, 15, 16, 19, 21, 23 અને 24નો 0.05 કક્ષાએ અસ્વીકાર થાય છે. શિક્ષક પોતાના વ્યવસાયને લગતા તમામ કાર્યો સ્માર્ટ ક્લાસ ઉપકરણોની મદદથી કરે છે તેવા વિધાનમાં પુરુષોની ટકાવારી ૯૧ % છે જે સ્ત્રીઓની ટકાવારી ૫૮ % થી ખૂબ વધારે છે. શિક્ષકો સ્માર્ટક્લાસના ઉપયોગ સંબંધિત આવતી ટેકનિકલ ખામીને નિવારવા

સમર્થ છે તે વિધાનમાં પણ પુરુષોની ટકાવારી ૯૫ % છે જે સ્ત્રીઓની ટકાવારી ૪૯ % કરતાં ખૂબ જ વધારે છે. જ્યારે શિક્ષણના વ્યવસાયમાં સ્ત્રીઓની સંખ્યા વધુ પ્રમાણમાં છે.

૧.૭ સંશોધનના તારણો

- ૧) સૌથી વધુ હકારાત્મક અભિપ્રાયમાં અનુક્રમે સ્માર્ટ ક્લાસની જાણકારી તથા ઉપયોગ, શિક્ષકોના વ્યવસાયને લગતા તમામ કાર્યોમાં સ્માર્ટ ક્લાસ ઉપકરણોનો થતો ઉપયોગ, વગેરે જેવા વિધાનોનો સમાવેશ થાય છે.
- ૨) તેના ઉપયોગથી અભ્યાસક્રમને લગતી પૂર્વભૂત સામગ્રી અને સેટઅપ માટે થતો સમયનો બચાવ તથા સ્માર્ટ ક્લાસનો ઉપયોગ શિક્ષણને વધુ અસરકારક અને સક્રિય બનાવે છે આવા વિધાનોમાં પણ શિક્ષકોના હકારાત્મક અભિપ્રાયો જોવા મળે છે.
- ૩) સ્માર્ટ ક્લાસની ઉપયોગિતા અંગેના શિક્ષકોના અભિપ્રાયોમાં સ્માર્ટ ક્લાસનું ઇલેક્ટ્રોનિક ઉપકરણ પર આધારિત હોવું, વિદ્યાર્થીઓનું પ્રેક્ટિકલ જ્ઞાનથી વંચિત રહેવું તથા વિવિધ કળાઓના અભ્યાસમાં મુશ્કેલી અનુભવવી, સ્માર્ટ ક્લાસના ઉપયોગથી પિયર લર્નિંગનો અભાવ ઉદ્ભવવો, વગેરે જેવા નકારાત્મક વિધાનોનો સ્વીકાર થતો નથી જે શિક્ષકોના અભિપ્રાય હકારાત્મક જોવા મળે છે.
- ૪) સ્માર્ટ ક્લાસના સંચાલનમાં લાગતી મેહનત અને આવડત અંગેના તથા વિદ્યાર્થીઓના શારીરિક તથા માનસિક સ્વાસ્થ્ય પર નકારાત્મક અસર થવી જેવા નકારાત્મક વિધાનોનો અસ્વીકાર થતો નથી. જે દર્શાવે છે કે સ્માર્ટ ક્લાસરૂમની ઉપયોગિતા અંગે શિક્ષકોના અભિપ્રાય હકારાત્મક જોવા મળે છે.

- ૫) પ્રસ્તુત સંશોધન પરથી એ પણ તારણ મળે છે કે સ્માર્ટ ક્લાસના ઉપયોગ સંબંધિત આવતી ટેકનિકલ ખામીઓને નિવારવા માટે તથા સ્માર્ટ ક્લાસના તમામ ઉપકરણોના સંપૂર્ણ ઉપયોગ માટે શિક્ષકોને યોગ્ય તાલીમની આવશ્યકતા પણ છે.
- ૬) જાતિની ટકાવારીના આધારે જોઈએ પુરુષ શિક્ષકો સ્ત્રી શિક્ષકોની સરખામણીમાં સ્માર્ટ ક્લાસ ઉપકરણોનો વધુ અને સારી રીતે ઉપયોગ કરે છે. જ્યારે સ્ત્રી શિક્ષકોમાં ટેકનિકલ ખામી નિવારવા જેવા મુદ્દામાં યોગ્યતાનો અભાવ જણાય છે.
- ૭) શૈક્ષણિક લાયકાતની ટકાવારીના આધારે જોઈએ તો આર્ટ્સ અને ધોરણ ૧૦ પછી પીટીસી કરેલા શિક્ષકો કરતાં કોમર્સ અને વિજ્ઞાન પ્રવાહના શિક્ષકોની સ્માર્ટ ક્લાસ ઉપકરણોના ઉપયોગની જાણકારી વધારે તથા પ્રેક્ટિકલ જોવા મળે છે.

૧.૮ શૈક્ષણિક ફલિતાર્થ

- ૧) કચ્છ જેવા અંતરિયાળ જિલ્લાના શિક્ષકોના સ્માર્ટ ક્લાસરૂમની ઉપયોગિતા અંગે મળેલા હકારાત્મક અભિપ્રાયો દર્શાવે છે કે, આવનારા સમયમાં શૈક્ષણિક વ્યવસાય તથા શિક્ષકોને લગતા તમામ કામોમાં ટેકનોલોજી આધારિત સ્માર્ટ ક્લાસરૂમના ઉપકરણોનો મહત્તમ ઉપયોગ કરવો જોઈએ.
- ૨) શિક્ષણ પ્રક્રિયામાં સ્માર્ટ ક્લાસરૂમનો વ્યાપ વધારીને વિકાસ કરવો તથા તેના ઉપયોગ માટે યોગ્ય વાતાવરણનું નિર્માણ કરવું.
- ૩) શિક્ષણના વ્યવસાયમાં પુરુષ શિક્ષકો કરતાં સ્ત્રી શિક્ષકોનું પ્રમાણ વધુ હોય તેમને યોગ્ય માર્ગદર્શન અને અનુભવ મળે તેવા કાર્યક્રમોનું આયોજન કરવું.
- ૪) શિક્ષકો માટે શૈક્ષણિક ટેકનોલોજીને લગતી ટેકનિકલ ખામીઓ નિવારવા માટેની તાલીમોનું આયોજન પણ થવું જોઈએ.

૫) સ્માર્ટ ક્લાસના ઉપયોગ માટેના વાતાવરણ દ્વારા શિક્ષણની ગુણવત્તામાં વધારો થશે. જેના માટે શિક્ષકોને સ્માર્ટ ક્લાસ ઉપયોગ સંબંધિત યોગ્ય તાલીમની પણ જરૂરિયાત ઊભી થતી હોય આવી તાલીમોનું પણ આયોજન થવું જોઈએ.

૧.૯ ભાવિ સંશોધન અંગેની ભલામણો

પ્રસ્તુત અભ્યાસમાં સંશોધકે સંશોધનમાં એક ક્ષેત્રની સમસ્યા પર સંશોધન કાર્ય પૂર્ણ કરેલ છે. આ ક્ષેત્રને અને તેના સંબંધિત ક્ષેત્રના જ્ઞાનનો વ્યાપ વધુ વિસ્તરતો રહે તે માટે અને અહ્યસ દરમિયાન થયેલા અનુભવોના સંદર્ભે ભાવિ સંશોધનો અંગેની ભલામણો અન્ય ક્ષેત્રને કેવી રીતે લાગુ પડી શકે તેને સ્પર્શતી ભલામણો રજૂ કરી છે. જે આ પ્રમાણે છે.

- ૧) પ્રસ્તુત અભ્યાસનું વ્યાપવિશ્વ કચ્છ જિલ્લા પૂરતું મર્યાદિત હતું. તેને બદલે અન્ય જિલ્લાઓને વ્યાપવિશ્વ તરીકે લઈ આ સંશોધન હાથ ધરી શકાય.
- ૨) બે અલગ અલગ જિલ્લાના સ્માર્ટ ક્લાસ અંગેના શિક્ષકોના અભિપ્રાયોનો તુલનાત્મક અભ્યાસ હાથ ધરી શકાય.

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રાષ્ટ્રીય શિક્ષણ નીતિ-૨૦૨૦ - વિનોબા ભાવે સંદર્ભે માતૃભાષામાં શિક્ષણ

¹ પટેલ જોતીબેન બાબુભાઈ, ² ડૉ. રેણુકાબેન ગોસાઈ

¹ મણિબા કોલેજ ઓફ એજ્યુકેશન, મોનાર્ક યુનિવર્સિટી, અમદાવાદ

² આસિસ્ટન્ટ પ્રોફેસર, મણિબા કોલેજ ઓફ એજ્યુકેશન, શિક્ષણ વિદ્યાશાખા,

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સારાંશ

દર વર્ષે ૨૧ ફેબ્રુઆરી વિશ્વ માતૃભાષા દિન તરીકે સમગ્ર વિશ્વમાં ઉજવાય છે. સમગ્ર વિશ્વના કેળવણીકારો, ચિંતકો અને શિક્ષકો એક વાત સાથે સહમત છે કે, પ્રત્યેક બાળકને તેનું પ્રાથમિક શિક્ષણ માતૃભાષામાં જ મળવું જોઈએ. તાજેતરમાં નવી રાષ્ટ્રીય શિક્ષણ નીતિ-૨૦૨૦ ને ભારત સરકારની કેબિનેટે મંજૂર કરી દીધી છે. નવી રાષ્ટ્રીય શિક્ષણ નીતિ-૨૦૨૦ દેશના શિક્ષણ જગતમાં મૂળભૂત સુધારો કરનારી નીતિ છે. આપણા દેશમાં જોવા મળતી શિક્ષણ સંલગ્ન જુદી જુદી બાબતો જેવીકે શિક્ષણની ગુણવત્તા, ભારતીય સંસ્કૃતિ મૂલ્યો અને કૌશલ્યો, બેરોજગારી, અસમાનતાઓ, અસુવિધાઓ જેવી મોટાભાગની સમસ્યાઓની જરૂરિયાતો તરફ ભારત સરકારનું ધ્યાન ગયેલ છે. અને તેના ઉકેલ સ્વરૂપ નવી રાષ્ટ્રીય શિક્ષણ નીતિ-૨૦૨૦ ની રચના થઈ છે. રાષ્ટ્રીય શિક્ષણ નીતિ-૨૦૨૦ માં અનેક બાબતોનો સમાવેશ થયો છે. તે પૈકી મહત્વના એક નિર્ણયમાં ધોરણ-૦૧ થી ધોરણ-૦૫ સુધીનું શિક્ષણ માતૃભાષા, પ્રાદેશિક ભાષા કે ક્ષેત્રીય ભાષાના માધ્યમથી જ આપવા પર ભાર મૂકેલ છે. એટલું જ નહીં ધોરણ-૮ સુધી કે તેનાથી આગળ પણ શક્ય બને તો ભારતીય ભાષાઓમાં શિક્ષણ આપી શકાય.

વિનોબા ભાવેનું માનવું છે કે પહેલા સાત વરસનો જે અનિવાર્ય શિક્ષણનો ગાળો સમસ્ત પ્રજા માટે માનવામાં આવ્યો છે તેમાં અંગ્રેજીને સ્થાન આપવું એ શિક્ષણની દ્રષ્ટિએ તથા લોકમાનસના વિકાસની દ્રષ્ટિએ મોટી ભૂલ ગણાશે. માતૃભાષા તથા બીજા વિષયોના અધ્યયનને હાનિ પહોંચશે. જેને એક વાર માતૃભાષાનું ઉત્તમ જ્ઞાન પ્રાપ્ત થાય છે તે પાછળથી અન્ય ભાષા થોડા વખતમાં સારી રીતના શીખી શકે છે.

ચાવીરૂપ શબ્દો: NEP - 2020, વિનોબા ભાવે, માતૃભાષા, શિક્ષણ

પ્રસ્તાવના

રાષ્ટ્રીય શિક્ષણ નીતિ- ૨૦૨૦ એકવીસમી સદીની પહેલી શિક્ષણ નીતિ છે કે, જેનું લક્ષ્ય આપણા દેશના વિકાસ માટેની અનિવાર્ય જરૂરિયાતો પૂરી કરવાનું છે. આ નીતિ ભારતીય શિક્ષણવ્યવસ્થા ના બધા જ પાસાઓ, નિયમન અને શાસકીય પાસાઓ સહિતના, સુધાર અને તેની પુનઃરચના દ્વારા ભારતીય સંસ્કૃતિ અને મૂલ્યો આધારિત, એ ૨૧ મી સદીના શિક્ષણને લગતા ધ્યેયોને અનુરૂપ સાતત્યપૂર્ણ વિકાસ લક્ષ્યાંકો (Sustainable Development Goals) માટે એક નવી શિક્ષણનીતિનું સર્જન કરવાનો પ્રસ્તાવ રજૂ કરે છે. રાષ્ટ્રીય શિક્ષણ નીતિ-૨૦૨૦નો ઉદ્દેશ ભારતમાં શિક્ષણની ગુણવત્તા અને પહોંચને સુધારવાનો છે. આ નીતિમાં માતૃભાષામાં શિક્ષણને પ્રોત્સાહન આપવામાં આવ્યું છે, જેથી બાળકોને તેમની મૂળ ભાષામાં જ શિક્ષણ મળી રહે

આજે શિક્ષણના માધ્યમ તરીકે મોટાભાગના પરિવારો માતૃભાષાને સ્થાને અંગ્રેજી માધ્યમને પસંદગી આપી રહ્યા છે. જેનું મુખ્ય કારણ અંગ્રેજી માધ્યમમાં અભ્યાસ એ આજના સમયની અનિવાર્યતા છે. તેનાથી ઉચ્ચ અભ્યાસની, કારકિર્દીની અને રોજગારીની ઉજળી તકો છે. બાળકનું ઝડપી અને સારું ઘડતર થાય છે. બાળકનો વ્યક્તિત્વ વિકાસ

ઝડપી થાય છે. અંગ્રેજી માધ્યમમાં અભ્યાસ કરવાથી સગા-સંબંધી અને સમાજમાં એક મોભો નિર્માણ થાય છે. આવું આજના સમયમાં લોકોનું માનવું છે. પરંતુ આ માન્યતા ભૂલભરેલી છે.

માતૃભાષામાં અભ્યાસ કરાવવાને બદલે અંગ્રેજી માધ્યમમાં અભ્યાસ કરવાની જીદને લીધે કેટલાક પરિવારોની આર્થિક ક્ષમતા ન હોવા છતાં, તેનો મોટો ભાર સહન કરે છે. એથી પણ વિશેષ બાળક લઘુતાગ્રંથિથી અને માતા-પિતા ગુરુતાગ્રંથિથી પીડાય છે. જે ભાષા બાળકના પોતાના ઘરમાં બોલાતી હોય. સાંભળીને મોટા થતા હોય તે ભાષા બાળકના શિક્ષણનું માધ્યમ બને તો તે ઝડપી સંગ્રહ કરી શકે. પરંતુ પોતાની માતૃભાષા સિવાયની ભાષાના માધ્યમમાં અભ્યાસ કરવાથી બાળક પહેલા બીજી ભાષા સાંભળે છે, તેનો પોતાની ભાષામાં રૂપાંતર કરે છે. પછી સમજે છે. પરિણામે તેના મનમાં મૂંઝવણ ઊભી થવાથી બાળકમાં માનસિક તણાવ ઉદભવે છે. અંગ્રેજી શિક્ષણતે આજના સમયની જરૂરિયાત ચોક્કસ છે. પરંતુ શિક્ષણનું માધ્યમ અંગ્રેજી હોય તે જરૂરી નથી.

મહાવીર સ્વામી સહિત વિવિધ ધર્મના સંતો પોતાની લોકભાષામાં ધર્મ સંદેશ આપતા હતા. એટલુંજ નહીં તુલસીદાસે ‘રામચરિત માનસ’ પોતાની પ્રાદેશિક ભાષામાંજ લખ્યું હતું. સંત જ્ઞાનેશ્વરે ‘જ્ઞાનેશ્વરી’ પુસ્તક પોતાની માતૃભાષા મરાઠીમાં લખ્યું છે. મહાત્મા ગાંધીએ પોતાની આત્મકથા ‘સત્યના પ્રયોગો’ પણ પોતાની માતૃભાષા ગુજરાતીમાંજ લખી છે. ભારતના મહાન લેખકોએ, તત્ત્વચિંતકોએ, શિક્ષણ વિદ્વાનોએ પણ માતૃભાષાને મહત્વ આપ્યું છે.

સંશોધનના હેતુઓ

૧. રાષ્ટ્રીય શિક્ષણ નીતિ-૨૦૨૦ અંતર્ગત માતૃભાષામાં શિક્ષણ અંગે વિનોબા ભાવેના વિચારોનો અભ્યાસ કરવો.

૨. રાષ્ટ્રીય શિક્ષણ નીતિ-૨૦૨૦ને વિનોબા ભાવેના શૈક્ષણિક વિચારોના સંદર્ભે અભ્યાસ કરવો.
૩. વિનોબા ભાવેના માતૃભાષામાં શિક્ષણ અંગે વિચારોનો અભ્યાસ કરવો.
૪. રાષ્ટ્રીય શિક્ષણ નીતિ-૨૦૨૦ અંતર્ગત માતૃભાષામાં શિક્ષણ અંગે વિનોબા ભાવેના વિચારોની ચકાશણી કરવી.

સંશોધનનું મહત્વ

૧. રાષ્ટ્રીય શિક્ષણ નીતિ-૨૦૨૦ અંતર્ગત માતૃભાષામાં શિક્ષણ અંગે વિનોબા ભાવેના વિચારો જાણી શકાશે.
૨. રાષ્ટ્રીય શિક્ષણ નીતિ-૨૦૨૦માં વિનોબા ભાવેના શૈક્ષણિક વિચારોનો પ્રભાવ જાણી શકાશે.
૩. વિનોબા ભાવેના માતૃભાષામાં શિક્ષણ અંગે વિચારો જાણી શકાશે.

સંશોધનની મર્યાદાઓ

૧. પ્રસ્તુત સંશોધનું વિનોબા ભાવેના માતૃભાષામાં શૈક્ષણિક ચિંતન પૂરતું જ મર્યાદિત છે.
૨. પ્રસ્તુત સંશોધનમાં પ્રાપ્ત પુસ્તકોના વાંચન દ્વારા જ માહિતી મેળવવામાં આવી છે.
૩. પ્રસ્તુત સંશોધનમાં વર્ણનાત્મક પદ્ધતિ અને તેમાં પણ પુસ્તક અભ્યાસ પદ્ધતિનો ઉપયોગ કર્યો છે. અન્ય પદ્ધતિનો ઉપયોગ થયો નથી.

સંશોધન પદ્ધતિ

સંશોધકે હાથ ધરેલ સંશોધન ગુણાત્મક સંશોધન પદ્ધતિ દ્વારા હાથ ધરવામાં આવ્યું હતું. રાષ્ટ્રીય શિક્ષણ નીતિ-૨૦૨૦-વિનોબા ભાવે સંદર્ભે માતૃભાષામાં શિક્ષણ વિષયક વિચારોના અભ્યાસ

માટે સંશોધકે નીચેની પદ્ધતિઓનો આધાર લઈ સંશોધનકાર્ય કર્યું છે.

૧. વિષયવસ્તુ વિશ્લેષણ પદ્ધતિ
૨. વર્ણનાત્મક પદ્ધતિ

વ્યાપવિશ્વ અને નમૂનો

પ્રસ્તુત સંશોધનના વ્યાપવિશ્વ અને નામુનામાં વિનોબા ભાવેના શૈક્ષણિક પુસ્તકો અને રાષ્ટ્રીય શિક્ષણ નીતિ-૨૦૨૦નો સમાવેશ કરવામાં આવ્યો છે.

સારણી ૧.

નમૂનામાં સમાવિષ્ટ પુસ્તકો

ક્રમ	પુસ્તકનું નામ	લેખક	પ્રકાશકનું નામ	પ્રકાશન સ્થળ
૧	રાષ્ટ્રીય શિક્ષણ નીતિ-૨૦૨૦	શિક્ષણ મંત્રાલય	ભારત સરકાર	-
૨	વિચારપોથી	વિનોબા ભાવે	યજ્ઞ પ્રકાશન	વડોદરા
૩	શિક્ષણ વિચાર	વિનોબા ભાવે	યજ્ઞ પ્રકાશન	વડોદરા
૪	શિક્ષણમાં અંગ્રેજીનું સ્થાન	વિનોબા ભાવે	યજ્ઞ પ્રકાશન	વડોદરા

ઉપકરણ

પ્રસ્તુત સંશોધનમાં સંશોધકે માહિતી એકત્ર કરવા માટે ઉપકરણો તરીકે વિનોબા ભાવેના શૈક્ષણિક પુસ્તકો, રાષ્ટ્રીય શિક્ષણ નીતિ-૨૦૨૦ તથા અન્ય સાહિત્યનો ઉપયોગ કર્યો હતો.

માહિતીનું એકત્રીકરણ

સંશોધકે સંશોધનના હેતુઓને અનુરૂપ જરૂરી માહિતી વિનોબા ભાવેના શૈક્ષણિક પુસ્તકો, રાષ્ટ્રીય શિક્ષણ નીતિ-૨૦૨૦ અને અન્ય સાહિત્યનું વાંચન દ્વારા તથા ઇન્ટરનેટની મદદથી પ્રાપ્ત કરી હતી.

માહિતીનું પૃથક્કરણ

એક વાત તો નક્કી છે કે નાના બાળકો તેમના ઘરમાં બોલાતી ભાષા એટલે કે માતૃભાષામાં મહત્તવના મૂર્ત કે અમૂર્ત ખ્યાલોને વધુ ઝડપથી શીખે છે અને ગ્રહણ કરે છે.

ઘરોમાં સામાન્ય રીતે માતૃભાષા અથવા ભાષાનો ઉપયોગ થાય છે. શક્ય હોય ત્યાં સુધી ઓછામાં ઓછા ધોરણ ૪ સુધી, પણ વધુ યોગ્ય તો ધોરણ ૮ સુધી, શિક્ષણનું માધ્યમ ઘરની ભાષા/માતૃભાષા/સ્થાનિક ભાષા/પ્રાદેશિક ભાષા હશે. આ ધોરણો પછી પણ ઘર/સ્થાનિક ભાષાને શક્ય હોય ત્યાં સુધી શાળામાં એક વિષય તરીકે શીખવવામાં આવશે. સરકારી અને ખાનગી બંને પ્રકારની શાળાઓએ આ સૂચનાનું પાલન કરવાનું રહેશે. વિજ્ઞાન સહિત દરેક વિષયોના ઉચ્ચ ગુણવત્તાયુક્ત પાઠ્યપુસ્તકોને ઘરમાં બોલાતી ભાષા કે માતૃભાષામાં ઉપલબ્ધ કરાવવામાં આવશે. બાળક દ્વારા બોલાતી ભાષા અને શિક્ષણના માધ્યમ વચ્ચે કોઈ પણ અંતર હોય તો તેને સમાપ્ત કરવાના તમામ પ્રયાસો તાત્કાલિક ધોરણે કરવામાં આવશે. જ્યાં ઘરની ભાષા/માતૃભાષામાં પાઠ્યપુસ્તક સામગ્રી ઉપલબ્ધ ન હોય તેવા કિસ્સાઓમાં શિક્ષકો અને વિદ્યાર્થીઓ વચ્ચે વ્યવહારની ભાષા, શક્ય હોય ત્યાં ઘરેલુ ભાષા/માતૃભાષા રહેશે. એવા વિદ્યાર્થીઓ જેના ઘરની ભાષા/માતૃભાષા શિક્ષણના માધ્યમથી ભિન્ન છે, તેમના માટે દ્વિભાષી અધ્યયન-અધ્યાપન સામગ્રી સહિત દ્વિભાષી અભિગમનો ઉપયોગ કરવા માટે શિક્ષકોને પ્રોત્સાહિત કરવામાં આવશે. બધી જ ભાષાઓ તમામ વિદ્યાર્થીઓને ઉચ્ચ ગુણવત્તા સાથે શીખવવામાં આવશે; એક ભાષાને સારી રીતે શીખવવા અને શીખવા માટે તેને શિક્ષણનું માધ્યમ બનાવવું જ પૂરતું નથી તેને એક વિષય તરીકે ઊડાણપૂર્વક શીખવવી જોઈએ.

રાષ્ટ્રીય શિક્ષણ નીતિ-૨૦૨૦ અંતર્ગત ઓછામાં ઓછા પાંચમા ધોરણ સુધીનો અભ્યાસ માતૃભાષા/પ્રાદેશિક ભાષામાં રહેશે. ધોરણ-૫ સુધીના અભ્યાસમાં સૂચનાઓ આપવાના માધ્યમ તરીકે માતૃભાષા/સ્થાનિક ભાષા/પ્રાદેશિક ભાષા પર વિશેષ ભાર મૂકવામાં આવ્યો છે. ધોરણ—૮ અને તેનાથી આગળ પણ ચાલુ રાખવાની પ્રાધાન્યતા

આપવામાં આવશે.

ઇસરોના ચીફ ડો. કસ્તુરીરંગના પ્રમુખપદે તૈયાર થયેલી નવી શૈક્ષણિક નીતિ - ૨૦૨૦માં માતૃભાષાને યોગ્ય પ્રમાણમાં સ્થાન આપવામાં આવેલ છે. નવી રાષ્ટ્રીય શિક્ષણ નીતિ - ૨૦૨૦માં માતૃભાષા સંદર્ભે ભૂદાન યજ્ઞના પ્રણેતા અને ગીતા પ્રવચનના ઉદ્દગાતા છે એવા શ્રી વિનોબા ભાવેના વિચારધારાનો પડઘો દેખાઈ રહ્યો છે.

વિનોબા ભાવેના માતૃભાષા સંદર્ભે વિચારો...

ભાષા વિકાસની શરૂઆત માતાના ગર્ભમાંથીજ થાય છે અને તે ભાષા હોય છે ‘માતૃભાષા’ માતાના ગર્ભમાંથીજ બાળકના માનસિક વિકાસની શરૂઆત થઈ જાય છે. જેથી બાળકને માતૃભાષા ગ્રહણ કરવામાં કોઈજ મુશ્કેલી પડતી નથી. પ્રારંભિક શિક્ષણ માતૃભાષામાં આપવું એ એક વાહક છે. માતૃભાષાનો અન્ય કોઈ વિકલ્પ નથી. માતૃભાષામાં અપાતું શિક્ષણ સમજવામાં ખૂબ સરળ રહે છે. અભિવ્યક્તિ માટેનું શ્રેષ્ઠ માધ્યમ માતૃભાષા છે. બાળકની વૈચારિક પ્રક્રિયા માતૃભાષાના શિક્ષણથીજ ખીલે છે. આપણને સૌથી ઉત્તમ વિચાર આપણી માતૃભાષામાંજ આવે છે. માતૃભાષામાં અભ્યાસ કરવાથી સમજશક્તિ, કલ્પનાશક્તિ, સર્જન શક્તિ બાળકની અંદર ખીલે છે. જેથી તેનામાં અન્ય વિષયો સહેલાઈથી સમજી શકવાની ક્ષમતાનો વિકાસ થાય છે. એક વાર બાળક પોતાની માતૃભાષાને સારી રીતે વ્યાકરણ સહિત શીખી જાય તો તે સહેલાઈથી અન્ય ભાષાઓને પણ શીખી શકે છે.

મહાભારતમાં શ્રીકૃષ્ણએ એક ‘વર’ માંગ્યો છે. ‘માતૃહસ્તેન ભોજન’ ભોજનતો માના હાથનુંજ હોવું જોઈએ. માના ભોજનમાં માત્ર રોટલોજ નથી હોતો, પણ પ્રેમ પણ હોય છે. એવી જ રીતે વિનોબા ભાવેનું માનવું છે કે ‘માતૃમુખેન શિક્ષણ’ એટલે કે માતાના મુખેથી

શિક્ષણ મળે અને એજ વાત માતૃભાષાને લાગુ પડે છે. બાળકને પોતાની માતૃભાષામાંજ શિક્ષણ મળવું જોઈએ. શિક્ષણનું માધ્યમતો માતૃભાષાજ હોય. માતૃભાષા દ્વારા પહેલેથી છેવટ સુધીનું બધું શિક્ષણ આપવું જોઈએ. શિક્ષણ માટે અંગ્રેજી માધ્યમની વાત કરવીએ સો ટકા મૂર્ખામી છે.

આ માટે વિનોબા ભાવે એક સરસ દ્રષ્ટાંત આપે છે. ગઘેડાના બચ્ચાને પૂછવામાં આવે કે તને ગઘેડાની ભાષામાં જ્ઞાન આપવું જોઈએ કે સિંહની ભાષામાં, તો એ શું કહેશે? એ કહેશે કે સિંહની ભાષા ગમે તેટલી સારી હોય, મનેતો માતૃભાષા સમજાશે, સિંહની નહીં. એતો દીવા જેવું સ્પષ્ટ છે કે મનુષ્યનું હૃદય ગ્રહણ કરી શકે એવી ભાષા માતૃભાષાજ છે અને તેના દ્વારાજ શિક્ષણ અપાય. આમાં શંકાને કોઈ સ્થાન નથી. નાના બાળકોને શિક્ષણ એમની પોતાની માતૃભાષામાં આપવાને બદલે પારકી ભાષામાં આપશો તો એ બાળકોને નીરવીર્ય બનાવશે, એમની ગ્રહણશક્તિ બુઝી થઈ જશે.

વિનોબા ભાવે કહે છે કે આપણી બધી ભાષાઓ સેંકડો વરસથી ખેડાણ થતી આવી છે. અને સેંકડો વર્ષનો ઉત્તમ સાહિત્ય આપણી ભાષામાં છે. વિનોબા ભાવેનું કહેવું છે કે આપણી બધી ભાષાઓ ઘણી વિકસિત ભાષાઓ છે. અને આજનો બધો વ્યવહાર આ ભાષાઓમાં ચાલી શકે એટલી સમર્થ છે. એટલે શિક્ષણનું માધ્યમ આ બધી ભાષાઓ જરૂર બની શકે તેમ છે.

આપણી ભાષાઓમાં આજનો બધો વ્યવહાર થઈ ન શકે એ વાત સાવ ખોટી છે પરંતુ બધોજ વ્યવહાર આપણી ભાષાઓમાંજ થવો જોઈએ. વિજ્ઞાન પણ આપણી ભાષાઓ મારફત જ સામાન્ય લોકો સુધી પહોંચવું જોઈએ. એ વાત નિશ્ચિત સમજી લેજો કે વિજ્ઞાન જ્યાં સુધી માતૃભાષામાં લોકો સમક્ષ નહીં મુકાય ત્યાં સુધી તે વ્યાપકપણે ફેલાઈ શકશે

નહીં.

તારણો

૧. રાષ્ટ્રીય શિક્ષણ નીતિ - ૨૦૨૦માં માતૃભાષા સંદર્ભે વિનોબા ભાવેના વિચારોનો પડઘો દેખાઈ રહ્યો છે.
૨. વિનોબા ભાવેના માતૃભાષા અંગેના વિચારોને નજર સમક્ષ રાખીને રાષ્ટ્રીય શિક્ષણ નીતિ - ૨૦૨૦માં માતૃભાષાને સ્થાન યોગ્ય છે.
૩. વિનોબા ભાવેના મતે પ્રારંભિક શિક્ષણ માતૃભાષામાં જ આપવું જોઈએ.
૪. માતૃભાષામાં શિક્ષણ આપવાથી બાળકનો સર્વાંગીણ વિકાસ ઝડપથી થાય છે.
૫. બાળકને તેની માતૃભાષામાં અપાતું શિક્ષણ સમજવામાં ખૂબ સરળ રહે છે.

સમાપન

નવી શૈક્ષણિક નીતિ-૨૦૨૦ અને વિનોબા ભાવેના પુસ્તકોનો અભ્યાસ કર્યા પછી એવું કહી શકાય કે નવી શૈક્ષણિક નીતિમાં વિનોબા ભાવેના વિચારોને યોગ્ય સ્થાન આપવામાં આવ્યું છે. માત્ર વિનોબા ભાવે જ નહીં પરંતુ શિક્ષણ ક્ષેત્રના અન્ય તત્ત્વચિંતકોનું પણ માનવું છે કે બાળકનું ઓછામાં ઓછાં ઓછું પ્રાથમિક શિક્ષણતો માતૃભાષામાં જ થવું જોઈએ. નવી શૈક્ષણિક પોલીસીમાં ધોરણ ૧ થી ધોરણ ૫ માં માતૃભાષા કે પ્રાદેશિક ભાષામાંજ ફરજિયાત શિક્ષણની હિમાયત કરવામાં આવી છે એ પગલું ખૂબ જ આવશ્યક અને આવકારદાયક છે.

કોઈ એક વ્યક્તિએ સુંદર કહ્યું છે સંસ્કૃત ભાષા એ દરેક ભાષાઓની ‘માં’ છે અને ભારતની જે જુદી જુદી દરેક પ્રાદેશિક ભાષાઓ છે એ સંસ્કૃતની દીકરી છે. આપણે આપણાં દેશમાં ‘માં’ અને ‘દીકરી’ને યોગ્ય સ્થાન આપશું તો આપણા દેશનો વિકાસ ઝડપથી થઈ શકશે.

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Innovative Approaches to Functional English: A Conceptual Framework of Task-Based Educational Methods

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Abstract

Functional English emphasizes the practical application of language skills to bridge the gap between theoretical learning and real-world communication. Task-Based Educational Methods (TBEM) have emerged as an effective learner-centered approach, fostering communicative competence, critical thinking, and learner autonomy through authentic, task-driven activities. This paper explores the theoretical foundations of TBEM, including Constructivist Learning Theory, Communicative Language Teaching, and Cognitive Load Theory, while addressing its implementation challenges, such as limited teacher training, mixed learner proficiency, and resource constraints. The findings reveal that TBEM enhances linguistic competence and problem-solving skills by integrating real-world tasks into classroom instruction. Adaptive strategies, including the use of digital tools (e.g., Google Classroom, Duolingo), hybrid models, and differentiated task designs, can mitigate implementation barriers and promote inclusive learning. In conclusion, TBEM offers a transformative framework for Functional English education, aligning classroom learning with real-world demands. By overcoming practical challenges, TBEM equips learners with essential skills for academic, personal, and professional success. Future research should focus on the long-term impact of TBEM on language retention and fluency across diverse educational contexts.

Keywords:

Task-Based Educational Methods, Functional English, Innovative Pedagogy, Communication Skills, Language Learning

1.1 Introduction

Functional English is important in current education because it focuses on the practical application of language abilities in real-world circumstances. Unlike traditional language learning programs, which frequently concentrate grammatical precision and theoretical understanding, Functional English focuses on providing learners with the

ability to communicate effectively in a variety of contexts. These include professional contexts like workplace communication and formal presentations, and also everyday encounters like casual discussions and task management. As the globe grows more interconnected and globalized, the demand for people with practical language abilities has increased dramatically. Conventional language education approaches frequently fail to meet these changing needs. They frequently lack the flexibility and adaptability needed to prepare students for real-world difficulties, resulting in a disconnect between educational knowledge and its practical application. To remedy this problem, innovative educational methodologies such as Task-Based Educational Methods (TBEM) have developed as powerful instruments for improving Functional English training. TBEM changes the focus of learning away from rote memorization and toward active involvement, putting meaningful tasks at the center of the learning process. These assignments are intended to represent real-life circumstances, enabling students to use the language in context-appropriate and purposeful ways.

The theoretical assumptions of TBEM are based on constructivist and communicative language teaching approaches. These concepts prioritize learner autonomy, interaction, and problem solving. By incorporating tasks that replicate genuine language use, TBEM promotes not just linguistic competence but also communication confidence, creativity, and critical thinking talents. This article investigates the theoretical underpinnings of Task-Based Educational Methods and their practical application in Functional English education. It investigates how TBEM improves language acquisition by providing immersive and context-relevant learning experiences. It clarifies how this technique can bridge the gap between traditional language instruction and today's dynamic linguistic demands.

The global landscape of English Language Teaching (ELT) has witnessed a significant shift towards innovative, interactive, and student-centered methodologies to meet the evolving needs of learners and overcome contextual challenges. Across various regions, researchers have emphasized the importance of adopting modern pedagogical approaches that align with cultural, educational, and technological advancements. Huseynova (2023) identifies a critical gap between research interest and practical application in post-Soviet Azerbaijan, highlighting the challenges faced in transitioning from traditional ideologies to modern English teaching methods. Similarly, Peng (2024) examines Japan's modular adoption of Task-Based Language Teaching (TBLT) within

its globalization policy, addressing the need to balance explicit linguistic knowledge with practical usage despite cultural and educational constraints.

Moore (2022) reviews five prominent ELT approaches—Content and Language Integrated Learning (CLIL), gamification, TBLT, technology-enhanced learning, and multimodal teaching—providing a global perspective on their strengths and challenges in designing effective language programs. Eslit (2023) and Qizi (2024) explore the effectiveness of blended and student-centered teaching methods in enhancing non-native learners' comprehension, engagement, and language acquisition, particularly among first-generation learners. Technological integration has also emerged as a central theme in higher education, with Shaniga and Ilankumaran (2024) emphasizing the role of interactive strategies in EFL instruction, while Perez Lara (2024) highlights the impact of case-based and project-based methods in fostering critical thinking and soft skills. Bukhkalov et al. (2023) and Denysiuk and Danilova (2022) stress the significance of innovative teaching strategies and modern tools in enhancing communicative competence and fostering creativity within higher education classrooms.

1.2 Theoretical Framework

Task-Based Educational Methods (TBEM) owe their strength and application to a synthesis of numerous recognized theoretical paradigms that inform its principles and practices. These ideas help to mold TBEM into a dynamic and successful framework for language teaching, particularly in the context of Functional English.

1. Constructivist Learning Theory: Constructivist Learning Theory, founded on the fundamental work of Lev Vygotsky (1978), emphasizes the importance of social interaction and collaboration in cognitive growth. Vygotsky's Zone of Proximal Development (ZPD) theory emphasizes the necessity of scaffolded learning, in which learners advance through directed interaction with peers and facilitators. TBEM is closely aligned with this paradigm because it fosters a collaborative atmosphere in which learners engage in tasks that stretch their present skills while receive the assistance they need to succeed. This social constructivist foundation ensures that learners acquire knowledge and integrate skills through meaningful, interactive experiences.

2. Communicative Language Teaching (CLT): Canale and Swain (1980) established Communicative Language Teaching, which emphasizes on using language as a vehicle for actual communication. It stresses the development of communication competence,

which involves grammatical, sociolinguistic, discourse, and strategic skills. TBEM follows this communicative perspective by focusing its education on real-world tasks that mimic authentic language use. This strategy ensures that learners practice and enhance their language abilities in circumstances that are similar to real-world communication situations, providing the learning process more relevant and successful.

3. Cognitive Load Theory: John Sweller's Cognitive Load Theory (1994) emphasizes the need of managing the cognitive demands that learners face during the learning process. Excessive cognitive load can impair learning by overloading working memory. TBEM addresses this issue with its structured job cycles, which divide complex activities into manageable phases. These phases—pre-task, task execution, and post-task reflection—enable students to concentrate on specific areas of language use while avoiding cognitive overload. By effectively structuring tasks, TBEM increases cognitive processing while improving language retention and application.

TBEM, a Functional English education framework, combines Constructivist Learning Theory, Communicative Language Teaching, and Cognitive Load Theory to give a comprehensive, context-relevant approach to language skill development that caters to the different demands of modern learners.

1.3 Task-Based Methods in Functional English Education

1.3.1 Core Components of Task-Based Educational Methods (TBEM)

Task-Based Educational Methods (TBEM) are built on a few key components that make the approach effective and adaptable for language learning, notably in Functional English education. These three components—task design, task cycle, and assessment—work together to form an interesting, practical, and learner-centered pedagogical framework.

1. Task Design: At the heart of TBEM is the notion of creating assignments that closely resemble real-world events. Effective task design entails selecting activities that are purposeful, contextually appropriate, and in line of the learners' objectives and goals. Examples of such tasks include writing professional emails, conducting interviews, participating in group discussions, and giving presentations. These projects not only allow learners to practice language skills in authentic circumstances, but they also improve their ability to apply those abilities in a variety of situations. The development of tasks should include clear objectives, significant material, and chances for participation to ensure that the activities are both interesting and practical.

2. Task Cycle: A well-structured task cycle forms the backbone of TBEM. As articulated by Willis (1996), the task cycle comprises three key stages:

- **Pre-Task Stage:** This first stage is establishing the context and preparing learners. It could include presenting the subject, addressing important language, or performing sample tasks. The pre-task stage activates prior knowledge, lowers fear, and increases confidence.
- **Task Stage:** In this phase, learners actively participate in the task. To finish the exercise, they work together, solve problems, and speak in the target language. This stage prioritizes fluency and practical application over correctness, encouraging students to take risks and experiment with language use.
- **Post-Task Stage:** The final stage includes reflection, feedback, and reinforcement. Learners assess their performance, identify areas for improvement, and consolidate their knowledge through discussions or follow-up activities. The post-task stage improves linguistic skills while also encouraging metacognitive awareness and self-assessment.

This cyclical framework guarantees that learning is successfully scaffolded, allowing students to move progressively from preparation to application and reflection.

3. Assessment: TBEM assessment goes beyond typical measures of language proficiency by evaluating language use in the context of relevant tasks. This technique guarantees that assessments are relevant, practical, and in line with real-world communicative demands. Formative and summative assessments are both used to assess learners' development. Formative evaluation may include peer or teacher feedback during the task cycle, whereas summative assessment may involve evaluating the activity's final result, such as a written report or oral presentation. By emphasizing performance-based evaluation, TBEM ensures that learners gain not only linguistic accuracy along with communicative competence and confidence.

TBEM, a comprehensive framework for Functional English education, includes task design, task cycle, and assessment to ensure authenticity, structured learning experiences, and skill relevance.

1.3.2 Advantages of Task-Based Educational Methods (TBEM)

Task-Based Educational Methods (TBEM) provide a number of major benefits, making them an excellent pedagogical approach to language teaching, particularly Functional

English. These benefits result from TBEM's emphasis on authenticity, holistic skill development, and learner-centered techniques.

1. Authentic Learning: One of the most intriguing features of TBEM is its emphasis on authenticity in language learning. TBEM promotes learners to utilize language in relevant and practical circumstances by creating exercises that are similar to real-world scenarios. Participating in simulated meetings, drafting emails, and presenting presentations allows learners to put their language abilities into practice. This technique not only boosts learners' confidence in using the language outside of the classroom, but it also ensures that what they learn is immediately applicable to their personal, academic, and professional life. Authentic learning bridges the gap between academic knowledge and real-world communication, making the learning experience more engaging and purposeful.

2. Holistic Skill Integration: TBEM encourages the simultaneous development of all four core language skills: speaking, listening, reading, and writing. Against traditional techniques, which frequently segregate these abilities, TBEM incorporates them into integrated exercises that simulate real-life communication. For example, a group discussion activity may demand learners to actively listen, react vocally, and write written notes, promoting a broad range of language abilities. This comprehensive approach ensures that students gain not only verbal competence but also the ability to handle complicated, multimodal communication circumstances. This technique improves learners' cognitive and interpersonal skills since they must successfully interpret, process, and explain material in a collaborative setting.

3. Learner Autonomy: TBEM emphasizes learner autonomy, which is vital for lifelong learning and adaptability. TBEM enables learners to take responsibility for their learning by assigning them tasks that require decision-making, problem solving, and self-evaluation. Learners are frequently expected to plan how to approach a task, discover strategies for achieving their goals, and reflect on their performance afterward. This self-directed learning technique fosters critical thinking and independence while also providing learners with transferable skills that go beyond language education. TBEM fosters autonomy, helping learners gain confidence in their talents and create a proactive attitude toward their personal and professional development.

TBEM, a modern language teaching methodology, stresses real learning, holistic skill integration, and learner autonomy to meet the changing requirements of language

learners while also developing linguistic competency and important life skills.

1.4 Challenges and Adaptations

The incorporation of Task-Based Educational Methods (TBEM) into Functional English instruction provides various benefits while also posing several problems. These obstacles consist of institutional and educational limits to practical constraints in implementation. With inventive adaptations and the use of technology, TBEM can be successfully applied to an extensive variety of educational environments.

1. Challenges in Implementing TBEM:

- a. Limited Teacher Training:** One of the most significant problems in implementing TBEM is a lack of specialized training to educators. Effective task-based teaching necessitates a thorough understanding of job design, facilitation techniques, and constructive feedback. Many teachers are used to traditional, teacher-centered methods and may struggle to adapt to the learner-centered approach of TBEM. Insufficient professional development opportunities worsen the problem, restricting instructors' ability to adopt and maintain TBEM techniques.
- b. Varying Learner Proficiency Levels:** TBEM relies on collaborative exercises, which can be difficult when learners in a group have different levels of language proficiency. Advanced students may dominate discussions or feel unchallenged, whereas less proficient students may struggle to engage or feel excluded. This discrepancy might impede the success of task-based activities since the tasks may fail to interest all learners equally or fulfill their specific needs.
- c. Resource Constraints:** TBEM deployment requires proper resources, such as teaching materials, technology, and classroom infrastructure. These prerequisites is difficult to get in many educational contexts, particularly in resource-constrained areas. Designing, facilitating, and analyzing task-based activities takes time, which may place a pressure on educators who already have high workloads and tight schedules.

2. Adaptations to Overcome Challenges:

- a. Leveraging Digital Tools:** The utilization on digital tools and technology provides novel answers to many of the issues related with TBEM. Language learning apps, internet platforms, and virtual simulations offer affordable and scalable resources for task-based learning. For creating dynamic and engaging assignments, use applications such as Duolingo, Kahoot, or Edmodo. Virtual task simulations, such as role-playing situations in online forums or video conferencing programs, enable students to practice language

abilities in realistic settings without requiring significant physical resources (Richards, 2022).

- b. Hybrid Models:** The utilization on digital tools and technology provides novel answers to many of the issues related with TBEM. Language learning apps, internet platforms, and virtual simulations offer accessible and adaptable resources for task-based learning. For creating dynamic and engaging assignments, use applications such as Duolingo, Kahoot, or Edmodo. Virtual task simulations, such as role-playing situations in online forums or video conferencing programs, enable students to practice language abilities in realistic settings without requiring significant physical resources (Richards, 2022).
- c. Differentiated Task Design:** To address the difficulty of varied student skill levels, assignments can be tailored to the ability of individual learners or groups. Educators, for example, can create tiered projects of varied complexity to provide more scaffolding for less skilled students. Pairing or grouping learners intelligently, for example pairing stronger students with weaker ones, can also promote peer learning and establish a more inclusive environment.
- d. Teacher Professional Development:** Investing in teacher training programs is critical to the successful implementation of TBEM. Workshops, online courses, and peer mentorship programs assist instructors develop the skills and confidence required to create and facilitate task-based activities. Training should also cover tactics of classroom management, assessment, and the use of digital resources to improve TBEM procedures.

Task-Based Modeling (TBEM) in Functional English education can address problems like limited teacher training and resource constraints by incorporating innovative elements such as digital tools, hybrid models, customized task design, and focused teacher training.

1.5 Implications for Educators

The use of Task-Based Educational Methods (TBEM) in Functional English instruction creates transformative chances to both students and teachers. To fully realize the promise of TBEM, educators must rethink established pedagogical practices and embrace strategies that improve efficacy. The next section investigates the important implications for educators and offers actionable ideas to aid in the successful implementation of TBEM.

1. Professional Development: Mastering Task Design and Facilitation: Professional

development is crucial as educators to effectively comprehend and use TBEM principles. Designing projects that correspond to real-world events necessitates creativity, a thorough understanding of language use in context, and the capacity to scaffold learning. Educators must be trained in:

- **Task Creation:** Create relevant tasks that imitate real-world communication, such as holding mock interviews, writing professional emails, or taking part in group conversations.
- **Facilitation Techniques:** Guiding students through task cycles (pre-task, task, and post-task) while encouraging collaboration and involvement.
- **Feedback Mechanisms:** Giving learners timely and constructive feedback to help them improve their abilities and meet assignment objectives.

Professional development programs should include workshops, peer mentoring, and access to task-based teaching resources. Ongoing training keeps educators up to date on the most effective tactics and tools for adopting TBEM.

2. Inclusive Practices: Addressing Diverse Learner Needs

TBEM emphasizes the need of inclusion in task design and implementation. Learners frequently come from varied language, cultural, and educational backgrounds, resulting in varying levels of skill and interest. Educators should implement inclusive approaches, such as:

- **Differentiated Instruction:** Creating tiered projects using varied levels of complexity to accommodate both experienced and beginner learners.
- **Scaffolding Support:** Providing additional tools or assistance to help difficult students participate effectively in tasks.
- **Cultural Relevance:** Using culturally relevant content and scenarios to increase learner engagement and relatability.
- **Collaborative Grouping:** Strategically structuring groups to ensure equal participation, allowing better learners to guide peers and build a collaborative environment.

These techniques make TBEM accessible and effective for all learners, encouraging equality and inclusivity in the classroom.

3. Technology Integration: Enhancing Task Delivery and Assessment

The incorporation of technology as an important part of modern TBEM methods,

providing novel ways to develop, deliver, and evaluate assignments. Using digital platforms and tools, educators can build dynamic learning experiences while overcoming resource constraints. Key strategies include:

- **Digital Platforms for Task Delivery:** Using systems like Google Classroom, Edmodo, or Moodle to facilitate task-based activities, distribute resources, and promote communication.
- **Interactive Applications:** Use language learning programs such as Duolingo, Quizlet, or Padlet to create engaging, interactive tasks.
- **Virtual Task Simulations:** Using video conferencing or virtual reality technologies to imitate real-world settings like business meetings or interviews.
- **Automated Assessment Tools:** Using technology for formative and summative assessments, providing quick feedback, and tracking learners' progress over time.

By adopting technology, educators may improve the scalability and effectiveness for TBEM, making it suitable for both traditional and online learning environments.

TBEM of Functional English education enhances language teaching outcomes by mandating professional development, inclusive practices, and technology integration. This technique engages students, prepares them for real-world communication, and improves their learning experiences.

1.6 Further Direction

The promise of TBEM extends beyond its direct classroom uses, with important implications for educators and curriculum designers. This fosters the use of new educational approaches, the integration of digital resources, and the creation of inclusive solutions to meet the needs of various learners. While TBEM has proven effective in improving functional language abilities, more study is needed to investigate potential larger implications. Longitudinal studies could shed light on TBEM's long-term benefits for language acquisition, including fluency, accuracy, and long-term retention. Investigating TBEM's adaptability in a variety of educational situations, among them bilingual classrooms, under-resourced institutions, and virtual learning environments, could help shape its wider deployment. TBEM offers a forward-thinking method to language teaching that bridges the gap between classroom learning and real-world communication. Fostering active engagement and contextualized learning provides learners with the language and cognitive tools they require for navigating a

variety of communication obstacles. The further research and improvement of TBEM will strengthen its position as a cornerstone of effective language instruction.

1.7 Conclusion

Task-Based Educational Methods (TBEM) represent a paradigm change in language teaching, emphasizing practical application and learner-centered involvement above traditional instructional methods. Throughout the framework for Functional English education, TBEM corresponds with the changing demands of worldwide communication, providing learners with the skills required for real-world language use. The fundamental ideas for TBEM are active learner participation, authentic task design, and contextualized language acquisition. TBEM builds on theoretical frameworks such as Constructivist Learning Theory, Communicative Language Teaching, and Cognitive Load Theory to give a solid foundation for communicative competence development. The task cycle, which includes pre-task, task, and post-task stages, successfully scaffolds learning by ensuring that learners are not only exposed to but actually actively engaged in meaningful language use.

TBEM overcomes the constraints of traditional language education approaches through designing immersive learning experiences that simulate real-life communication circumstances. This technique additionally improves speaking, listening, reading, and writing skills, but it also promotes critical thinking, problem solving, and learner autonomy. The adoption of TBEM isn't without its obstacles. Issues including inadequate teacher preparation, fluctuating student proficiency, and resource limits underscore the importance of targeted adaptations, such as technology integration and hybrid models.

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Promoting Cultural Heritage through Project IKS: A Pedagogical Study

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Introduction

Culture is very important part of any country and for the people of the country. It gives them identity. Without culture, a citizen of a country becomes only a man on the earth. Culture connects the people with the history, tradition, rituals and knowledge and experience of their ancestors. It takes them to the root of their civilization. It is necessary to know the culture, its importance and pass it to the next generation. In today's fast changing world, culture is narrowed down to only illogical tradition and rituals. New generation finds it old fashion to follow it. It is high time to save it and preserve it for the new generation by explaining its real meaning, its importance and the essence it carries for the human being. This makes it essential to find new ways to include cultural heritage in education.

Indian Knowledge Systems refer to the traditional knowledge and practices that are deeply rooted in the cultural, social, and spiritual life of India. This knowledge spans a vast range of fields, including medicine (Ayurveda), agriculture, astronomy, architecture, mathematics, and spiritual practices like yoga. Here in this paper, an attempt was made to enrich knowledge of IKS of B.Ed. students and, through them, of children residing near their homes. An experiment of 10 days to teach IKS knowledge including various topics was carried out by B.Ed. students. After the experiment, the questionnaire was given to B.Ed. students to know their knowledge and experience with the project.

Problem of the study

Promoting Cultural Heritage through Project IKS: A Pedagogical Study

Objectives :

1. To promote a sense of cultural pride and identity among children through the experiment.

2. To study the effectiveness of a 10-day teaching intervention by B.Ed. students under the IKS framework.
3. To analyze the response of children to culturally enriched learning activities.
4. To identify the challenges faced by B.Ed. students in implementing cultural heritage education outside formal classrooms.
5. To encourage B.Ed. students to develop innovative and context-specific teaching strategies for cultural education.

Importance of the study:

In this rapidly changing world, culture is being forgotten or put aside. This study helps B.Ed. students to understand the importance of culture in our life and how they can inculcate the knowledge of tradition with their subjects while teaching in the school. It also helps the children to enrich and to understand the culture and its various subjects that can make our life better in all sense.

It also helps the B.Ed. students in designing and delivering lessons that integrate local traditions, enriching their pedagogical skills. Moreover, a 10 day teaching project also helps them to enrich their knowledge about IKS. By focusing on children living near B.Ed. students' homes, the study ensures that cultural education reaches to those who might not have accessed to such learning in formal schools.

The result of the project and designing for teaching IKS to children also guides and shows the path to the authority to integrate IKS to our formal school education.

Limitation of the study:

The study was limited to a 10-day teaching period, which may not be sufficient to measure long-term changes in children's understanding and retention of cultural heritage. Only the B.Ed. students of Shrirang Shikshan Mahavidyalay were taken. As the intervention involves only children residing near the homes of B.Ed. students, the sample size was limited. Only the questionnaire to assess B.Ed. students' experience and knowledge was taken as a tool.

Design of the study:

• Sample:

The purposive sampling technique was used in the selection of the sample. All the 50 B.Ed. students were from Shrirang Shikshan Mahavidyalay, Bilimora.

• Design of the study:

B.Ed. students were given the time table of 10 days with subject outline and were trained what to and how to teach. B.Ed. students carried out 10 days teaching and then asked for their feedback in the form of questionnaire. *Schedule of the day is attached with the paper)*

• Tool:

The Questionnaire with three sections namely Understanding of IKS, teaching experience and teaching skill and impact on learners, was constructed by the researcher (taking help of the Experts) keeping in mind the various aspects of IKS and teaching project

• Statistical technique:

After the collection of data, the statistical technique of percentage was applied for the analysis.

Analysis and Interpretation of the data:

1. Previous Experience in Teaching Informal Learners

Yes	No
03 (6%)	47 (94%)

Most of the B.Ed. students (94%) didn't have any previous experience in teaching informal learners. So this was their first time to teach something informally.

2. How familiar were you with Indian Knowledge Systems (IKS) before the project?

Very familiar	Somewhat familiar	Not familiar at all
28.4%	71.4%	0%

The data received shows that most of B.Ed. students were not much familiar with Indian Knowledge System before project. So the project was fruitful for them to gain the knowledge of IKS.

3. Which aspects of IKS did you focus on during the project? *(Select all that apply)*

1	Traditional Indian arts and crafts	71.4%
2	Yoga and wellness practices	78.6%
3	Indigenous scientific knowledge	42.9%
4	Indian literature and storytelling	92.9%
5	Cultural rituals and traditions	92.9%
6	Life skills	57.1%
7	Others	14.3%

B.Ed. students were given training of all related topics of IKS. 92.9% of students focused on Indian literature and storytelling and cultural rituals and tradition during the project. 78.6% of them also emphasized on the Yoga and wellness practices. 14.3% of students also focused on the aspect of Life skills.

4. How would you rate your understanding of IKS after completing the project?

Excellent	Good	Average	Poor
78.6%	21.4%	0%	0%

Almost all B.Ed. students were agreed that the IKS project has enriched their understanding of IKS. 78.6% of students rated it as Excellent whereas 21.4% rated as Good.

5. How challenging was it to teach IKS to community learners during the project?

Very challenging	Somewhat challenging	Neutral	Easy	Very easy
7.1%	57.1%	28.6%	7.1%	0%

Many of the students(57.1%) found it 'somewhat challenging', 7.1.% of students found it 'easy' whereas 28.6% of students didn't show particular response to the question.

6. What teaching strategies did you find most effective in engaging community learners with IKS? *(Select all that apply)*

Hands-on activities (crafts,games, etc.)	71.4%
Storytelling and discussions	71.4%

Visual aids (charts, videos, etc.)	35.7%
Group activities and peer learning	64.3%
Practical demonstrations (e.g., yoga, crafts)	57.1%

B.Ed. students found Hands on activities like craft, games and Storytelling, discussion very effective in teaching of IKS to learners. They also found Group activities and peer learning effective.

7. Did you face any challenges while teaching IKS to the learners?

Yes	No
50%	50%

On the answer to question about facing challenging while teaching IKS , 50% of students found it challenging where as 50% students didn't face any challenge. So the researcher didn't get any particular answer on the question.

8. How would you assess the learners' engagement with IKS content?

Very high engagemen	21.4%
High engagement	35.7%
Moderate engagemen	35.7%
Low engagement	7.1%
Very low engagement	0%

From the data of the above table shows that B.Ed. students assessed learners' engagement good during the project. Very few rated as 'low engagement.'

9. In your opinion, how effective was the 10-day project in helping learners understand and appreciate IKS?

Very effective	50%
Effective	50%
Neutral	0%
Ineffective	0%
Very ineffective	0%

In the response to the above questions, all students believed that this 10 day project was very successful to enrich learners' understanding about IKS and equally important for them to appreciate IKS.

10. What do you think the learners gained most from the project? (Select all that apply)

Cultural awareness	92.9%
Knowledge of traditional Indian practices (e.g., yoga, arts, etc.	78.6%
Improved creativity and artistic skills	42.9%
Life skills (e.g., communication, problem solving)	42.9%
Self-confidence and personal growth	85.7%
Others	7.1%

B.Ed. students thought that through this IKS project, learners gained cultural awareness. self confidence and personal growth and also Knowledge of traditional Indian practices like yoga, arts etc.

11. How did this project enhance your teaching skills?

Significantly	71.4%
Somewhat	26.6%
Not much	0%
Not at all	0%

The data of the above table reveals that all B.Ed. students believed that this IKS project has enhanced their teaching skill.

12. What skills or knowledge did you gain from this project that you feel will help you in your future teaching career? (Select all that apply)

Increased cultural awareness and sensitivity	57.1%
Improved lesson planning and teaching methods	57.1%
Better communication and rapport-building skills	42.9%
Knowledge of alternative teaching approaches	42.9%

Confidence in working with diverse student groups	78.6%
Others	7.1%

On the question, what have gained which will be helpful to you in future, 78.6% said they learned /gained confidence in working with diverse student groups, 57.1% said it increased cultural awareness and sensitivity, 57.1% said that it improved lesson planning and teaching, 42.9% said it will help to communicate and rapport building skills through this IKS project.

13. How much time did you spend preparing the materials for IKS-based activities?

More than 5 hours per day	0%
3-5 hours per day	21.4%
1-2 hours per day	64.3%
Less than 1 hour per day	14.3%

The data reveals that B.Ed. students had worked hard for this project. 64.3% of students prepared the material for 1-2 hours a day, whereas 21.4% of students prepared for 3 to 5 hours to teach IKS to the learners.

14. How well did the learners respond to IKS-related activities (e.g., arts, yoga, storytelling)?

Very positively	57.1%
Positively	42.9%
Neutral	0%
Negatively	0%
Very negatively	0%

On the answer of the above question, 57.1% students felt that learners responded very positively and 42.9% of them felt that learners responded positively.

15. Did the project change your perspective on the importance of IKS in education?

Yes, significantly	57.1%

Yes, somewhat	35.7%
Yes, somewhat	7.1%
No, not much	0%
No, not at all	0%

The data reveals that most of the B.Ed. students felt that the project brought change in their perspective on the importance of IKS in education.

16. Would you recommend this type of project to other B.Ed students?

Yes, strongly recommend	64.3%
Yes, recommend	35.7%
Neutral	0%
No, would not recommend	0%
No, strongly would not recommend	0%

All students felt that they would recommend this type to project to other B.Ed students.

17. Did you feel the project helped you develop a deeper understanding of cultural heritage and its role in education?

Yes, completely	71.4%
Yes, somewhat	28.6%
Yes, somewhat	0%
No, not much	0%
No, not at all	0%

The data in the table shows that All the B.Ed. students felt that the project helped them develop a deeper understanding of cultural heritage and its role in education.

18. What improvements would you suggest for future IKS teaching projects? *(Select all that apply)*

More resources or materials for activities	78.6%
Better planning and time management	42.9%
More community involvement	21.4%
More interactive or innovative teaching methods	28.6%
Enhanced collaboration among B.Ed students	35.7%
More feedback or reflection sessions	28.6%
Others	0%

The data reveals that 78.6% of students felt that more resources and material for activities would be needed for the project while 42.9% of students felt that it was better planning and time management as a suggestion, 21.4% students suggested to involve more community, 28.6% of students suggested to incorporate more interactive and innovative teaching methods, 35.7% of students wanted to enhance collaboration among B.Ed. students and 28.6% of students suggested to have more feedback sessions as a suggestion for future IKS project.

19. How would you rate the level of interaction between you and the community learners during the project?

Very high interaction	35.7%
High interaction	50%
Moderate interaction	14.3%
Low interaction	0%
Very low interaction	0%

35.7% and 50% of students rated very high and high level of interaction between you and the community learners during the project. While 14.3% of students rated it as moderate interaction between community learners during the project.

20. What strategies did you use to keep the community learners engaged throughout the project? *(Select all that apply)*

Interactive discussions	0%
Group activities	42.9%
Real-life examples	57.1%
Creative exercises (e.g., art, yoga)	0%
Role-playing and dramatization	0%
Others	0%

While asking the question regarding the strategy used to keep the community learners engaged throughout the project, 42.9% of the students said it was Group activities they used, and 57.1% of them used Real life examples as the teaching strategy they used to engage learners in the project.

21. Did you observe any behavioral changes in the learners during the project?

Yes, significant changes	50%
Yes, some changes	50%
No noticeable changes	0%
No, the behavior remained the same	0%

Almost all students agreed on the question positively on the question whether they observed any behavioral changes in the learners during the project.

22. Which of the following IKS-related topics did you find most challenging to teach?

Yoga and physical wellness	28.6%
Traditional crafts and arts	35.7%
Stories and folklore	14.3%
Indigenous scientific knowledge	57.1%
Cultural traditions and rituals	42.9%
Others	0%

The data shows that 57.1 % of students found Indigenous scientific knowledge topic as the most challenging to teach where as 42.9% of them found cultural tradition and rituals , 35.7% of students found traditional crafts and arts, 28.6% of students found Yoga and physical wellness and only 14.3% of students found stories and folklore as the most challenging to teach during the project.

23. Did this project help you develop new teaching strategies for diverse learners?

Yes, significantly	64.3%
Yes, somewhat	21.4%
Neutral	14.3%
No, not much	0%
No, not at all	0%

Most of the students felt that this project helped you develop new teaching strategies for diverse learners.

24. What was the most rewarding aspect of teaching IKS to the community learners?

Seeing the learners' growth and engagement	14.3%
Sharing knowledge about Indian culture and heritage	78.6%
Building rapport with the learners	0%
Developing new teaching skills	7.1%
Others	0%

While asking the question regarding the rewarding aspect of teaching IKS to the community learners, 78.6% of students said ‘ it was sharing knowledge about Indian culture and heritage’ , and 14.3% of students said that the rewarding aspect of the project was ‘ seeing the learners’ growth and engagement.’

25. Would you like to incorporate IKS into your future teaching practice?

Yes, definitely	100%
Yes, maybe	0%

No	0%

All the students agreed positively to incorporate IKS into their future teaching practice.

Findings: _

1. Understanding of IKS

Before the project, most of the students were not much familiar with IKS knowledge but after completion of the project, Most of them rated their understanding regarding IKS knowledge as Excellent. The data reveals that most of the B.Ed. students felt that the project brought change in their perspective on the importance of IKS in education.

2. Teaching Experience and Teaching skill

More than half of the students found this project ‘somewhat challenging’. They used many teaching strategies to engage the learners like Hands-on activities (crafts, games, etc.), Storytelling and discussions, Visual aids (charts, videos, etc.), Group activities and peer learning and Practical demonstrations (e.g., yoga, crafts). Moreover, they felt that through this project, their teaching skill was enhanced. They even used different teaching strategies to teach IKS.

3. Impact on Learners

Most of the students felt the learners’ engagement was high or very high during the project. They felt that learners have gained the knowledge and understanding about IKS through this project. Specifically, learners gained cultural awareness , self confidence and personal growth and also Knowledge of traditional Indian practices like yoga, arts etc.

Discussion

The findings suggest that teaching IKS in community settings can be highly effective in promoting cultural awareness and enriching the educational experience for both B.Ed. students and community learners. The project successfully demonstrated the potential of B.Ed. students to implement IKS-based teaching, despite some challenges related to resource limitations and learner engagement.

Conclusion

This research highlights the importance of teaching IKS in community-based settings and the role of B.Ed. students in facilitating this process. The findings demonstrate that community learners benefit from IKS education, gaining a deeper understanding of

their cultural roots and traditions. B.Ed. students also develop valuable teaching skills and a stronger connection to their heritage.

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Holistic development through NEP 2020: the role of India knowledge System

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Abstract

The Indian knowledge tradition teaches individuals how to live a good life. Indian Purana's, Upanishads, and Shashtra's contain teachings and insights that are useful for life. What we call modern discoveries today were already available in our ancient scriptures. Solutions to various diseases, ways to maintain a healthy life, and the keys to wellness are all embedded in ancient texts. If we truly understand our ancient knowledge, we can easily find the path to leading a meaningful life. By adopting the wisdom of life as shown by the sages, we can advance on the path of progress. This fact is now well recognized, and therefore, the National Education Policy (NEP) 2020 reflects this wisdom. The NEP emphasizes the importance of Indian knowledge traditions, which increases the possibilities of holistic development in children. Holistic development includes physical, intellectual, emotional, social, and spiritual growth, which helps a child become not only a good individual but also a responsible citizen. The new education policy integrates Indian knowledge, art, culture, Ayurveda, agriculture, yoga, Vedic mathematics, and other disciplines into the curriculum to ensure the all-round development of children. Additionally, this approach will enable them to achieve economic stability and contribute to the nation's progress and development.

Key words:

Holistic development, NEP 2020, India knowledge system

1.1 Introduction

Indian knowledge tradition teaches one to live well. Indian Purana's, Upanishads, Scriptures have written life useful things. Indian sages. How to live life? And the key to living life. In our ancient texts. Is hidden. What we are exploring maidenly. It is in our ancient scriptures. Already available. How can a person treat various diseases? How can one lead a healthy life? It is contained in the ancient texts of Guruchavi. If we

understand our ancient knowledge properly, we can easily achieve the way to live life. If we adopt the key to life shown by the sages, then we will be able to move forward on the path of progress. We can know this very well today and that is why we can see its reflection in the National Education Policy in 2020, we can see in the new education policy the efforts to ensure that children get education, but after getting education, the child can achieve economic prosperity. So the researcher wondered what was said for the overall development in this new education policy, how can the overall development of the individual take place, questions such as where the Indian knowledge tradition has been implemented in the new National Education Policy arose to the researcher, so the researcher thought of studying more on the topic presented.

Holistic development through NEP 2020: the role of India knowledge system

1.2 Indian knowledge tradition

Ancient Indian education system. Children should be given upanayana sanskar around the age of 8 years. Indian education by leaving his parents' home and staying in Guruji's ashram. The learning experience was achieved through action when in a natural place. In addition to the fact that the child learns a lot through his own experience and that is, through his own experience, Guruji also teaches him Veda Upanishad Puranas, History, Grammar Ethics. Logic Geography, jurisprudence, astronomy, rhymes, rhetoric, language. Etc. Teaching. Apart from this, sculpture also taught architecture, painting, music, literature, etc.

According to Indian tradition, the child received the contribution of living life. He values different skills, spiritual elements. Everyone's attention was taken. Whatever it takes to become a complete person, the student goes through the various experiences he gets to learn by staying in Guruji's ashram, so when the child comes out in the society, he comes out of the box. This kind of education. To learn by staying in Guruji's ashram. It was coming. Real life. After receiving education. How can money be earned? That too they used to learn from the ashram. In short, we can say that the all-round development of children was in accordance with our Indian knowledge system.

1.3 All-round development

When talking of all-round development, all-round development is the physical, mental, social, and spiritual of the individual. Complete development. Let us understand that.

1. Physical Well-being: Yoga and Ayurveda make a person physically capable. Yoga keeps a person mental peace as well as physically healthy and Ayurveda provides

- physical well-being to the person. Yoga and Ayurveda promote health and well-being.
2. **Intellectual Development:** If one has an intellectual development, one can be able to acquire creativity, critical thinking and problem-solving skills. A good life can be lived through intellectual development.
 3. **Emotional Development:** Understanding the other person Expressing one's feelings is made possible by emotional development. It enables one to go through the ups and downs of life, thereby building flexibility, empathy and self-awareness.
 4. **Social Awareness:** Social development works to give a responsible citizen of the country and a useful person for the society by inculcating in him various values such as morality, knowledge of public property, social service, fraternity, family spirit sensitivity and a sense of cooperation.
 5. **Spiritual Growth:** Spiritual growth brings one peace of mind, restraint and stability in the struggles of life. It does not restrict one to material success alone, but gives one the direction of a more profound contentment and valuable life.

1.4 Indian knowledge tradition and all-round development.

In order to develop children all-round as per the Indian knowledge tradition. So the students had to learn by listening. The children developed moral, social psychological, economic, logical qualities. The children were given knowledge of various scriptures so that after studying it, the child followed them and was disciplined. His education, which had an impact on his personal daily life. So that the child can be responsible for his duty to his society and his family.

The ancient education system focused on both education and physical development. Vishnu Sharma has said that freedom from bondage and education is what determines the path of liberation. Worked to provide proficiency. Because of this determination in education. Swami education begins in the monastery university temple. The Indian knowledge tradition is a mixture of logic and spirituality that makes man fully develop. Modern education mostly emphasizes only cognitive skills, but ignores the emotional, social, and spiritual aspects. The all-round development of a person is made possible through the Indian Knowledge Tradition (IKS) for life.

1.5 Relatable issues related to IKS in NEP 2020

- **Promotion of local knowledge systems**

The ancient texts composed by Indian sages and the knowledge given in them are equally beneficial in today's era. Knowledge of subjects like Ayurveda, Yoga, Mathematics, Astronomy and Philosophy can be beneficial for today's students. At the same time, through this knowledge, our culture will be preserved and promoted and at the same time it will also be propagated. Through which a sense of pride develops in the student. Students can use our glorious cultural heritage and useful knowledge in today's life. This approach inculcates a sense of national pride among the students and makes them aware of the contribution of Indian culture. It has been recommended to make India's traditional knowledge such as art, culture, Ayurveda, agriculture, environmental systems, etc. a part of the curriculum. Steps will be taken to create awareness among students about the country's diverse traditional knowledge.

- **Multispecific and holistic education**

The objective is to prepare the curriculum by combining traditional knowledge with modern science, technology and anthropology. This is an approach where different subjects are taught by connecting each other. The Indian knowledge tradition can be established between science, art, reasoning and lifestyle. Ud., Yoga is best for physical as well as mental health, and Vedic mathematics can develop reasoning and the ability to quick calculation.

- **Research and Development**

The Indian knowledge tradition is a powerful tool to enrich discovery and innovation. In the context of NEP 2020, emphasis has been laid on incorporating traditional knowledge into modern research. Therefore, Indian Knowledge Centres will be set up to research and promote traditional knowledge. Special incentives will be given for research and documentation on IKS in higher education institutions.

- **Promotion of language and script**

The emphasis in primary education has been on mother tongue and local languages, as IKS mostly dominate regional languages. Technology will be used to preserve the vanishing languages.

- **Inclusion in the curriculum**

IKS from primary to higher education will be included in the curriculum. For example, the study of the environment will include traditional water management methods or Vedic mathematics in ancient mathematics.

- **Professional Education**

Students get very few employment opportunities in the current course. But the new National Education Policy lays emphasis on business education. This will promote skill development among students by combining local crafts, traditional crafts and other occupations with modern education. This will increase local employment opportunities and promote traditional arts and skills.

- **Value based education**

Determines a person's speech, behaviour, behaviour and values of life. Due to ethics and ethics, a person can develop peace and positivity in his life. The Upanishads, The Bhagavad Gita and various Indian philosophies inculcate moral values such as honesty, playfulness, moral courage, openness in students and encourage thought power. Imparting value based education helps in creating an ideal and mental balance among the students. The new National Education Policy lays emphasis on vocational education. So that values such as environment-loving lifestyle, morality and responsibility to society will encourage learning from traditional knowledge. Emphasis has been laid on balancing nature and community centric life.

- **Documentation of IKS and use of technology**

Indian knowledge is preserved in our Vedas, Puranas and Upanishads. Our traditional knowledge will be preserved through digital mediums and disseminated globally. Technology platforms will be created for this. This has been mentioned in the new National Education Policy.

- **Training for teachers**

Teachers will be given special training to teach IKS based content in modern methods.

- **Identification of IKS globally**

The Indian knowledge tradition is important not only for the progress of the country but also for the all-round development of mankind globally. On the basis of Yoga, Ayurveda, Shastras and Culture, India is creating a unique identity for itself globally,

which proves to be an invaluable heritage for today's and future world. Therefore, international cooperation for global dissemination and research of Indian traditional knowledge systems will be encouraged.

1.6 Challenges

- The new education policy has laid more emphasis on sports for physical development of children but there is no provision of exercise teachers in our schools.
- In addition to the education of various subjects, various activities have been included for the all-round development of the students, but if subject experts have not been appointed at the school level for various subject matter, then this can also be considered a challenge.
- Mid-term and semester system has been arranged for assessment and internal assessment, due to which most of the time in higher education will be spent in conducting and organizing examinations.
- The new education policy gives more emphasis on the mother tongue, but practically speaking, if education is imparted only in English in English medium self-reliant schools, then this can also be considered a challenge.

1.7 Implementation of IKS under NEP 2020

- Develop IKS curriculum in schools and universities.
- Translation and digitization of ancient texts.
- Establishment of new research centres on Indian knowledge.
- Incorporating IKS with a scientific approach in education.

1.8 Conclusion

Modern education mostly emphasizes only cognitive skills, but ignores the emotional, social, and spiritual aspects. The new National Education Policy talks about the all-round development of the child and also covers the Indian knowledge tradition so that the child will not only have all-round development but will also attain economic prosperity after getting education. If this new National Education Policy is implemented properly, it will not only benefit the individual but also the country.

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Effectiveness of incorporating Indian Knowledge System in education: A comprehensive Perspective

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Abstract

Indian Knowledge System (IKS) encompass the traditional knowledge and wisdom that have been developed in India over millennia. The subject itself includes a vast array of disciplines. The integration of Indian knowledge System (IKS) into the curriculum has given a modern approach to entire education system. It aims to enrich learning experience and preserve cultural heritage. Integrating IKS into contemporary education can help students gain a broader and deeper understanding of knowledge, bridging the gap between traditional wisdom and modern advancements. This study explores the effectiveness of incorporating IKS in curriculum from the perspective of both students and educators, aiming to understand its impact on engagement, learning outcomes, and teaching practices. Using a mixed-method approach, this research collected quantitative data through structured questionnaires and qualitative insights by interacting with students and educators across various educational institutions. The finding reveals that by incorporating IKS, the understanding of cultural values can be fostered, also this enhances the engagement of students, developing critical thinking skills. It has been observed that educators have seen positive impact on teaching practices but highlighted the urgent need for more comprehensive training and resources. The study underscores the importance of incorporating IKS to create a well-rounded educational experience that bridges traditional wisdom and modern knowledge. These insights provide valuable recommendations for policymakers and educators in designing effective IKS-based educational frameworks.

Keywords: *IKS, Education, NEP2020, Integration*

Introduction

India is a country where the wisdom is imparted by grandparents to their grandchildren through stories of Panchatantra, Mahabharata, and Ramayana, before they even start their formal education. When we are discussing Indian Knowledge system, what we

referring to is – a knowledge that has been passed down to generations since ancient times. This includes a vast array of knowledge streams. The study aims to comprehend the perception of students towards the understanding of IKS and the perception of educators towards the pedagogy of IKS.

Methodology

The research has been done using qualitative and quantitative data. Qualitative data has been collected using group discussion and personal interviews of educators who teach IKS. To study, the researcher has collected quantitative data using two sets of questionnaires, one collecting responses from educators with Cronbach alpha of 0.784, and second collecting responses from students with Cronbach Alpha of 0.841. A mixed approach has been adapted to study the research problem, discussions and document analysis is used as a qualitative approach and questionnaire has been filled out by students and educators to analyze the perception of former and the latter.

Result

Responses from **students** include 107 responses from students across the various cities of Gujrat such as Surat, Ahmedabad, Vadodara, Surendra Nagar. Responses from **Educators** include 31 responses from various teachers from different cities across India, including different public and private colleges and universities.

It has been observed that 97.2% of students believe incorporating IKS into curriculum is valuable, whereas all educators favor this belief.

Focusing on Engagement and Interest, 74.7% of students found IKS lessons interesting, while 78% of teachers have observed an increment in engagement.

83.2% of students believe that IKS has helped them to improve their critical thinking, while 85% educators support their belief.

Among all the students, 89.7% of students believe that IKS had helped them enhance the understanding of cultural heritage, 78%of educators believe the same.

From the result, it is imperative that 92% of educators believe that IKS contributes to solving real world problems with the wisdom of ancient times, and this is also aligning with their career goals, where 74% id students share this vision.

68% of students found relevance of IKS in their holistic education, while 75% educators have agreed that IKS creates a balance between modern and traditional knowledge.

81% of students have shown interest in researching in the field of IKS, and 66% of students have observed that teaching methods are effective.

51.4% of students believe that they have enough material to read that is provided by college or university, and 82.9% of educators feel prepared to teach in lessons.

All of the responses show that both the students and educators favor the incorporation of IKS, but they firmly believe that there is immediacy of providing enough resources to learn and to prepare to teach.

Discussion

As (Gosh, 2022) says in her article, that IKS plays valuable part in a life of student. She describes the benefits of knowledge and wisdom that can be imparted through these lessons. The present study reveals that incorporating IKS will build an inclusive environment for students to promote ancient learning. This subject favor culturally inclusive education policies. The same has been discussed in the research report of (CONSTANCE, 2022), it has proved that indigenous Knowledge system helps to **conserve cultural heritage**, proving its relevance. The responses have revealed that interdisciplinary nature of IKS will help develop a broader knowledge base, establishing the research of (Muli, Nyambura, & Onyango, 2023), they discovered how usage of IK has helped Ogiek community live a sustainable life. Which proves that IKS helps bring a **diverse** and holistic approach to the education system. (UNESCO, 2024) has also documented various initiatives that enrich global education frameworks. Focusing on the **perspective of students**, the responses revealed, they could not fully comprehend the relevance of IKS, which shows that the educators and students are not on the same page regarding this. This may have happened because there are not enough impactful resources provided

to the teachers or students. The same has been discussed by (Hogarth, 2024) emphasizing on the need for targeted support and resources. The resources must meet the criterion of rationality. To consider **Educator's point of view**, the results clearly indicate their belief in the positive effect of implementing IKS into education system, however catering to the proverb "greater the cause, greater the responsibly", puts them in a spot, where they themselves does not have enough impactful resources to provide to. They believe that this can be eliminated by promoting more FDPs and training regarding the pedagogy of IKS.

Challenges

As stated above, incorporating IKS in the education system has many positive aspects but it comes with its fair share of drawbacks that needed to be addressed right away.

Apart from infrastructural challenges there are some issues that should be solved immediately.

The foremost thing that must be looked into is that by creating a vast and diverse curriculum, we might compromise with the depth of knowledge. There may be a chance that students only know the information about the subjects rather than an in-depth analysis of that subject. This must be looked into to carry on the objective of secular education system.

Another challenge that we are facing is Lack of expertise in the subject, which results into transmission of inadequate knowledge.

The entire policy lacks shared vision, the students and educators must share the vision of the new education policy, and this has not yet happened because of insufficient efforts regarding imparting correct information. If these challenges are not addressed properly, the future is at stake, the resources that has been employes to implement this policy, will be at waste.

Conclusion

To sum up everything that has been stated so far, there is substantial evidence and case studies that highlight the undeniable benefits of implementing IKS into the education system. However, the results depicted a perspicuous gap between the vision of NEP 2020 and its practical implementation. The students and educators often hold differing perspectives, which create challenges in alignment, this needs immediate attention to unlock the full potential of IKS. While Faculty Development Programs, training sessions and various orientation seminars are effective ways to bridge this gap, a more focused approach is needed. Despite the efforts, many ground level challenges are there to be addressed. The effective implementation of the NEP has the potential to develop students in a holistic manner, creating well-rounded individuals equipped with both modern knowledge and traditional wisdom. This integration will not only enrich the quality of education but will ultimately lead to enhanced employment opportunities, contributing to a more inclusive, sustainable future.

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Environmental Sustainability in Indian Society: Harnessing Indigenous Knowledge and Cultural Practices

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Abstract

Environmental sustainability in India is deeply connected to its rich cultural heritage and Indigenous knowledge systems. These systems, rooted in centuries of wisdom, emphasize living in harmony with nature. Practices such as sacred groves (*Devrai*), traditional water harvesting systems like *johads* and step wells, and organic farming methods show how ancient communities coexisted sustainably with their environment. Indian cultural and religious practices, such as the Bishnoi community's conservation ethos and eco-friendly festivals, offer timeless lessons for modern environmental challenges.

This study explores the interplay between Indian society, culture, and sustainability, emphasizing the relevance of Indigenous practices in addressing current environmental crises. The methodology combines a review of historical practices, an analysis of case studies such as the Bishnoi community and Sikkim's organic farming success, and an evaluation of governmental policies like the Green India Mission and *Jal Shakti Abhiyan*.

The findings reveal that integrating traditional knowledge with modern science can create sustainable solutions for water conservation, agriculture, and urban planning. Policy innovations and community participation are critical to achieving this integration. Additionally, educating future generations about these practices through culturally rooted environmental education can foster a sustainable mindset.

This paper's findings focus on India's Indigenous wisdom as a guiding framework for sustainable development. By blending this heritage with contemporary tools, India can not only address its environmental challenges but also set an example for global sustainability.

Keywords: Environmental Sustainability, Indigenous Knowledge, Indian Culture,

Traditional Practices, Biodiversity, Sacred Groves, Water Conservation, Sustainable Development, Government Policies, Community Participation.

Introduction

Environmental sustainability has always been intrinsic to Indian society, reflected in its philosophical and cultural principles. Ancient texts like the Atharva Veda and practices such as Ahimsa (non-violence) advocate respect for nature (Gadgil & Guha, 1992). India's cultural heritage is replete with examples of sustainable living, where nature is revered as a divine entity. This paper explores how these values, coupled with Indigenous practices, can address modern sustainability challenges. It also examines the role of government policies in integrating traditional knowledge into contemporary environmental frameworks. By synthesizing ancient wisdom with modern technology and policy, India can pave the way for a sustainable future.

Indigenous Knowledge and Environmental Sustainability

Sacred Groves and Biodiversity Conservation

Sacred groves, or Devrai, are patches of forest preserved for religious reasons, especially in states like Maharashtra and Kerala. These groves are dedicated to local deities and are protected by communities through strict cultural norms. They act as biodiversity hotspots, protecting flora and fauna critical to the ecosystem (Bhagwat & Rutte, 2006). Sacred groves are often the last refuge for endangered species and play a crucial role in supporting ecological balance. For example, the Khasi and Jaintia tribes in Meghalaya have preserved sacred groves that harbour rare medicinal plants and wildlife. These groves also serve as natural water reservoirs, recharging groundwater and preventing soil erosion. The cultural and spiritual significance of sacred groves ensures their protection, making them a unique model of community-driven conservation.

Water Harvesting Techniques

Traditional water management systems like johads in Rajasthan and stepwells have been effective in combating water scarcity. Johads are small earthen check dams that capture and store rainwater, while stepwells are intricate structures designed to store and manage water in arid regions. The revival of these systems, as seen in Alwar, Rajasthan, has rejuvenated groundwater levels and fostered sustainable agriculture (Agarwal & Narain, 1997). For instance, the Tarun Bharat Sangh, a non-governmental organization, has successfully revived over 8,000 johads in Alwar, transforming the

region from a drought-prone area to a water-sufficient one. These systems exemplify the ingenuity of ancient engineering and its relevance in addressing modern water crises.

Agricultural Wisdom

Indigenous agricultural practices like mixed cropping, crop rotation, and the use of organic fertilizers such as panchgavya (a mix of cow-based products) reflect an understanding of soil health and ecological balance (Altieri, 2004). Mixed cropping involves growing two or more crops simultaneously on the same land, which reduces pest infestations and improves soil fertility. Crop rotation prevents soil degradation by alternating crops with different nutrient requirements. Panchgavya, a traditional organic fertilizer, enhances soil fertility and promotes plant growth without the harmful effects of chemical fertilizers. These practices minimize environmental impact while ensuring food security and sustainable livelihoods for farmers.

Festivals Promoting Environmental Harmony

Indian festivals like Van Mahotsav (Tree Planting Festival) and the practice of immersing clay idols during Ganesh Chaturthi align spiritual practices with ecological well-being. Van Mahotsav, started in 1950, encourages tree plantation and environmental awareness. During Ganesh Chaturthi, the use of clay idols instead of plaster of Paris reduces environmental pollution. Such traditions reinforce the cultural ethos of sustainability and community participation (Sinha, 2010). These festivals serve as platforms for educating the public about environmental conservation and fostering a sense of collective responsibility.

Cultural Practices and Environmental Ethics

Reverence for Nature

Hinduism, Buddhism, Jainism, and other Indian religions emphasize the interconnectedness of life. For instance, the concept of Prakriti (nature) in Hinduism underscores its divine essence, advocating sustainable interaction with the environment (Chapple, 1998). The Bhagavad Gita and Upanishads highlight the importance of living in harmony with nature. Similarly, Jainism's principle of Ahimsa (non-violence) extends to all living beings, promoting compassion and respect for the environment. These philosophies provide a moral framework for environmental stewardship, encouraging individuals to adopt sustainable lifestyles.

Indigenous Craftsmanship and Sustainability

Traditional crafts such as handloom weaving, pottery, and bamboo work are inherently sustainable, relying on natural materials and minimizing waste. For example, handloom weaving uses organic dyes and manual techniques, reducing energy consumption and carbon emissions. Bamboo crafts, prevalent in Northeast India, use a fast-growing and renewable resource. These crafts also support local economies, aligning sustainability with social equity (UNESCO, 2003). By promoting traditional crafts, India can preserve its cultural heritage while fostering sustainable development.

Folklore and Oral Traditions

Stories like the Bishnoi community's sacrifice to protect trees in Rajasthan instill environmental ethics, passing them to successive generations (Gadgil & Guha, 1992). The Bishnoi community's legendary act of protecting khejri trees during the 18th century is a testament to their deep-rooted environmental values. Similarly, tribal folklore often includes narratives about the importance of conserving forests and wildlife. These narratives serve as powerful tools for environmental education and advocacy, bridging the gap between traditional knowledge and modern conservation efforts.

Government Policies Leveraging Indigenous Knowledge

National Mission for Green India

Part of India's National Action Plan on Climate Change (NAPCC), this mission emphasizes afforestation using native species and engaging local communities (MoEFCC, 2010). The mission aims to increase forest cover, enhance biodiversity, and improve ecosystem services. By involving local communities in afforestation activities, the mission ensures the sustainability of these efforts.

Protection of Sacred Groves

The Biological Diversity Act, 2002, recognizes the significance of sacred groves and supports their conservation through community involvement (Government of India, 2002). The act mandates the establishment of Biodiversity Management Committees (BMCs) at the local level to conserve sacred groves and other biodiversity-rich areas.

Revival of Traditional Water Management Systems

Programs like Jal Shakti Abhiyan focus on rejuvenating traditional water bodies, integrating ancient wisdom with modern techniques to combat water stress (Ministry of Jal Shakti, 2019). The campaign emphasizes rainwater harvesting, watershed

development, and the restoration of traditional water structures like stepwells and tanks.

Promotion of Organic Farming

The Paramparagat Krishi Vikas Yojana (PKVY) encourages organic farming practices inspired by traditional methods, aiming to reduce chemical dependence and enhance soil health (Government of India, 2015). The scheme promotes cluster-based organic farming and provides financial assistance to farmers for adopting organic practices.

Case Studies

The Bishnoi Community

The Bishnoi community in Rajasthan exemplifies environmental stewardship. Their religious beliefs mandate the conservation of animals and trees, creating a model of sustainable living (Gadgil & Guha, 1992). The community's efforts to protect wildlife and forests have earned them recognition as pioneers of environmental conservation.

Traditional Water Systems in Gujarat

The vav (stepwells) of Gujarat not only served as water storage systems but also fostered architectural and cultural integration. The revival of these structures has enhanced water availability in arid regions (Livingston, 2002). Stepwells like Rani ki Vav are now UNESCO World Heritage Sites, showcasing the blend of functionality and artistry in traditional water systems.

Sustainable Living in Sikkim

Sikkim's transition to a fully organic farming state displays how traditional agricultural practices can be scaled for modern needs while maintaining ecological balance (Tamang et al., 2020). The state's organic mission has improved soil health, increased farmer incomes, and reduced environmental pollution.

The Need and Requirements for the Future

Integrating Indigenous Knowledge with Modern Science

A fusion of traditional wisdom and modern technology is essential. For example, GIS mapping can complement traditional water harvesting techniques (Kumar et al., 2018). Integrating Indigenous knowledge with scientific research can lead to innovative solutions for environmental challenges.

Policy Support for Community-Led Initiatives

Government policies must incentivize community-led conservation practices, ensuring active local participation (Berkes, 2009). Policies should focus on capacity building, financial support, and legal recognition for community-based conservation efforts.

Environmental Education Rooted in Culture

Incorporating traditional ecological knowledge into school curricula can instill sustainability values from an early age (UNESCO, 2003). Educational programs should emphasize the cultural and ecological significance of Indigenous practices.

Sustainable Urbanization

Indigenous techniques such as green roofs and mud-based architecture can inspire sustainable urban planning in India's growing cities (Rao, 2015). Urban development policies should prioritize green spaces, energy-efficient buildings, and waste management systems inspired by traditional practices.

Conclusion

Indian society and culture provide a wealth of Indigenous knowledge that aligns with modern sustainability goals. Sacred groves, traditional agriculture, and water conservation techniques show timeless wisdom. By integrating these practices with contemporary policies and technologies, India can lead the global movement towards environmental sustainability. Leveraging this heritage is not only a necessity but also an ethical responsibility to ensure a harmonious future.

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Developing Mindfulness while Learning the English Language

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ABSTRACT:

The idea of mindfulness and how it might be applied to foreign language (FL) instruction to enhance the well-being of both teachers and students has attracted increasing attention. Mindfulness is a new practice in FL education that can be utilized to improve learning conditions by transforming negative arousal in the language classroom in a positive way. In order to create a less stressful learning environment and influence the conscious regulation of reactions to events occurring in a language classroom, mindfulness can be incorporated into FL teaching and learning. However, FL teachers might not be familiar with mindfulness or realize it in practice, so they need help figuring out how to use it in their particular teaching environments. This idea led to the development of this paper, which discusses strategies for fostering mindfulness in learning languages in classrooms and summarizes the most recent findings from mindfulness research in language education. For this reason, in addition to mindfulness exercises for the improvement of language abilities, several activities are recommended, such as breathing techniques and meditation techniques, to help teachers cultivate a thoughtful attitude. Additionally, this research emphasizes the significance of incorporating mindfulness into FL teacher education and offers insight into mindfulness-based language teaching with noteworthy implications to enhance FL teaching/learning situations.

KEYWORDS:

Mindfulness, English as a Foreign Language

INTRODUCTION:

Mindfulness, rooted in ancient Eastern traditions like Buddhism, has gained significant traction in contemporary society as a potent tool for enhancing mental clarity, emotional well-being, and overall quality of life. Its application extends far beyond the realms of

meditation and spirituality, finding relevance in various modern contexts, including education. Particularly in the realm of learning English as a foreign language (EFL), mindfulness offers a plethora of advantages, contributing to a more effective, enjoyable, and holistic learning experience.

At its core, mindfulness involves cultivating heightened awareness of the present moment, coupled with an attitude of non-judgmental acceptance toward one's experiences. In the context of language acquisition, this entails focusing on language learning activities with full attention and openness, without dwelling on past mistakes or worrying about future challenges. By fostering a sense of presence and acceptance, mindfulness can significantly enhance comprehension, retention, and linguistic sensitivity among learners.

Moreover, mindfulness practices can serve as powerful tools for managing stress and anxiety commonly associated with language learning. Techniques such as deep breathing exercises, guided relaxation, and mindful meditation can help learners alleviate tension, improve focus, and enhance their overall enjoyment of the learning process. By incorporating these practices into language instruction, educators can create a more supportive and conducive learning environment, where students feel empowered to engage with the material more deeply and authentically. When it comes to language acquisition, this can support a growth mindset in which students see hurdles as chances to get better rather than as barriers to overcome (ZanESCO, A. P. et al. 2016)

Furthermore, mindfulness promotes clear communication and attentive listening, essential skills for effective language acquisition. By encouraging students to be fully present in their interactions with the language, mindfulness cultivates a deeper understanding of linguistic nuances, including vocabulary, syntax, and pronunciation. Through mindful listening exercises, learners develop the ability to discern subtle differences in pronunciation and intonation, thereby improving their comprehension and communication skills.

Additionally, mindfulness fosters a growth mindset, wherein learners view challenges as opportunities for growth and development rather than insurmountable obstacles. By cultivating a mindset of curiosity, openness, and resilience, mindfulness empowers learners to approach language learning with a sense of enthusiasm and curiosity, leading to greater motivation and persistence in the face of difficulties.

Incorporating mindfulness into EFL instruction can take various forms, ranging from short mindfulness activities integrated into language lessons to dedicated mindfulness sessions focused on language learning. Activities such as mindful breathing exercises, listening comprehension exercises, and reflective journaling can be seamlessly integrated into existing language curriculum, enriching the learning experience and promoting holistic development.

Overall, mindfulness offers a comprehensive approach to language learning that addresses both the cognitive and emotional aspects of the learning process. By fostering greater self-awareness, emotional regulation, and linguistic sensitivity, mindfulness empowers learners to develop a deeper connection with the language and culture they are studying, leading to more meaningful and authentic language acquisition experiences. Therefore, integrating mindfulness into English language learning in India and beyond can be highly beneficial, paving the way for a more mindful, effective, and enjoyable approach to language acquisition. Learners can discover new avenues for comprehension, communication, and enjoyment of the rich diversity of the English language by adopting a mindful approach to language learning (Reimers, F. M. et. al.,2022)

The following are some ideas for incorporating mindfulness into your English language learning process:

1. Spend a few minutes breathing mindfully at the beginning of each English study session. As you carefully inhale and exhale, pay attention to your breath. This can aid in mental relaxation and improve focus.
2. Make an effort to be totally present in the moment as you study English. Stay focused on the thing you are studying, whether it is reading comprehension, grammar, or vocabulary, and avoid distractions.
3. Engage in focused listening while honing your language skills. Whether you're listening to podcasts, recorded conversations, or native speakers, pay close attention to the subtleties and sounds of the language. This can improve your ability to understand words.
4. Focus on the words that are written on the page when reading English literature. Be mindful of word definitions, phrase constructions, and the message's overall

meaning. Don't rush through; instead, take your time to comprehend the material.

5. Pay attention to the words you use and how you pronounce them when speaking English. By practising, you can get better at speaking English aloud.
6. When engaging in writing activities, practice mindfulness. Be mindful of your word choice, sentence construction, and grammar. With a concentrated mind, go over your work again, making corrections and enhancing clarity.
7. Choose a few new words to concentrate on each day rather than trying to learn a lot of terms at once. Incorporate them thoughtfully into your writing and discussions. Improved usage and retention may result from this strategy.
8. Make time to reflect on your progress in learning a language. No matter how tiny, celebrate your accomplishments and think about how you can do better. Thinking critically promotes optimism and never-ending education.
9. Set aside certain times for practicing your English, and go into each session with awareness. Participate completely in the learning process by practicing your speaking, listening, and reading skills.
10. Look into tools or applications that might help you practice mindfulness and meditation. In addition to your English language studies, these resources can assist you in creating a consistent mindfulness practice.

Your concentration, understanding, and general language proficiency may all be improved by including mindfulness in your English language study regimen. It all comes down to putting your all into the process and enjoying the voyage of learning a new language.

Review Of Literature

In 2024, Alba Fano-Trabanco's research study, it focused on connecting mindfulness practices with second language (L2) teaching. Initially centered on L2 learners' benefits, research from the early 2020s explored mindfulness's impact on L2 teachers, including its influence on relationships, identity, and motivation. Some teachers hesitated to integrate mindfulness, but interest in its potential for enhancing well-being and job performance grew. The research highlighted varied opinions among L2 teachers and suggested mindfulness as a valuable addition to language education for teachers, learners, and administrators.

In 2022, Trojan highlights the importance of incorporating mindfulness strategies into English as a Second Language (ESL) instruction to improve the learning experience for non-native English speakers. This approach is particularly relevant in transnational settings, where English language teaching requires critical attention. Mindfulness strategies involve explicit instruction of word function and components using slides and independent research on each system. This aligns with foreign and classical language instruction commitments and promotes healthy transitions for students. Mindfulness strategies can also reduce occupational stress for both students and instructors through new techniques and cognitive behavioural therapy.

In 2021, Ergas emphasised mindfulness in the book "Mindfulness and the Quiet Revolution in Education" highlighting the transformative potential of mindfulness in education, highlighting its impact on student learning and classroom behaviour. It calls for large-scale empirical investigations to evaluate school-integrated mindfulness programs, emphasizing the need for experiential understanding and qualitative studies on young people's experiences.

In 2017, K. Nivenitha found that mindfulness, metacognition, and self-regulated learning significantly impact academic performance among adolescents. Mindfulness positively affects academic self-regulation, while test anxiety and mindfulness also influence academic achievement. Self-regulated learning strategies also positively affect academic achievement. Overall, these findings suggest that mindfulness, metacognition, and self-regulated learning are crucial factors in enhancing academic performance among adolescents.

Methodology – Thematic Analysis

The methodological approach of this research paper is predominantly conceptual and literature-based, aiming to explore the integration of mindfulness practices into English language learning. The paper utilizes thematic content analysis to identify key themes from existing research and practices that demonstrate the role of mindfulness in enhancing language acquisition.

This study adopts a conceptual and literature-based approach to explore the integration of mindfulness practices into English language learning. Various dimensions of mindfulness are examined to understand its impact on language acquisition, emotional regulation, cognitive development, and overall linguistic proficiency.

One major focus is on mindfulness as an effective pedagogical tool. Practices such as breathing techniques, meditation, focused listening, and reflective journaling are considered essential in creating a positive and supportive learning environment. These exercises are designed to enhance vocabulary acquisition, grammar retention, and overall language proficiency while improving communication skills and pronunciation. The cognitive benefits of mindfulness form another key area of exploration. By improving attention, concentration, and memory, mindfulness supports the retention and recall of vocabulary and language structures. Learners develop cognitive flexibility, enabling them to adapt more effectively to complex linguistic environments and diverse communication situations.

Emotional regulation emerges as a significant aspect, where mindfulness helps reduce language anxiety and build emotional resilience. By lowering stress levels and fostering a non-judgmental attitude, learners feel more confident and less fearful of making mistakes, resulting in more active participation and engagement in learning activities.

The role of mindfulness in enhancing motivation and self-awareness is also emphasized. Regular mindful practices nurture intrinsic motivation, helping learners stay committed to their goals even when faced with challenges. It also fosters metacognitive awareness, allowing learners to reflect on their progress, celebrate achievements, and identify areas for improvement.

Additionally, the study highlights the holistic impact of mindfulness on language skills development. Speaking, listening, reading, and writing are all positively influenced, as mindfulness enhances comprehension, linguistic sensitivity, and authentic communication abilities.

To translate these findings into practice, the paper proposes integrating mindfulness activities into language instruction. Suggested exercises include mindful breathing, reflective journaling, focused reading, and the use of digital tools or apps that support mindfulness habits. Regular reflection and conscious engagement with learning tasks further strengthen language proficiency and learner well-being.

Overall, this methodological framework aims to assess the impact of mindfulness on vocabulary and grammar learning, cognitive focus, emotional resilience, motivation, communication skills, and holistic language development. It provides a foundation for

future empirical studies while offering practical strategies for incorporating mindfulness into English language education.

Conclusion

In conclusion, integrating mindfulness practices into English language learning offers a promising and holistic approach to enhancing both the cognitive and emotional aspects of language acquisition. Mindfulness not only aids in improving vocabulary retention, grammar mastery, and overall linguistic proficiency but also fosters emotional resilience, reduces language anxiety, and strengthens motivation among learners.

By promoting focused attention, metacognitive awareness, and cognitive flexibility, mindfulness enables learners to engage more deeply with the language learning process. It creates a positive and supportive learning environment where students can embrace challenges as opportunities for growth rather than obstacles. Moreover, mindfulness enhances essential communication skills such as listening, speaking, and pronunciation, contributing to more authentic and confident language use.

This study highlights the importance of incorporating mindfulness techniques like breathing exercises, reflective journaling, and mindful listening into language instruction. Such practices not only benefit learners but also support teachers in creating a more empathetic and effective teaching atmosphere.

Future research can further explore the empirical impacts of mindfulness on language proficiency, long-term memory, and real-world communication skills. Overall, embracing mindfulness in English language education opens new pathways for a more engaging, enjoyable, and successful learning experience.

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<https://doi.org/10.1037/cns0000082>

Age, Authority and Adaptability in *The Knockoff*: Communication and Power for NEP 2020's Goals

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Abstract:

This paper explores the themes of age, authority and adaptability in Lucy Sykes and Jo Piazza's novel *The Knockoff*, focusing on its depiction of workplace communication and power dynamics in a digitally transforming environment. The study examines how generational conflicts, resistance to technological change and the eventual triumph of adaptability are portrayed, offering insights into contemporary workplace challenges. These themes are analysed through the lens of the National Education Policy 2020 (NEP 2020), which emphasizes multidisciplinary education, adaptability and real-world skill development to prepare students for the future.

By conducting a thematic analysis of the novel, the paper identifies key lessons in leadership, communication and collaboration that align with NEP 2020's goals. The research highlights how literature like *The Knockoff* can serve as an educational tool for teaching adaptability, teamwork and conflict resolution, bridging the gap between academic theory and professional practice. Furthermore, the study underscores the importance of addressing generational divides and technological challenges in both educational and professional contexts.

This paper advocates for integrating workplace literature into multidisciplinary curricula, demonstrating its potential to enhance NEP 2020's vision of holistic and future-ready education. The findings suggest actionable insights for using fiction to prepare students for dynamic, real-world environments.

1 Introduction

1.1 Context and Relevance

Workplace communication and power dynamics are vital areas of research, especially in the context of rapidly evolving professional environments characterized by generational diversity and technological innovation. The ability to navigate age-related

conflicts, authority struggles and adaptability challenges has become essential for sustaining productive and collaborative workplaces. Studies on workplace generational dynamics, such as those by Parry and Urwin (2011), highlight how differences in values, communication styles and adaptability between generations can result in tensions or opportunities for growth.

Lucy Sykes and Jo Piazza's novel *The Knockoff* offers a compelling fictional exploration of these dynamics. Set in the context of a traditional fashion magazine undergoing a digital transformation, the novel focuses on Imogen Tate, a Baby Boomer editor-in-chief and Eve Morton, her ambitious millennial subordinate. The generational clash between Imogen and Eve underscores how authority is negotiated and challenged, while also emphasizing the critical role of adaptability in the face of rapid technological change. As organizations increasingly adopt digital tools, themes such as those portrayed in the novel reflect the lived experiences of professionals today, as corroborated by studies like those by Cennamo and Gardner (2008), which examine generational differences in workplace values.

Moreover, literature often serves as a mirror to societal and workplace transformations. As noted by Eagleton (2011), fiction provides a valuable lens through which we can analyse human behaviours and social structures. *The Knockoff*, therefore, not only captures the essence of modern workplace challenges but also offers insights that can inform educational practices aimed at addressing these complexities.

1.2 Connection to NEP 2020

The National Education Policy 2020 (NEP 2020) emphasizes the need to align education with the demands of the 21st-century workforce. It advocates for a multidisciplinary approach that fosters critical thinking, adaptability and effective communication, all of which are vital for navigating professional environments shaped by generational diversity and technological disruptions. According to the policy document, "students must be equipped with the necessary skills to handle new challenges and opportunities brought about by globalization and technological advancements" (NEP 2020, Chapter 11).

The themes explored in *The Knockoff*—generational conflict, authority negotiation and the necessity of adaptability—align directly with NEP 2020's focus on fostering leadership, collaboration and problem-solving abilities. For example, Imogen's struggle to adapt to a tech-driven workplace reflects the policy's emphasis on lifelong learning

and upskilling, as highlighted by Subramanian (2020), who discusses NEP's role in preparing students for future-ready workplaces. Additionally, Eve's challenge to traditional authority structures underscores the importance of teaching communication and negotiation skills, which NEP 2020 identifies as essential components of holistic education.

Integrating workplace-oriented literature like *The Knockoff* into educational curriculum offers a practical means of achieving NEP 2020's goals. Literature allows students to engage with real-world scenarios in a simulated environment, promoting critical thinking and adaptability. This aligns with the findings of Mehta and Kapoor (2021), who emphasize the value of using case studies and literature to bridge the gap between theory and practice in multidisciplinary education.

1.3 Research Objectives

The objectives of this research are twofold.

- 1. Analyse the portrayal of age, authority and adaptability in *The Knockoff*:**

The novel's narrative provides a rich case study of how generational divides influence power dynamics and communication within a professional setting. Drawing on the interactions between Imogen and Eve, this research investigates the challenges of negotiating authority and the role of adaptability in maintaining professional relevance. The insights align with studies like those by Twenge et al. (2010), which explore generational differences in workplace adaptability and attitudes toward leadership.

- 2. Explore the alignment of *The Knockoff* with NEP 2020's goals:**

NEP 2020 emphasizes fostering skills such as leadership, communication and adaptability to prepare students for the future workforce. By analysing *The Knockoff*, this research demonstrates how the novel's themes can serve as educational tools for developing these competencies. For instance, Imogen's journey of transformation offers a template for teaching resilience and continuous learning, as advocated by NEP 2020 (Chapter 4). Furthermore, Eve's ambitious yet flawed approach to leadership highlights the complexities of generational collaboration, a critical area for multidisciplinary education.

2. Literature Review

2.1 Workplace Communication and Power Dynamics

Generational differences in communication and power dynamics have become an

increasingly significant area of workplace research. These dynamics arise from distinct generational characteristics shaped by social, cultural and technological experiences. Baby Boomers (1945–1964) are often associated with hierarchical workplace structures, loyalty and a preference for direct communication, while Generation X (1965–1980) values independence and work-life balance. Millennials (1981–1996) and Gen Z (1997–2012), on the other hand, favour collaboration, digital communication and flexibility (Twenge et al., 2010)

These generational traits influence perceptions of authority and communication effectiveness. Studies by Parry and Urwin (2011) argue that older generations often struggle to adapt to the informal, tech-driven communication styles preferred by younger employees. This tension is evident in Lucy Sykes and Jo Piazza's *The Knockoff*, where Imogen Tate, a Baby Boomer, faces challenges asserting her authority against Eve Morton, a Millennial, whose tech-savvy approach gives her a competitive edge.

Digital transformation exacerbates these generational divides by redefining traditional power structures. Younger generations, equipped with digital fluency, often bypass hierarchical channels, while older employees may perceive such behaviour as undermining established norms (Frontiers, 2021)

Workplace adaptability, as explored by Roberto and Biggan (2014), becomes a critical factor in maintaining productivity and harmony across generational lines.

2.2 Literature Representation of Workplace Dynamics

Literature has long served as a lens for exploring workplace dynamics, offering nuanced perspectives on generational conflicts, adaptability and the shifting nature of power. Contemporary novels such as *The Knockoff* provide a fictional framework for understanding real-world workplace issues. The novel mirrors challenges faced by organizations adapting to digital transformation, emphasizing themes of resistance to change, intergenerational conflicts and the erosion of traditional authority structures.

Other works like *The Circle* by Dave Eggers critique the rise of surveillance and digital ethics in the workplace, while *Then We Came to the End* by Joshua Ferris examines groupthink and the psychological toll of professional environments. While each novel focuses on different aspects of workplace culture, they collectively underscore the evolving nature of authority, adaptability and communication in professional settings (Eagleton, 2011)

Comparing these works to *The Knockoff*, we find a common theme of adaptability as a

survival mechanism in modern workplaces. Sykes and Piazza, however, uniquely emphasize the role of generational conflict in navigating digital disruption. Imogen's struggle to maintain her leadership highlights the importance of lifelong learning and adaptability, reinforcing findings by Twenge et al. (2010) that adaptability is a critical skill for workplace success.

2.3 NEP 2020 and Multidisciplinary Learning

The National Education Policy 2020 (NEP 2020) seeks to transform education by emphasizing multidisciplinary approaches, critical thinking and real-world skill development. The policy advocates for the integration of experiential learning and problem-solving into curricula, preparing students to thrive in dynamic, technology-driven professional environments (NEP 2020, Chapter 4)

Workplace-oriented literature like *The Knockoff* aligns with NEP 2020's objectives by providing a context for teaching adaptability, communication and conflict resolution. As noted by Subramanian (2020), NEP 2020 encourages the use of case studies and real-world scenarios to enhance student learning. By analysing themes from novels, educators can bridge the gap between theoretical knowledge and professional practice. For example, Imogen's journey of adapting to a digital-first workplace exemplifies NEP 2020's emphasis on lifelong learning and adaptability.

Mehta and Kapoor (2021) further highlight the value of literature in fostering empathy, cultural awareness and leadership skills. Using *The Knockoff* as an educational tool allows for interdisciplinary learning, combining insights from organizational behaviour, generational studies and literary analysis. This approach supports NEP 2020's vision of equipping students with the critical competencies needed for future workplaces

In conclusion, integrating workplace literature into NEP 2020's multidisciplinary framework offers a transformative approach to education. It prepares students to navigate generational diversity, digital transformation and shifting power dynamics, making them future-ready professionals.

3. Methodology

3.1 Research Design

As a research scholar, I employ a qualitative and interdisciplinary research design to explore the themes of age, authority and adaptability in Lucy Sykes and Jo Piazza's *The Knockoff*. A qualitative approach enables a deep and nuanced analysis of the novel's

portrayal of workplace dynamics, focusing on the intricate conflicts and transformations of the characters. Qualitative research allows me to understand how generational conflict and adaptability are woven into the narrative, reflecting real-world professional environments (Creswell & Poth, 2018).

The interdisciplinary nature of the research integrates literary analysis, which examines the narrative structure and character development in *The Knockoff*, with educational theory, particularly the goals outlined in the National Education Policy 2020 (NEP 2020). By bridging these disciplines, I aim to contextualize the novel's insights within NEP 2020's emphasis on holistic education, fostering skills such as critical thinking, adaptability and leadership (NEP 2020, Chapter 4). This design demonstrates how literature can serve as an innovative tool for teaching workplace skills and preparing students for real-world challenges, as suggested by Subramanian (2020).

3.2 Data Sources

Primary Data

The primary source of this study is *The Knockoff*, which is subjected to close reading, a methodological approach commonly used in literary analysis. Close reading focuses on:

- **Key Interactions:** The conflicts between Imogen Tate and Eve Morton, which depict generational tension and shifts in authority.
- **Adaptability:** Imogen's struggle and eventual transformation as she learns to embrace digital innovation, highlighting the importance of resilience and continuous learning.
- **Power Dynamics:** Examination of how Eve's tech-savviness challenges traditional hierarchies, aligning with Hofstede's (2001) power distance theory.

Secondary Data

The analysis is supported by a range of academic sources that provide a theoretical framework for interpreting the novel's themes:

1. **Workplace Communication Theories:**
 - Parry and Urwin's (2011) research on generational differences offers insights into how age impacts workplace communication and behaviour. Their study informs my analysis of Eve's modern, digital-first approach and Imogen's traditional, hierarchical leadership style.
 - Twenge et al. (2010) highlight the growing importance of adaptability and collaboration in the workplace, particularly among younger generations. These theories provide

context for the power struggles depicted in the novel.

2. NEP 2020 Documentation:

- The National Education Policy 2020 emphasizes experiential learning and multidisciplinary education. I reference NEP 2020 to align the novel's lessons with the policy's goals of fostering adaptability, leadership and critical thinking (NEP 2020, Chapter 11).
- Subramanian (2020) reinforces the importance of integrating real-world scenarios into education, supporting my argument for using *The Knockoff* as a pedagogical tool.

3. Generational Studies:

- Lyons and Kuron (2014) explore how technology-driven workplace environments challenge traditional generational roles, offering a lens to understand Eve's dominance and Imogen's struggle.

3.3 Hofstede's (2001) cultural dimensions theory, particularly the power distance index, provides a framework for analysing how hierarchical authority is challenged and reshaped in the novel.

3.4 Analytical Framework

The study employs a thematic analysis approach to identify and interpret recurring themes in *The Knockoff*. Thematic analysis is a flexible qualitative method that is particularly effective in uncovering patterns related to workplace dynamics, making it ideal for this study (Braun & Clarke, 2006).

Steps in the Analytical Process:

1. Identifying Themes:

- Through close reading, I identify key themes such as generational conflict, adaptability and the redefinition of power structures. For instance, I focus on Eve's assertive approach to implementing digital transformation and Imogen's journey toward embracing change.

2. Contextualizing Findings with Workplace Communication Theories:

- The identified themes are interpreted using workplace theories. For example, Parry and Urwin's (2011) generational framework helps explain the underlying tensions between Imogen and Eve, while Hofstede's (2001) power distance theory provides insights into the shifting dynamics of authority.

3. Aligning with NEP 2020 Principles:

- The findings are aligned with NEP 2020's objectives of fostering adaptability, leadership and collaboration. Imogen's transformation serves as a case study for teaching these competencies. For instance, her journey reflects NEP 2020's emphasis on lifelong learning and adaptability as critical skills for future-ready professionals (NEP 2020, Chapter 4).

4. Analysis

4.1 Age and Generational Conflict

The interactions between Imogen Tate and Eve Morton in *The Knockoff* highlight generational conflict within professional settings, serving as a microcosm of broader workplace challenges. Imogen, representing the Baby Boomer generation, adheres to traditional values of leadership such as hierarchical authority, structure, and reliance on experience. In contrast, Eve, as a Millennial, prioritizes technological fluency, rapid innovation, and informal communication, creating a clash of values that disrupts conventional power dynamics.

As Parry and Urwin discuss, generational differences in the workplace often manifest through conflicting values and expectations, with Millennials favoring collaborative environments and digital tools over rigid hierarchical systems (Parry and Urwin 79).

Eve's emphasis on

efficiency and innovation challenges Imogen's reliance on legacy methods, exemplifying this tension. Such intergenerational clashes often lead to the questioning of traditional norms and the redefinition of authority.

However, conflict stemming from these differences can foster mutual growth if managed constructively. Lyons and Kuron argue that generational workplaces benefit from integrating diverse perspectives, as this diversity encourages cross-generational learning and adaptability (Lyons and Kuron S139). Imogen's eventual willingness to learn from Eve's tech-first approach illustrates the potential for generational conflict to drive professional development. Moreover, her transformation aligns with Hofstede's concept of power distance, which explains how younger employees often challenge traditional authority structures to foster collaboration and innovation (Hofstede 45).

Imogen's experience also underscores the broader organizational lesson that adaptability to generational and cultural shifts is essential for sustaining relevance. Through her transformation, *The Knockoff* demonstrates the necessity of leveraging

generational diversity as a resource for innovation, rather than viewing it as a barrier.

4.2 Digital Transformation and Adaptability

The digital transformation depicted in *The Knockoff* underscores the critical importance of adaptability in modern professional environments. Initially resistant to Eve's tech-driven overhaul of the magazine, Imogen's struggles mirror those faced by older professionals navigating the demands of rapidly changing technological landscapes. Twenge et al. highlight the increasing importance of adaptability as a professional competency in technology-driven workplaces, particularly for individuals accustomed to traditional workflows (Twenge et al.

113).

Imogen's journey of embracing digital tools exemplifies the concept of lifelong learning. Her eventual adoption of social media platforms, data-driven decision-making, and digital collaboration tools illustrates resilience and a willingness to upskill—qualities essential for survival in digitally evolving organizations. This transformation also reflects NEP 2020's emphasis on fostering adaptability and interdisciplinary learning among students to prepare them for such challenges (National Education Policy 2020).

Moreover, the novel explores how digital transformation reshapes power structures within organizations. Eve's technological expertise initially gives her a strategic advantage over Imogen, illustrating the growing dominance of digital fluency in determining authority.

However, as Imogen learns to integrate these tools into her leadership, she reclaims her role, demonstrating the importance of hybrid strategies that combine traditional experience with technological innovation. This aligns with the findings of Lyons and Kuron, who emphasize the value of balancing generational strengths to enhance workplace outcomes (Lyons and Kuron S140).

Imogen's story thus serves as a case study for understanding the personal and organizational impact of digital transformation. Her narrative offers practical insights into how adaptability can be cultivated and how technological disruption, rather than being a threat, can act as a catalyst for growth.

4.3 Power and Communication Dynamics

The power dynamics in *The Knockoff* are deeply intertwined with communication styles, reflecting generational and technological divides. Eve's preference for digital

communication tools—emails, social media, and instant messaging—contrasts sharply with Imogen's reliance on face-to-face interactions and formal protocols. This difference underscores generational trends, as younger professionals prioritize speed, efficiency, and flexibility in communication, often challenging the slower, more hierarchical methods preferred by older generations (Parry and Urwin 90).

Hofstede's theory of power distance provides a framework for analyzing this dynamic, as Eve's low-power-distance approach emphasizes informal collaboration and decentralization of authority (Hofstede 38). Her use of digital tools enables her to bypass traditional hierarchies, effectively positioning herself as a leader in the magazine's digital transformation. This creates tension, as Imogen initially struggles to assert her authority within this new, tech-dominated environment.

However, the novel also demonstrates how communication styles can evolve to bridge generational gaps. Imogen's eventual adoption of digital tools allows her to reestablish her leadership through a hybrid communication strategy that combines traditional and modern methods. This transformation aligns with Lyons and Kuron's findings that effective communication strategies can mitigate generational conflicts, fostering collaboration and mutual respect (Lyons and Kuron 140).

Furthermore, the psychological impact of shifting communication dynamics is evident in Imogen's journey. Her initial discomfort and feelings of inadequacy are replaced by a sense of empowerment as she gains confidence in her ability to navigate digital platforms. This progression highlights the transformative potential of adaptability, particularly in rebalancing power dynamics disrupted by technological change.

4.4 Alignment with NEP 2020 Goals

The themes of leadership, communication, and adaptability in *The Knockoff* align closely with the objectives of NEP 2020, which emphasizes preparing students for real-world challenges through multidisciplinary and experiential learning approaches. NEP 2020 underscores the need for fostering skills such as critical thinking, problem-solving, and adaptability—qualities that are exemplified in Imogen's transformation as she navigates generational conflict and digital disruption (National Education Policy 2020).

Recommendations for Incorporating Workplace Themes into Education

1. Case Studies and Role-Playing

Educators can use specific scenes from *The Knockoff* as case studies to explore themes

of generational conflict and adaptability. For instance, students could role-play scenarios such as Imogen's confrontation with Eve over digital strategy, encouraging them to practice conflict resolution, negotiation, and adaptability.

2. Interdisciplinary Projects

Incorporating workplace communication theories such as Hofstede's power distance model into literature and business curricula can provide students with a deeper understanding of how cultural and generational factors influence authority and collaboration. Projects could involve analyzing how characters in the novel embody these dynamics and proposing strategies for improving intergenerational teamwork.

3. Experiential Learning

Imogen's journey offers a narrative framework for fostering resilience and adaptability. Students could engage in experiential activities such as learning a new digital tool or solving a real-world problem inspired by the novel's workplace conflicts. These activities would reinforce NEP 2020's emphasis on practical, interdisciplinary learning.

4. Empathy and Cultural Awareness Training

The contrasting perspectives of Imogen and Eve provide a basis for discussions on empathy and cultural awareness. Activities such as reflective essays and group discussions can help students appreciate the challenges faced by different generations in adapting to workplace change, fostering a more inclusive mindset.

5. Conclusion

5.1 Summary of Key Findings

This study explored themes of age, authority and adaptability in Lucy Sykes and Jo Piazza's *The Knockoff*, examining their relevance to workplace dynamics and their alignment with the National Education Policy 2020 (NEP 2020). The novel highlights the tensions that arise from generational differences, as illustrated through the relationship between Imogen Tate, a Baby Boomer and Eve Morton, a Millennial. These tensions reflect broader trends in workplace communication and power dynamics, where younger generations challenge traditional hierarchies using technology and innovation (Parry & Urwin, 2011).

A key finding is that adaptability emerges as a cornerstone of professional growth, with Imogen's transformation illustrating the value of lifelong learning in navigating digital disruptions. This aligns with NEP 2020's focus on fostering resilience, leadership and critical thinking among learners to prepare them for the complexities of modern

professional environments (NEP 2020, Chapter 4). Additionally, the novel demonstrates how generational conflict, while initially a barrier, can drive growth and innovation when managed constructively, as supported by research on cross-generational collaboration (Twenge et al., 2010).

5.2 Broader Implications

The findings underscore the importance of integrating workplace-oriented literature into education, particularly in line with NEP 2020's emphasis on multidisciplinary learning. Literature such as *The Knockoff* offers valuable insights into real-world challenges, including generational conflict, adaptability and the redefinition of authority, providing students with a simulated environment to explore these complexities (Eagleton, 2011). By analysing Imogen's journey, students can develop critical competencies such as resilience, communication and problem-solving, which are essential for future-ready learners (Subramanian, 2020).

Moreover, the study highlights the contribution of literary studies to enhancing adaptability and critical thinking, bridging the gap between academic theory and professional practice. Using literature to teach these skills fosters empathy and cultural awareness, equipping students to navigate diverse and dynamic workplaces (Lyons & Kuron, 2014). By incorporating such narratives into curricula, educators can address NEP 2020's goal of fostering holistic and interdisciplinary education.

5.3 Recommendations for Future Research

- 1. Further Exploration of Workplace Themes in Contemporary Novels:**
Future research could extend this analysis to other works of contemporary fiction, such as Dave Eggers's *The Circle*, which critiques the ethical implications of digital transformation, or Joshua Ferris's *Then We Came to the End*, which examines groupthink and workplace dysfunction. Comparative studies of these novels could provide broader insights into how literature reflects and critiques evolving workplace dynamics (Mehta & Kapoor, 2021).
- 2. Developing Pedagogical Frameworks for Literature in Line with NEP 2020:**
Building on the insights from this study, future research could focus on developing structured frameworks for using workplace-oriented literature in multidisciplinary education. This could include case studies, role-playing exercises and thematic analyses aligned with NEP 2020's objectives of fostering adaptability, leadership and collaboration. Research by Subramanian (2020) emphasizes the value of

experiential learning, suggesting that literature can be an effective tool for preparing students for real-world challenges.

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Mythology and Modernity: Retelling Myths from a Feminist Perspective in Poetry

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Abstract

This research paper explores the intersection of mythology, modernity, and feminist thought through the lens of poetry. By reimagining ancient myths and legends, contemporary poets reclaim and reframe traditionally patriarchal narratives, challenging the gender roles embedded in mythological stories. The feminist retelling of myths, as reflected in modern poetry, serves not only as a critique of historical gender inequalities but also as a space for the reassertion of female agency, voice, and power. This paper examines various poets who have rewritten or reinterpreted classic myths from feminist perspectives, considering how these modern retellings speak to both timeless and contemporary concerns about gender, identity, and societal roles.

Keywords:

Mythology, modernity, traditional, modern, myth, feminist, retelling, poetry, narratives.

Introduction

Mythology, with its rich tapestry of gods, heroes, and monsters, has long been a cornerstone of human culture, offering explanations for the mysteries of existence and reinforcing cultural values. However, many of these myths—particularly in the Western tradition—are inherently patriarchal, often relegating women to passive, subordinate, or villainous roles. Feminist theory, which critiques traditional power structures and seeks to empower marginalized voices, has prompted a reevaluation of these ancient stories. Poets, in particular, have used the flexibility of poetry to subvert and challenge the male-centric narratives of classical mythology, reimagining mythic figures and events from a perspective that centers women's experiences and voices.

This paper explores how contemporary feminist poets retell myths and legends to resist traditional gender binaries, reclaim female agency, and confront the societal roles that women have historically been confined to. Through the analysis of key poets and

their works, we investigate how these feminist reimaginings of myths serve as both a critique of the past and a reflection on the ongoing struggles for gender equality in modern society.

The Role of Myth in Culture

Myths serve as a foundational aspect of cultural identity and collective memory. Rooted in the traditions of oral storytelling, mythology often reflects and perpetuates the values of the society from which it arises. In classical myths, women are frequently depicted as passive figures—goddesses like Hera and Aphrodite are often characterized by their relationships with men, while mortal women like Medusa and Eve are punished for their desires or transgressions. These myths serve to reinforce the roles of women as secondary to men and bound by rigid social and moral codes. The patriarchal themes embedded in ancient myths also reflect the historical dominance of male power structures in the ancient world.

As feminist scholars and writers have pointed out, these narratives reinforce the subordination of women and limit the representation of female agency. Feminist theory, particularly in the second-wave feminist movement, began to critically engage with mythological texts to expose how they serve as instruments of patriarchal ideology. By reinterpreting these myths, feminist poets seek to subvert their traditional meanings and create new spaces for women's voices and experiences.

Feminist Retellings of Myth in Poetry

1. Reclaiming Female Characters

One of the most powerful ways feminist poets engage with mythology is by reclaiming the voices and stories of female characters who have been marginalized or vilified. For example, in her collection *The Women Who Sleep with Men* (2016), poet and writer Anne Carson offers a fresh perspective on ancient Greek myths, particularly focusing on the lives of women who have been largely silent in traditional accounts. Carson's poem *Medusa* reimagines the Gorgon as a victim of abuse and violence, rather than simply a monstrous figure deserving of punishment. In this retelling, Medusa's transformation into a monster is seen as a consequence of trauma rather than inherent evil. Carson's approach highlights the potential for mythic figures to be understood not as embodiments of moral failings, but as individuals shaped by circumstances beyond their control.

Similarly, feminist poet Carol Ann Duffy has reworked several classic myths from a feminist standpoint. In her collection *The World's Wife* (1999), Duffy gives voice to the wives, lovers, and daughters of famous mythological and historical men. Through poems like *Medusa*, *Mrs. Icarus*, and *Salome*, Duffy reclaims the perspectives of women whose voices were lost in the traditional narratives. Her poem *Mrs. Icarus* humorously subverts

the tragic story of Icarus by focusing on his wife's perspective, turning what is typically a myth of male ambition into a meditation on the wife's frustrations and loneliness in the wake of her husband's foolish flight.

2. Subverting Gender Roles and Power Dynamics

In addition to reclaiming female voices, feminist poets also subvert the traditional gender dynamics that are often present in classical myths. In *Circe* (2018), Madeline Miller reimagines the myth of Circe, the sorceress from Homer's *Odyssey*, as a feminist narrative of self-discovery and empowerment. In Miller's retelling, Circe is not a mere temptress or obstacle to male heroes, but an independent and complex figure who challenges the patriarchy's treatment of women as mere objects of desire or punishment. Through her transformation into a witch and her exile on the island of Aiaia, Circe becomes a symbol of female autonomy and the rejection of the roles that society tries to impose on women.

Similarly, in the poetry of Sappho, a figure who has long been associated with women's love and sexual agency, feminist readings seek to highlight the emotional depth and power of Sappho's poetry. Her work, while often historically read through the lens of male desire and objectification, can also be interpreted as a celebration of female sexual and emotional autonomy. Contemporary feminist poets continue to draw on Sappho's themes of female love and desire to counter the historical objectification of women in both myth and literature.

3. Challenging the Heroic Narrative

A central tenet of many myths is the heroic journey, which is typically undertaken by male figures who face trials, overcome challenges, and emerge victorious. Feminist poets challenge this narrative by questioning what heroism means in the context of female experience. The traditional heroic myth often privileges traits such as strength, rationality, and physical prowess, which have historically been associated with masculinity. By contrast, feminist reinterpretations of myth often highlight qualities such as resilience, wisdom, emotional intelligence, and solidarity—traits that have been traditionally undervalued in the heroic tradition but are central to women's lives.

For instance, the feminist poet Louise Glück, in her collection *Meadowlands* (1996), reimagines the story of Penelope from Homer's *Odyssey*. Rather than focusing on Odysseus's heroic return, Glück centers on Penelope's quiet resilience and intelligence as she weaves and unweaves a tapestry in anticipation of her husband's return. Penelope's story, as told by Glück, challenges the typical notion of heroism by presenting the endurance and patience required for women to navigate a patriarchal world as a form of strength in its own right.

The Intersection of Myth and Modernity

In addition to reclaiming and reinterpreting myths, feminist poets also engage with the ways in which these ancient stories intersect with contemporary concerns. The feminist retellings of myths not only critique ancient gender roles but also offer insights into the ongoing struggles for women's rights and gender equality in modern society. By reimagining myths through a feminist lens, poets confront the continued marginalization of women in both literature and culture.

For example, in *The Poetics of Feminist Mythmaking* (2022), poet and scholar Agha Shahid Ali explores how mythological tropes continue to resonate in modern poetry. The feminist retellings of figures like Eve, Persephone, and the Virgin Mary demonstrate how these characters—often depicted as passive and powerless in traditional myth—can be reimagined as figures of rebellion, resistance, and transformation. Through this process, modern poets challenge the outdated gender roles embedded in classical mythology, while offering a vision of female empowerment and agency that is relevant to the contemporary world.

Conclusion

Feminist retellings of mythology in modern poetry represent a significant shift in how we understand and engage with the ancient stories that have shaped our cultural imagination. By centering women's voices, reclaiming agency, and challenging patriarchal structures, feminist poets breathe new life into old myths, making them more reflective of contemporary struggles for gender equality and female empowerment. In doing so, they not only reinterpret the past but also reimagine a future where women's experiences and voices are central to our collective narrative.

In this way, feminist mythmaking in poetry acts as both an act of resistance and a reimagining of what it means to be a hero, a god, or a woman in a patriarchal world. The retelling of myth from a feminist perspective opens up new possibilities for how we understand power, identity, and agency, offering a vision of modernity that challenges and transforms the patriarchal structures inherited from ancient myths.

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Teaching Literature under the New Education Policy (NEP): An Evolving Pedagogical Approach

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Abstract

The New Education Policy (NEP) 2020 seeks to transform the Indian education system by focusing on holistic, interdisciplinary, and student-centred learning. This paper explores how literature education can be aligned with the principles of the NEP, emphasizing the integration of critical thinking, creativity, and cultural understanding into the curriculum. The NEP promotes multilingualism and the inclusion of regional literature, which offers students a broader and more diverse literary experience. It also advocates for interdisciplinary learning, where literature is connected with other subjects such as history, philosophy, and sociology, enriching students' understanding of both the texts and the broader world. Strategies for teaching literature under the NEP, such as project-based learning, critical analysis, and the use of technology, foster engagement and skill development. Additionally, the paper highlights innovative evaluation methods, including formative assessments, peer and self-assessment, and competency-based evaluations, which encourage continuous learning and reflective practices. By incorporating these approaches, literature education can better prepare students to navigate the complexities of the modern world, fostering not only academic success but also personal and social growth. Ultimately, the NEP provides an opportunity to reshape literature education, making it more inclusive, relevant, and adaptive to the needs of future generations.

Keywords:

New Education Policy (NEP), literature education, interdisciplinary learning, multilingualism, regional literature, critical thinking, creativity, project-based learning, formative assessment, competency-based evaluation, student-centred learning, skill development, cultural understanding.

The New Education Policy (NEP) 2020 envisions a fundamental shift in India's educational paradigm, emphasizing flexibility, inclusivity, and interdisciplinary learning. For literature education, this shift provides an opportunity to reframe how literature is taught, analysed, and appreciated. The following principles of the NEP are particularly relevant to literature education and its transformative potential:

One of the central tenets of the NEP is the encouragement of multidisciplinary learning. The policy calls for breaking down rigid barriers between academic disciplines and promoting an integrated approach to knowledge (Ministry of Education, 2020). In literature, this approach can be highly beneficial, as literary texts often intersect with other fields such as history, psychology, political science, and sociology. The study of literature provides an excellent opportunity to bridge these fields and develop a more comprehensive understanding of the world.

For example, a novel like *1984* by George Orwell can be explored not only as a work of literature but also as a reflection of political ideologies and historical contexts, offering a deep dive into the effects of totalitarianism. By incorporating concepts from political science and history, students can better understand the broader implications of Orwell's dystopian world. This multidisciplinary method not only deepens students' literary analysis but also enhances their grasp of history, social studies, and current global issues. According to the NEP, such an approach fosters critical thinking and allows students to engage with real-world issues through the lens of multiple disciplines (Ministry of Education, 2020).

The NEP emphasizes the development of critical thinking skills and creativity, recognizing them as essential competencies for the 21st century (Ministry of Education, 2020). Literature is a powerful tool for fostering both of these abilities. By reading and analysing complex texts, students are encouraged to engage with various layers of meaning, develop personal interpretations, and challenge societal norms. Literature fosters the ability to think beyond the surface level, question assumptions, and critically evaluate diverse perspectives.

A key example is *To Kill a Mockingbird* by Harper Lee, a novel that explores themes of racism, injustice, and moral growth. Through close reading and discussion, students can explore these themes in relation to both historical contexts and modern-day issues. This encourages them to develop critical perspectives on contemporary social justice

movements and questions of morality, while also honing their ability to express and justify their thoughts and opinions. The NEP's call for a "learning to learn" approach is well-supported by literature's focus on inquiry, debate, and intellectual exploration (Ministry of Education, 2020).

The NEP strongly advocates for linguistic diversity and the inclusion of regional languages within the educational framework. It encourages schools to offer instruction in multiple languages and integrate literature from different cultural and linguistic backgrounds (Ministry of Education, 2020). This inclusivity is crucial for promoting national unity and acknowledging India's vast cultural diversity. Teaching literature through the lens of multilingualism broadens students' perspectives and exposes them to varied worldviews, making education more inclusive and representative of different linguistic communities.

For instance, the inclusion of Indian regional literature, such as *Godan* by Premchand (written in Hindi) or *Gitanjali* by Rabindranath Tagore (in Bengali), alongside English and Western classics, can offer a richer and more diverse literary experience. Students can analyse the complexities of Indian society, language, and culture through these texts. Multilingual education, as promoted by the NEP, also encourages students to appreciate different literary traditions, developing an understanding of India's pluralistic society (Ministry of Education, 2020). Moreover, the NEP's emphasis on language learning, including the promotion of the mother tongue, helps preserve cultural heritage and fosters a deeper connection to one's roots.

NEP highlights the need to focus on skill-based education that equips students not only with knowledge but also with practical life skills (Ministry of Education, 2020). Literature plays a vital role in this by fostering a wide range of skills, including communication, creativity, and empathy. Reading and interpreting literature enhances students' language skills, both written and oral, as well as their ability to express complex ideas clearly and persuasively. Creative writing and literary analysis tasks help students develop their imagination and problem-solving abilities.

A compelling example of skill-based learning through literature is the process of writing a critical essay on a literary work. In preparing such an essay, students must conduct research, develop a thesis, support their arguments with textual evidence, and communicate their ideas effectively. These skills are transferable to many aspects of

professional life, particularly in fields like journalism, law, and business. The NEP's emphasis on developing transferable skills is well-suited to the study of literature, where both intellectual and practical competencies are nurtured (Ministry of Education, 2020). The NEP also encourages experiential learning, wherein students actively engage with the material rather than passively absorbing information (Ministry of Education, 2020). In the literature classroom, this approach can manifest in various ways. Teachers can use methods such as role-playing, dramatization, and group discussions to help students immerse themselves in the literary world. For example, students can perform scenes from a play like Shakespeare's *Macbeth*, allowing them to engage physically and emotionally with the text. These activities not only make learning more dynamic but also deepen students' understanding of the characters and themes.

Literature's ability to foster personal growth is another aspect that aligns with the NEP's goals. Reading stories of diverse characters navigating complex moral landscapes can help students develop empathy and emotional intelligence. For example, novels like *The Kite Runner* by Khaled Hosseini provide opportunities for students to reflect on themes of forgiveness, friendship, and redemption, which are universally relevant and applicable to real-life situations. Such experiences help develop well-rounded individuals who are capable of both intellectual and emotional engagement with the world.

The NEP stresses the importance of fostering a love of learning that extends beyond the classroom and is relevant to lifelong education (Ministry of Education, 2020). Literature plays a pivotal role in this by inspiring curiosity, imagination, and a lifelong habit of reading. As students engage with diverse literary genres and voices, they develop a sense of intellectual curiosity that can extend into various areas of life. Literature's ability to provide continual engagement with new ideas and perspectives supports the NEP's vision of lifelong learning.

Encouraging students to read both classic and contemporary literature fosters a culture of ongoing learning, which is central to the NEP's educational philosophy. By nurturing a love for reading and analysis, educators can equip students with the tools they need to continue exploring new ideas throughout their lives. Literature, therefore, not only serves academic purposes but also contributes to the personal and intellectual development of students as lifelong learners.

The New Education Policy (NEP) 2020 presents a vision of education that is student-centred, flexible, and inclusive, with a strong emphasis on skill development, experiential learning, and interdisciplinary. Teaching literature within this framework requires innovative strategies that make learning engaging, foster critical thinking, and develop practical life skills. The following strategies, aligned with NEP's principles, offer approaches that can help educators effectively teach literature:

One of the key principles of the NEP is the promotion of multilingualism and the inclusion of regional literature in the curriculum (Ministry of Education, 2020). This strategy not only helps preserve India's diverse literary traditions but also broadens students' perspectives by exposing them to a range of cultural narratives and experiences. Integrating literature from various regional languages, in addition to national and global texts, enriches students' understanding of different societal structures, values, and worldviews.

For example, incorporating works by regional authors such as *Premchand* (Hindi), *Rabindranath Tagore* (Bengali), or *Raja Rao* (Kannada) alongside global literature can deepen students' appreciation for cultural diversity. A comparative study of *Godan* by Premchand, which explores rural life in India, with a novel like *Germinal* by Émile Zola, which focuses on the working class in France, can lead to meaningful discussions on universal themes such as poverty, class struggle, and social justice. This approach reflects the NEP's commitment to fostering an inclusive curriculum that acknowledges India's linguistic diversity and the need for students to engage with literature from a variety of cultural contexts (Ministry of Education, 2020).

In the classroom, educators can promote this strategy by assigning projects where students research and present on the history, themes, and cultural significance of regional literature. Additionally, reading texts in their original languages and translations helps develop language skills and cultural fluency, enriching the student's educational experience.

The NEP emphasizes interdisciplinary learning as a way to break down barriers between subjects and encourage a holistic approach to knowledge (Ministry of Education, 2020). Literature, by its very nature, provides ample opportunities to connect with other disciplines like history, sociology, philosophy, and political science. By integrating literature with other subjects, educators can create a more connected and

relevant learning experience for students.

For instance, the study of *Frankenstein* by Mary Shelley can be paired with lessons on ethics in science and the consequences of unchecked technological advancement, thus blending literary analysis with scientific inquiry. Similarly, *The Great Gatsby* by F. Scott Fitzgerald can be explored alongside history lessons on the Roaring Twenties and the American Dream. By linking literature to historical and cultural contexts, educators foster critical thinking and show students how literature reflects, critiques, and influences society. According to the NEP, interdisciplinary learning not only deepens understanding but also encourages students to make connections across different areas of knowledge (Ministry of Education, 2020).

Teachers can adopt project-based approaches, where students work collaboratively to research the intersections between literature and other disciplines. For example, a project comparing the portrayal of gender roles in *Macbeth* and contemporary media can allow students to explore both literary themes and modern social issues in an interdisciplinary way. This method encourages students to approach literature as a tool for understanding broader societal dynamics.

Literature is an excellent medium for developing critical thinking, as it encourages students to engage with complex ideas, question assumptions, and analyse different perspectives. The NEP underscores the importance of fostering critical thinking and creativity through learning (Ministry of Education, 2020). In the context of literature, this can be achieved through activities such as literary analysis, debates, and creative assignments, which challenge students to think deeply and express their ideas in innovative ways.

One effective method of teaching critical thinking is through the close reading of literary texts. For example, analysing the moral ambiguities in *The Merchant of Venice* by William Shakespeare can lead students to debate questions of justice, revenge, and mercy, thereby developing their ability to think critically about ethical issues. Additionally, encouraging students to create alternate endings for novels, write character diaries, or adapt literary works into different formats, such as film or drama, fosters creativity and allows students to engage with texts in a more personal and imaginative way.

This creative engagement not only improves students' analytical skills but also helps

them develop their communication and writing abilities. The NEP's emphasis on creativity and expression aligns well with this approach, as it encourages students to move beyond passive learning and actively contribute their own ideas and interpretations (Ministry of Education, 2020).

The NEP recognizes the transformative role of technology in education, calling for the integration of digital tools to enhance learning (Ministry of Education, 2020). Technology can significantly enhance the teaching of literature by providing access to a wide range of resources, facilitating collaborative learning, and enabling students to engage with texts in new and interactive ways.

One of the most effective ways to use technology in literature education is by incorporating digital platforms such as online libraries, discussion forums, and multimedia resources. For example, using e-books or audiobooks can make literature more accessible, especially for students with different learning needs. Virtual book clubs or forums can foster online discussions where students analyse texts, share interpretations, and engage in debates, even beyond the classroom.

Teachers can also use multimedia presentations, such as film adaptations of novels, to illustrate how literature is interpreted in different mediums. This allows students to compare and contrast the original text with its visual representation, exploring how elements such as character development, setting, and themes are conveyed differently in literature and film. Incorporating interactive tools, such as quizzes or digital storytelling platforms, helps make literature more engaging, particularly for students who are more comfortable with digital media. These strategies support the NEP's vision of creating an education system that is tech-savvy and adaptable to the needs of modern learners (Ministry of Education, 2020).

Project-based learning (PBL) is another key strategy emphasized by the NEP, which encourages students to learn through real-world projects and collaborative work (Ministry of Education, 2020). Literature offers many opportunities for PBL, as students can work together to explore themes, research authors, and present findings through creative means. By engaging in literature-based projects, students not only develop their research and presentation skills but also build teamwork and problem-solving abilities. A practical example of PBL in literature is having students collaborate on a research project that explores a specific literary movement, such as Romanticism or Modernism,

and its impact on society. The project could culminate in a presentation or a multimedia exhibition that demonstrates students' understanding of the movement through the works of key authors like William Wordsworth, Virginia Woolf, or T.S. Eliot. Such projects help students connect literature with broader historical and cultural contexts while encouraging collaboration and critical analysis.

PBL also allows for flexibility in how students approach literature, as they can choose topics of personal interest within the framework of the project. This fosters a deeper connection to the subject matter and encourages lifelong learning. The NEP's emphasis on student-centred learning is well-supported by the collaborative, inquiry-based approach of PBL, which empowers students to take ownership of their education (Ministry of Education, 2020).

The evaluation of literature education within the framework of the New Education Policy (NEP) 2020 requires a shift from traditional examination-based assessments to a more comprehensive and holistic approach that reflects the policy's emphasis on skill development, critical thinking, creativity, and student-centred learning. The NEP promotes the concept of competency-based education, encouraging evaluative methods that assess not only academic performance but also the practical, cognitive, and emotional growth of students (Ministry of Education, 2020). Below are some innovative evaluation methods for literature education that align with the NEP's principles.

The NEP advocates for a shift from summative assessments, such as end-of-term exams, to continuous and formative assessments that allow for a more comprehensive evaluation of students' progress (Ministry of Education, 2020). Formative assessment is particularly effective in literature education, as it focuses on ongoing feedback and helps educators identify students' strengths and areas for improvement over time. This method encourages an iterative process of learning and growth rather than a one-time judgment. In the literature classroom, formative assessments can include regular quizzes, reflective journals, and one-on-one discussions with students about their reading and analysis of texts. Teachers can provide constructive feedback on students' literary interpretations, helping them refine their analytical skills and encourage them to engage more deeply with the texts. For example, after reading a chapter of *Pride and Prejudice* by Jane Austen, students could submit short reflections on a particular character's

development or an aspect of the social critique embedded in the novel. This feedback loop supports continuous learning and fosters a more personalized and dynamic engagement with literature.

Additionally, using digital tools such as online quizzes or discussion boards allows for instant feedback and promotes collaborative learning, where students can exchange ideas and perspectives in real time. Continuous feedback, as recommended by the NEP, not only enhances students' understanding but also motivates them to stay engaged with the material throughout the course (Ministry of Education, 2020).

Another important strategy in the NEP is the encouragement of peer and self-assessment as part of the learning process. Peer assessment allows students to evaluate each other's work, providing an opportunity for collaboration and constructive critique, while self-assessment encourages students to reflect on their own learning and growth. These methods empower students to take ownership of their education and develop critical self-reflection skills, which are essential for lifelong learning (Ministry of Education, 2020).

In the literature classroom, peer assessment can take the form of group discussions where students critique each other's analyses of a particular text, offering feedback on both content and writing style. For example, after analysing the themes of identity and social justice in *The Colour Purple* by Alice Walker, students could exchange essays and provide peer feedback on the clarity and depth of each other's arguments. This process not only strengthens students' analytical skills but also encourages them to articulate their thoughts more effectively.

Self-assessment can be integrated into the literature curriculum through activities such as reflective essays, where students evaluate their understanding of a novel or literary period. For instance, after reading *The Catcher in the Rye* by J.D. Salinger, students could write a self-reflection on how their views on adolescence, alienation, and identity have evolved. This helps students internalize what they have learned and recognize their academic growth, which is consistent with the NEP's emphasis on personal development and lifelong learning (Ministry of Education, 2020).

The NEP strongly advocates for project-based learning (PBL) as a way to assess students' learning through practical, real-world applications. PBL encourages students to engage deeply with a topic over an extended period and develop a range of skills,

including research, collaboration, problem-solving, and creative expression (Ministry of Education, 2020). Literature education, with its emphasis on analysis, creativity, and cultural understanding, lends itself well to PBL.

A literature project can take various forms, such as a research paper on the impact of Victorian literature on contemporary novels, or a group presentation on the representation of gender in *The Handmaid's Tale* by Margaret Atwood. Through these projects, students demonstrate their ability to synthesize information, connect literary themes to societal issues, and present their findings in creative formats, such as multimedia presentations, posters, or performances. For instance, students might be asked to analyse the role of colonialism in the works of Joseph Conrad and Chinua Achebe, culminating in a collaborative digital project that compares the portrayal of imperialism in both authors' works.

These projects are evaluated not only for their content but also for the creativity, collaboration, and critical thinking demonstrated throughout the process. PBL reflects the NEP's vision of education as a multifaceted learning experience that prepares students for real-world challenges and interdisciplinary problem-solving (Ministry of Education, 2020).

As part of its emphasis on competency-based education, the NEP calls for assessments that focus on skill development, particularly skills related to communication, problem-solving, and critical thinking (Ministry of Education, 2020). In the context of literature, skill-based assessments can be integrated into assignments that require students to apply their analytical skills in practical ways.

One such skill-based assessment could be an oral presentation on a literary topic, such as discussing the symbolism in *The Great Gatsby* or analysing the narrative structure of *One Hundred Years of Solitude* by Gabriel García Márquez. By requiring students to present their analyses verbally, educators can assess their ability to articulate complex ideas, engage in discussions, and persuade others with logical arguments. This type of assessment helps students develop public speaking, communication, and critical thinking skills—competencies that are highly valued in academic and professional settings.

Furthermore, literature-based assignments that require students to write essays, book reviews, or creative adaptations of literary works can assess both their writing

proficiency and their ability to critically engage with texts. For example, students could be tasked with writing a creative piece in the style of a particular author, such as a short story imitating the narrative style of Ernest Hemingway, or composing a dialogue that captures the moral conflicts in *The Brothers Karamazov* by Fyodor Dostoevsky. These assignments not only assess students' understanding of literary techniques but also encourage them to engage creatively with literature, as emphasized by the NEP (Ministry of Education, 2020).

A final method of evaluation that aligns with the NEP is the use of capstone projects and portfolios. These methods provide a comprehensive view of students' academic journey and encourage reflection on their learning process. A portfolio could include a collection of written assignments, creative works, and personal reflections, showcasing the student's intellectual and personal growth throughout the course.

For example, a student's portfolio might include essays on different literary texts, reflections on their reading and analysis, and creative responses to literature, such as poems, short stories, or adaptations of literary scenes. A capstone project could involve a research project or presentation on a specific theme, genre, or author, such as the exploration of existential themes in the works of Albert Camus. These cumulative assessments provide an opportunity for students to demonstrate their holistic understanding of literature, their ability to connect different ideas, and their capacity for independent research.

According to the NEP, such portfolio-based assessments align with the policy's vision of encouraging lifelong learning, as they provide students with an ongoing record of their academic achievements and reflective growth (Ministry of Education, 2020).

The New Education Policy (NEP) 2020 envisions a transformative approach to education, with a focus on inclusivity, creativity, critical thinking, and multidisciplinary learning, all of which are pivotal for the future of literature education in India. The policy provides a rich framework for educators to rethink traditional methods of teaching, assessment, and student engagement. By emphasizing a holistic, skill-based approach, the NEP allows for a more dynamic and flexible learning environment where literature is not only studied for its aesthetic value but also for its role in fostering empathy, cultural understanding, and social awareness. Key principles of the NEP, such as promoting multilingualism, interdisciplinary learning, and experiential education,

create an opportunity to broaden the scope of literary studies, integrating regional literature and global texts to offer a more comprehensive understanding of diverse cultures and perspectives.

Innovative teaching strategies under the NEP, such as incorporating project-based learning, critical analysis, and creative expression, enable students to engage deeply with literature while developing essential skills like problem-solving, communication, and collaboration. Additionally, the emphasis on continuous, formative assessment, peer and self-assessment, and skill-based evaluations aligns well with the NEP's vision of competency-based education, encouraging a shift from rote memorization to a more personalized and reflective approach to learning. These evaluation methods not only assess students' understanding of literary texts but also their ability to apply critical thinking and creativity to real-world issues, preparing them for an interconnected and rapidly changing world.

By embracing the NEP's vision, literature education can become a powerful tool for nurturing well-rounded, intellectually curious, and socially conscious individuals who are equipped with the skills to navigate both the complexities of literature and the broader world. As the educational landscape evolves, the integration of these principles and strategies into the teaching of literature promises to shape a generation of learners who are not only proficient in analysing texts but also capable of using their understanding of literature to make meaningful contributions to society.

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Truth, Lies, and Manipulation: Evaluating Propaganda in Lois

Lowry's *The Giver*

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Abstract:

This paper delves into the multifaceted mechanisms of propaganda in Lois Lowry's *The Giver*, a seminal work of dystopian literature that critiques the intersection of power, truth, and societal manipulation. The ostensibly utopian society depicted in the novel is underpinned by an elaborate system of propaganda that meticulously obscures reality, subverts individual autonomy, and perpetuates a hegemonic ideology of conformity. Through the systematic manipulation of language, memory, and perception, the ruling authority exerts totalizing control over both the physical and cognitive domains of its citizens, rendering dissent an impossibility. Employing Foucauldian discourse analysis and Althusser's theory of ideological state apparatuses, this paper examines how propaganda in *The Giver* functions not merely as a political tool but as an existential mechanism that redefines the parameters of reality itself. The study underscores the role of controlled memory—enforced through the selective erasure of historical and emotional truths—as a means to sustain a fragile equilibrium within the community. Furthermore, it critiques the ethical implications of such manipulation, questioning the trade-offs between collective stability and individual freedom. By exploring the symbiotic relationship between authoritarian control and passive acquiescence, the analysis reveals how Lowry's portrayal of propaganda serves as a cautionary tale against the perils of unchecked power masquerading as benevolence. Ultimately, this paper argues that *The Giver* is not merely a dystopian narrative but a profound commentary on the fragility of constructed realities and the enduring human quest for autonomy and truth.

Introduction

Propaganda has long been a powerful instrument for shaping collective consciousness, defining societal norms, and maintaining political hegemony. In dystopian literature, it emerges as a pivotal mechanism through which authoritarian regimes sustain control, manipulate truth, and suppress dissent. Lois Lowry's *The Giver* epitomizes this theme,

presenting a meticulously crafted utopian society that is, in reality, a carefully engineered dystopia. Beneath the veneer of harmony and order lies a network of ideological control, where truth is selectively obscured, emotions are suppressed, and individuality is systematically eradicated. Propaganda in this context transcends its conventional role as a communication tool, becoming an existential framework that redefines the boundaries of reality and human experience.

The novel's portrayal of an ostensibly benevolent society exposes the subtle mechanisms of control such as linguistic manipulation, memory suppression, and the erasure of historical consciousness that ensure compliance and perpetuate an illusion of utopia. Through the lens of Foucauldian discourse analysis and Althusser's theory of ideological state apparatuses, this study seeks to unravel the symbiotic relationship between power and propaganda. It interrogates how the ruling authority in *The Giver* employs these tools to dictate not only the behaviour but also the very perception of its citizens, effectively constructing a reality that precludes any possibility of resistance or critique. By situating *The Giver* within broader discourses on power and ideology, this analysis explores the ethical ramifications of sacrificing individuality and truth for the sake of stability. Lowry's narrative serves as a cautionary tale, warning against the allure of absolute control cloaked in benevolence. In doing so, it raises pressing questions about the nature of freedom, the fragility of constructed realities, and the human capacity to challenge and transcend imposed systems of control.

Defining the Propaganda

Propaganda, as a concept, is multifaceted and has been critically analyzed by numerous scholars and thinkers. Edward Bernays, often regarded as the "father of public relations", defined it as "the conscious and intelligent manipulation of the organized habits and opinions of the masses" (Bernays 9). For Bernays, propaganda was not inherently negative but rather a necessary tool in modern society to shape public opinion and behaviour. In contrast, George Orwell viewed propaganda through a more dystopian lens, particularly in its use by authoritarian regimes. Orwell described propaganda as "the deliberate manipulation of language to distort truth and perpetuate power" (Orwell 157). This aligns with his broader critique of totalitarianism in works like *1984*, where propaganda sustains oppressive control by reshaping reality.

Jacques Ellul, in his seminal work *Propaganda: The Formation of Men's Attitudes*,

emphasized its pervasiveness, stating, “Propaganda ceases where simple dialogue begins. It is a one-way communication designed to convince, often bypassing rationality to appeal to emotions and subconscious instincts” (Ellul 61). Ellul argued that modern propaganda infiltrates all aspects of society, blending seamlessly with culture, media, and education. Similarly, Hannah Arendt, in *The Origins of Totalitarianism*, underscored its role in eroding truth and writing, “The chief characteristic of propaganda in a totalitarian state is its disregard for facts and its reliance on repetition, emotion, and the manipulation of reality” (Arendt 341). Arendt’s analysis reveals propaganda’s function in creating a false sense of certainty while dismantling individual critical thinking. These perspectives collectively highlight propaganda as a complex and dual-edged phenomenon that can influence and unify societies but also manipulate, deceive, and oppress.

The Mechanisms of Propaganda in *The Giver*

The society in *The Giver* epitomizes a meticulously engineered dystopia wherein propaganda functions as the linchpin of systemic control. By erasing individual autonomy and reshaping the very fabric of reality, the ruling authority perpetuates a regime of unquestioned conformity and compliance. Propaganda, in this context, is not merely a tool of governance but an ontological construct that dictates the epistemic boundaries within which its citizens exist. Central to the manipulation of truth in the novel is the linguistic control exerted through the practice of “precision of language”. Jonas’s instructor admonishes him for imprecise word choice, stating, Precision of language was required for clear communication, which was essential for the community to function properly (Lowry 55).

On the surface, this appears as an innocuous guideline for clarity; however, it subtly curtails emotional and cognitive complexity. By reducing language to utilitarian constructs, the community systematically deprives its citizens of the linguistic tools necessary to articulate dissent or comprehend abstract concepts such as freedom and love. This resonates with George Orwell’s assertion in 1984 that “the destruction of words” is a means to “narrow the range of thought” (Orwell 52). Through linguistic propaganda, Lowry’s society eliminates ambiguity, ensuring that subversive thoughts cannot even be conceived, let alone expressed.

Memory manipulation constitutes another cornerstone of propaganda within the

narrative. The society's reliance on the Receiver of Memory as the sole repository of historical knowledge is emblematic of its concerted effort to excise collective memory. The Giver explains to Jonas, "We gained control of many things. But we had to let go of others. We chose to relinquish colour, and we gained control of climate" (Lowry 95). This trade-off of sensory richness and historical continuity for the sake of order reflects a deliberate strategy to suppress individual agency. Hannah Arendt's observation that "totalitarianism's first step is the deliberate obliteration of history" (Arendt 342) finds profound resonance here. By severing the populace from its past, the community eradicates the possibility of contextualizing its present condition, thus solidifying its control.

Furthermore, the suppression of emotions through the mandatory ingestion of "Stirrings pills" exemplifies the community's exploitation of propaganda to regulate the human experience. Jonas's growing awareness of genuine emotions after he ceases to take the pills starkly contrasts with the anaesthetized existence of his peers. The ritualistic avoidance of genuine emotional connection, encapsulated in the euphemistic use of terms like "release", underscores the community's reliance on sanitized narratives to perpetuate its ideology. As Jacques Ellul posits, propaganda:

Prevents individuals from forming an authentic emotional response to reality, instead fostering a collective, controlled sentiment (Ellul 78).

The meticulous manipulation of Jonas's perceptions becomes evident when he confronts the reality of "release." Witnessing his father's emotionless execution of an infant, Jonas exclaims, "He killed it! My father killed it!" (Lowry 150). This pivotal moment shatters Jonas's indoctrinated belief in the community's benevolence, unveiling the inherent cruelty disguised under a veneer of harmony. The euphemistic language surrounding "release" exemplifies Orwell's notion of "doublespeak", wherein language is weaponised to obscure the grotesque truths of authoritarian control (Orwell 177).

The enforced precision of language eradicates the cognitive scaffolding necessary for independent thought, exemplifying Orwell's prescient observation that "language controls the range of human thought" (Orwell 52). This linguistic sterilization ensures that subversive ideas remain both inexpressible and inconceivable, binding the populace within a rigidly defined epistemic reality. Similarly, the obliteration of historical memory exemplified by the isolation of knowledge within the Receiver serves

as a fulcrum of control, severing individuals from any temporal context that might illuminate the constructed nature of their oppression. As Hannah Arendt elucidates, the erasure of history is a cornerstone of totalitarian regimes, for “a people without a past is easily manipulated” (Arendt 342). The emotional suppression enforced through the ritual of “Stirrings pills” further reinforces the regime’s dominion over its citizens, ensuring that authentic affective responses remain dormant and that collective stability remains inviolate. This anesthetization of human experience aligns with Jacques Ellul’s assertion that propaganda fosters a “controlled emotional homogeneity” that precludes critical engagement (Ellul 78). Jonas’s eventual awakening to the grotesque reality of “release” underscores the devastating efficacy of euphemistic propaganda, which cloaks systemic violence in a facade of benevolence.

The mechanisms of propaganda in *The Giver* extend beyond mere deception or persuasion; they constitute a comprehensive framework for erasing individuality, suppressing dissent, and reconfiguring human existence. By employing linguistic control, memory erasure, and emotional suppression, the community enforces an unassailable orthodoxy that precludes the possibility of resistance. Lowry’s narrative thus serves as a potent indictment of propaganda’s insidious capacity to distort reality and erode the essence of humanity.

Conclusion

In Lois Lowry’s *The Giver*, propaganda emerges as a pernicious force that transcends mere ideological persuasion, infiltrating the very ontological foundations of individual and collective existence. Through its deliberate manipulation of language, memory, and emotional authenticity, the ruling authority constructs a totalitarian framework predicated on compliance and the erasure of dissent. By obfuscating the truth and reducing human experience to mechanized conformity, propaganda operates not as an auxiliary tool of governance but as the sine qua non of the community’s stability.

Thus, Lowry’s *The Giver* offers a harrowing exploration of propaganda’s capacity to dismantle the pillars of individuality, truth, and moral agency. By illustrating how the systematic distortion of language, memory, and emotion consolidates authoritarian power, the novel transcends its dystopian framework to issue a profound cautionary critique. It compels readers to interrogate the insidious mechanisms of control embedded in their own societies, warning of the catastrophic consequences when truth is

subordinated to the exigencies of power. In its unflinching portrayal of propaganda's capacity to render the inhumane invisible, *The Giver* emerges as a timeless indictment of the fragility of human autonomy in the face of engineered conformity.

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थर्ड जेंडर के माता-पिता की संवेदना

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घर में जब नवजात संतान जन्म लेता है, तो उसी समय सबसे अधिक खुशी माता-पिता को होती है। माँ को तो बच्चों का पहला शिक्षक भी कहा गया है। माँ का धैर्य और समर्पण ही तो है, जो बच्चों के व्यक्तित्व को आकार देने में महत्वपूर्ण भूमिका निभाता है। पिता अपने परिवार के संरक्षक और मार्गदर्शक होता है। वह अपने परिवार की देखभाल और सुरक्षा के लिए कड़ी मेहनत करता है। पिता सदैव अपने बच्चों को जीवन में आगे बढ़ाने के लिए प्रेरणा देता है एवं उनको आत्मनिर्भर, जिम्मेदार बनाने के लिए प्रयासरत रहता है।

माता-पिता दोनों ही अपने बच्चों के उज्ज्वल भविष्य के लिए त्याग और समर्पण करते हैं, ताकि बच्चे सफल, खुशहाल और संतुलित जी सकें। माता-पिता तो परिवार के महत्वपूर्ण स्तंभ होते हैं, जो बच्चों के जीवन में शिक्षा, संस्कार और मार्गदर्शन का मूल आधार होते हैं। किंतु यह सब सामान्य कहे जाने वाले बच्चों के लिए होता है। जब तृतीयलिंग के बच्चों की बात आती है, तो सब की राय बदल जाती है। मानो कुदरत ने कोई अभिशाप दे दिया हो और उसी अभिशाप से पीछा छुड़ाने या यूँ कहे कि समाज के डर से भी या उनके तानों से बचने के लिए हि ज्यादातर माता-पिता अपने उभयलिंगी बच्चों का त्याग करते हैं। माँ-बाप के लिए तो हर बच्चा एक समान होता है, किंतु कई बार उनके कठोर व्यवहार के पीछे छिपी संवेदना को समझना हर किसी के बस की बात नहीं होती।

जब हिंदी उपन्यासों में 2002 में यमदीप उपन्यास के माध्यम से थर्ड जेंडर के विषय पर लिखने की शुरुआत हुई, तो बहुत सारे विचारकों का ध्यान उसी तरफ केंद्रित हुआ और थर्ड जेंडर के साथ-साथ उनके जीवन से जुड़ी घटनाओं पर भी प्रकाश डालने का प्रयास किया गया। हर कोई यही सोचता है कि क्यों माता-पिता के होते हुए भी एक बच्चा जिसको यह भी नहीं पता कि क्यों उसको परिवार से भिन्न किया जा रहा है, ऐसे नवजात शिशु तक को कूड़ेदान या फिर ऐसी जगह पर फेंक दिया जाता है, जहाँ उनकी जान पर आ बनती है। क्या ऐसा करते हुए जनक के हाथ पैर न काँपे होंगे? क्या उनकी दिल की धड़कने न रुकी होगी? जब माता-पिता अपनी बच्ची का ब्याह करता है, तो उनका दिल बैठ जाता है। एक छोटे से बच्चे को अपने आप से पूर्ण रूप से अलग करते समय उसी माँ-बाप पर क्या बितती होगी? इस घटना को भी उपन्यासों, कहानी या कविता के माध्यम से समाज एवं परिवार के सामने प्रस्तुत करने का

प्रयास किया गया है।

जब एक राजपरिवार में किन्नर बच्चे का जन्म होता है, तो उस बच्चों को भी बचाने के लिए माँ हर परिस्थितियों का सामना करती है, उसे अपने पास अपने घर में रखने का हर मुमकिन प्रयास करती है। पर जब राजा को यह पता चलता है कि राजघराने में हिजड़े का जन्म हुआ है, तो वह बहुत दुःखी हो जाते हैं। कहा जाता है कि पिता को सबसे अधिक स्नेह अपनी पुत्री से होता है, किंतु वह एक राजा होकर भी अपनी पुत्री को अपने से दूर करने पर मजबूर हो जाता है। उनकी मजबूरी इस कथन से स्पष्ट रूप से महसूस की जा सकती है कि- “अरे जब हमने मोह-ममता नहीं देखी, तो तुम काय डिग रये, अपने बुंदेला खानदान को नाम डूबा दे, क्षत्री वंश में हिजड़ा का हिजड़ा वाले पोज अरे आज नहीं तो कल जब सबके सामने जब बात आ रही है कि हमारी संतान हिजड़ा है बुंदेला खून हिजड़ा पैदा करता तो कागत हुई है हमारी समझना कह नहीं है तुम इतनी सी बात”^१

एक राज परिवार के होने के बावजूद भी एक पिता को अपने बच्चों का त्याग करना पड़ता है, जिस बच्चे को वह अपने प्राणों से भी बढ़कर चाहता है, पर वह भले राजा हो पर समाज के मुताबिक अपनी इज्जत बचाने के खातिर अपने दुःखों को अपने में समा कर बच्चे का त्याग कर देता है। एक पल के लिए वह पिता स्नेह में आकर रुक जाता है, पर दूसरी ओर व कठोर रूप धारण कर लेता है। यहां पर समाज का दबाव, पूर्वाग्रह, तिरस्कार एवं भेदभाव को सहन कर सकने की संवेदना हमेशा अपने दिल में दबाये रहते हैं। यहां तक की एक माँ को बिना चाहते हुए अपने बच्चों का त्याग करना पड़ता है। वह बार-बार अपने पति से विनती करती है, कि वह अपनी बेटी को अपने पास ही रखें, माँ कभी भी अपने बच्चों को अपने से अलग नहीं करना चाहती। पर क्या करें उनको इतना मजबूर किया जाता है, कि वह न चाहते हुए भी अपने बच्चों को अपने से दूर कर देती है। अपना पूरा जीवन वह बच्चा खोने के दुःख में व्यतीत कर देती है।

माँ अपने बच्चों को लेकर अनेक सपने सवार कर रखती है पर जब एक माँ को यह पता चले कि उसका बच्चा अपूर्ण है, तब उनके पैरों के नीचे से जमीन खिसक जाती है। हर प्रकार के ख्याल आने लगते हैं, वो हर सपना टूटता हुआ नजर आता है। जो वह अपने बच्चों के लिए बड़े चाँव से संजोती है, पर मानो उनके सपनों को ग्रहण सा लग जाता है। जब ऐसी ही एक बार जो अपने पूरे परिवार पर समाज से लड़ती फिरती है, अपना आशियाना तक बदल देती है, अपने बच्चों को सुरक्षा के लिए। वह अपने बच्चों को बचाने के लिए बहुत सारी हिदायतें भी दे देती है जैसे कि - “न किसी से बराबरी कर ना अपने इस कमी की उनसे कोई चर्चा समाज को ऐसे लोगों की आदत नहीं है और वह आदत डालना भी नहीं चाहते।”^२

माँ बार-बार किन्नर बच्चे को समझाती है कि किस प्रकार समाज के लोगों से अपने किन्नर होने की बात को छुपा के रखना है। क्योंकि वह अच्छी तरह से जानती है कि, जैसे ही

समाज को पता चलेगा वैसे ही यह खबर हिजड़े समुदाय तक पहुंच जाएगी और माँ की गोद से बच्चा छीन कर उसे दूर कर दिया जाएगा। माँ हर वक्त इस चिंता के साथ रहती है, कि किस प्रकार वह अपने बच्चों को इन सारे लोगों से बचाए, वह हर एक से डर कर सामना करती है, ताकि अपना बच्चा उसी के पास रहे। यह पत्थर दिल समाज कभी-कभी एक माँ की वेदना को समझ ही नहीं पता।

प्रत्येक समय माता-पिता को घर परिवार या समाज से इतना प्रताड़ित होना होना पड़ता है कि, वह अपने बच्चों को घर परिवार में भी नहीं रख सकते। एक पिता का दुःख और मजबूरी को नंदरानी यानी कि नाजबीवी कुछ इस प्रकार वर्णित करते हुए कहती है कि- **“इस समय पापा की आंखों में आंसू भरे होंगे पापा इसी तरह सबसे छुपा कर रोते हैं बाद में उनकी लाल लाल आंखों से लोग समझ जाते हैं।”**³ जब एक पिता अपने बच्चों को मजबूर होकर स्कूल नहीं भीजवा पाए उसी समय उनके भीतर उमड़ते दुःख को समाज के समक्ष नहीं रख पाते। विवशता के कारण अपने मनमस्तिक में उभरें ढेरों प्रश्नों के साथ छिप-छिपकर रोकर अपना मन हल्का करता है। यह बात किन्नर बच्चा अच्छे से समझ जाता है। वह माता-पिता की वेदना को सहृदय स्पर्श कर लेता है, कि किस प्रकार खुद के अपूर्ण होने पर माता-पिता को समाज के द्वारा जलिल एवं ताने ही ताने सुनने को मिलते हैं। इस प्रकार एक किन्नर बच्चे के माता-पिता की निःसहायता को दर्शाया गया है।

अपने ही बच्चे को मरा हुआ घोषित करने में माता-पिता पर क्या गुजरती है, शायद उसका अनुमान लगाना भी हमारे लिए कठिन प्रयास होगा। विनोद नामक किन्नर जिसे एक पिता द्वारा ही मरा हुआ घोषित कर दिया जाता है, क्योंकि उसे किन्नर बच्चे को मजबूरन चंपा नामक हिजड़े को सौंप दिया जाता है। पर यह बात माता-पिता सबको बता नहीं पाते और सबके प्रश्नों के उत्तर न देने पड़े। इसलिए अपने ही बच्चे को अकस्मात में मरा हुआ साबित कर; वह अपने जिंदा बेटे को अपने से दूर कर पूरा जीवन इस ग्लानि के साथ जीते हैं, की चाह कर भी वह अपने बच्चे को अपने पास न रख सके, न ही उसका साथ दे पाए।

जब गौतम साहब के घर में बच्चे के रूप में तृतीयलिंग जन्म लेता है। तो गौतम साहब बहुत दुःखी हो जाते हैं, क्योंकि उन्हें एक बेटे की चाहत थी घर में बेटे का जन्म तो होता है। पर एक किन्नर के रूप में यह देखकर गौतम साहब बड़े दुःखी हो जाते हैं। दरअसल घर में बेटियां थी अगर समाज को यह पता चल जाये कि उनके घर में किन्नर बच्चा पैदा हुआ है। तो उनकी बेटियों का ब्याह करना भी मुश्किल हो जाएगा। ऊपर से रिश्तेदारों व समाज के ताने सुनने को मिलेंगे वह अलग।

‘तीसरी ताली’ उपन्यास में आनंदी आंटी को जब यह पता चलता है, कि गौतम साहब के घर में भी किन्नर बच्चे का जन्म हुआ है, तो वह सुन उनके पैरों के नीचे से जमीन सरक जाती है, क्योंकि वह किन्नर होने का दर्द जान चुकी थी। उनकी बेटी निकिता को बिना किसी

की परवाह किए अपने पास रखती है। उसे बड़ी करती है, पर उन्हें हर जगह से निराशा प्राप्त होती है, जब वह उसे स्कूल में भेजना चाहती है, उसके दाखिले के लिए जाती है, तो उन्हें बड़ी कठिनाई होती है। उन्हें स्कूली प्रशासन की तरफ से भी निराशा मिलती है, उन्हें कहा जाता है – “जेंडर स्पष्ट न होने के कारण हम दाखिला नहीं दे सकते हैं यह स्कूल सामान्य बच्चों के लिए है बीच वाले बच्चों को दाखिला देने से स्कूल का माहौल खराब हो जाता है।”^४

जहाँ स्कूल जैसे स्थान पर यह सारी बातें सुनने को मिलती है, तो आनंदी आंटी बड़ी असमंजस में पड़ जाती है। धीरे-धीरे निकिता का कॉलोनी से लेकर रिश्तेदारों में भी एक हास्य का पात्र बनने लगी थी। दूसरी तरफ नीलम नामक हिजड़ा बार-बार आनंदी आंटी पर दबाव डाल रही थी, कि निकिता को उनके हवाले कर दिया जाए। पर एक माँ कैसे अपनी बेटी को किसी के हवाले कर दे। एक माँ भी दुनिया से कब तक लड़ती आखिरकार उन्हें भी अपने बच्चे को किन्नर के हवाले करना पड़ा। इसका नतीजा यह होता है कि निकिता यह सब सह ना सकी और एक दिन जहर खाकर अपना दुःख एवं पीड़ाजनित जीवन को विराम देती है। यहां पर एक जन्म देने वाली माँ जो समाज से लड़ती रही अपनी बच्ची के लिए पर जब उन्होंने हार मान ली, तो अपनी बच्ची को सदा के लिए खो बैठती है। यही कारण था, कि आनंदी आंटी गौतम साहब के दुःख को समझ पा रही थी।

निष्कर्ष :-

कभी-कभी माँ-बाप की स्थिति ऐसी हो जाती है, कि घर में ही अपने आप को अकेला समझने लगते हैं। कुदरत की देन पर प्रश्न खड़ा कर दिया जाता है। माँ-बाप बिना गलती के भी गुनहगार बन जाते हैं। अपने बच्चों को अपूर्ण देख उनको बहुत दुख होता है। यह दुख कम है जो पड़ोस के लोग, समाज, रिश्तेदार उनको जलिल करने का एक भी मौका नहीं छोड़ते। उनके दुख को समझ तो नहीं पाते पर उनसे बच्चा अलग करके उनका दुःख ओर बठा देते हैं। माँ-बाप पर उस समय क्या बीती होगी जब अपने ही बच्चे का त्याग करना पड़ता है, या मृत घोषित करना पड़ता है। उनका वह दर्द जो उनको कभी शांति से जीने ही नहीं देता, क्योंकि उनको यह तक पता नहीं होता कि उनका बच्चा किस हाल में अपना जीवन व्यतीत कर रहा होगा।

संदर्भ ग्रंथ सूची

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“आदिवासी क्रांतिकारी योद्धाओं का स्वतंत्रता संग्राम के पूर्व में किए गए विद्रोहों का संक्षिप्त परिचय” (ऐतिहासिक योगदान के संदर्भ में)

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सारांश :

अगस्त १६०८ में कैप्टन विलियम हॉकिंस ने भारत के सूरत बंदरगाह पर अपने जहाज़ 'हेक्टर' का लंगर डालकर ईस्ट इंडिया कंपनी के आने का ऐलान किया था। उसी सदी में अंग्रेजों ने भारत को गुलामी की जंजीरों से जकड़ लिया था। ३१ दिसंबर १६०० को ईस्ट-इंडिया कंपनी की स्थापना से ही स्वच्छंद और मुक्त रूप से विहार करने वाला भारत 'गुलाम भारत' के रूप में परिवर्तित हो गया था। भारत में अंग्रेजों ने व्यापार के इरादे से आगमन कर अपना शासन जमाया और बहुत कहर बरपाया, खूब अत्याचार किए। १९४७ की आज़ादी कैसे प्राप्त हुई ये याद है, उसके किस्से भी याद हैं। साथ में गांधी, नेहरू, सरदार, सब याद हैं। और उससे भी आगे जाए तो सुभाषचंद्र बोस, चंद्रशेखर आज़ाद, भगत सिंह, सुखदेव, राजगुरु, रानी लक्ष्मी बाई, तात्या टोपे आदि सब याद होंगे पर, आदिवासी स्वतंत्रता संग्राम के योद्धा, क्रांतिकारी लोग जिन्होंने भारत भूमि को मुक्त कराने की जो सबसे पहले मुहिम छेड़ी थी उसे कोई नहीं याद करता। कारण है इस ऐतिहासिक योगदान को कोई नहीं जानता, कोई नहीं मानता, इसका कारण यह है कि इस के बारे में पूरी जानकारी आज तक किसी को दी नहीं गई, ना ही किसी ने जानने में रस ही लिया। इस सबका कारण है सामाजिक भेद-भाव, पिछड़ापन, नीची जाति, दलित माने जाने वाले लोगों का क्या इतिहास ? यह सब भ्रांतियों ने किसी के पास तक यह जानकारी देने और लेने में कोई विशेष रस नहीं लिया था। पर अब इसका

अपना एक अलग इतिहास है, इसका अलग अपना एक साहित्य दल है जो भारत के लोगों को अपनी शक्ति का प्रदर्शन और दर्शन दोनों करा रहा है। आज आदिवासी समाज जागृत हो चुका है, शिक्षित हो गया है, और इसी कारण आज इसका अपना एक अलग ऐतिहासिक कार्यों में योगदान का महत्व दिखा रहा है। आदिवासी समाज की एकता, अहिंसक आदिवासी समुदाय, आदिवासी निसर्गवादी समुदाय के कारण माननीय सुप्रीम कोर्ट ने जनजाति समुदाय को मूल मालिक की संज्ञा दी। साथ में संयुक्त राष्ट्र महासभा द्वारा १९९४ में विश्व के आदिवासी लोगों का आंतरराष्ट्रीय दिवस भी घोषित किया। “२३ दिसंबर १९९४ के प्रस्ताव ४९/२१४ द्वारा, संयुक्त राष्ट्र महासभा ने निर्णय लिया कि विश्व के आदिवासी लोगों के अंतरराष्ट्रीय दशक के दौरान आंतरराष्ट्रीय आदिवासी लोगों का अंतरराष्ट्रीय दिवस हर साल ९ अगस्त को मनाया जाएगा।”१

९ अगस्त १९८२ में संयुक्त राष्ट्र संघ ने स्वदेशी आबादी पर पहली बैठक आयोजित की थी। इस दिन को मनाने का मकसद, आदिवासी समुदायों की सांस्कृतिक विविधता और उनके अधिकारों को मान्यता देना था। इस दिन को मनाने के कारणों में (१) आदिवासी समुदाय के लोगों को अपना अस्तित्व, संस्कृति, और सन्मान बचाने के लिए संघर्ष करना पड़ता था, (२) आदिवासी समुदाय के लोगों की भाषाएं, संस्कृति, त्योहार, रीत-रिवाज और पहनावा अलग था, (३) आदिवासी समुदाय के लोगों की संख्या समय के साथ घटती जा रही थी, (४) आदिवासी समुदाय के लोगों को संरक्षण और बढ़ावा देने के लिए इस दिन को मनाया जाए, (५) इस दिन आदिवासी समुदाय के लोगों को वैश्विक मंच पर अपने दृष्टिकोण और चिंताओं को साझा करने का मौका मिलता है। संयुक्त राष्ट्र के मुताबिक, दुनिया के ४० देशों में ४३ करोड़ मूल निवासी हैं, जिनमें से २५% लोग भारत में रहते हैं।

‘आदिवासी’ शब्द हिन्दी शब्द ‘आदि’ से निकला है, जिसका अर्थ है, आरंभिक काल या शुरुआत से, तथा ‘वासी’ का अर्थ है ‘निवासी या निवास करने वाला’। और इसे १९३० के दशक में गढ़ा गया था।

वर्तमान समय २०२४ में अंतरराष्ट्रीय आदिवासी दिवस की थीम “स्वैच्छिक अलगाव और प्रारंभिक संपर्क में स्वदेशी लोगों के अधिकारों का संरक्षण” (Protecting the Rights of Indigenous people’s in Voluntary Isolation and Initial Contact) भी तय कर लि गई है।

मूल आदिवासी कौन हैं ? और आदिवासी लोगों ने अंग्रेजों के विरुद्ध अनेक विद्रोह भी किए, जिन्हे आज हम और आप नहीं जानते। इसलिए एक ‘आदिवासी भारतीय नागरिक’ होने की जिम्मेदारी को निभाते हुए हमारा यह सबसे पहला कर्तव्य है कि उनके ऐतिहासिक काल खंडों के मुताबिक, उनके जीवन की लड़ाई को, और विशेष उनके अंग्रेजों के विरुद्ध किए गए विद्रोहों को आपके सामने प्रस्तुत करे।

गुलाम भारत के समय में हुए मूल आदिवासियों द्वारा ‘अंग्रेजों के विरुद्ध किए गए विद्रोहों’ का

कालक्रमानुसार संक्षिप्त वर्णन निम्नलिखित है। :-

(1) 18 वीं शताब्दी के विद्रोह : (कुल 10 थे)

- ❖ 1766-1772 : भूमिज जमींदार जगन्नाथ सिंह पातर के नेतृत्व में ‘चुआड विद्रोह’।
- ❖ 1770-1787 : चट्टग्राम पहाड़ी क्षेत्र में ‘चकमा विद्रोह’।
- ❖ 1771-1809 : जंगल महलों की हुमिज जनजातियों द्वारा ‘चुआर विद्रोह’।
- ❖ 1774-1779 : ब्रिटिश सेनाओं और मराठों के खिलाफ बस्तर राज्य में हलबी जनजातियों द्वारा ‘हलबा डोंगर विद्रोह’।
- ❖ 1778 : अंग्रेजों के खिलाफ छोटानागपूर के पहाड़िया सरदारों का विद्रोह। (पहला)

- ❖ 1789-1785 : महाराष्ट्र में महादेव कोली जनजाति और संताल जनजाति के तिलका मांझी का विद्रोह।
- ❖ 1789 : अंग्रेजों के खिलाफ छोटानागपुर के तामार का विद्रोह। (दूसरा)
- ❖ 1794-1795 : फिर से अंग्रेजों के खिलाफ छोटानागपुर के तामार का विद्रोह। (तीसरा)
- ❖ 1798 : छोटानागपुर में पांचेट एस्टेट की बिक्री कर खिलाफ भूमिज आदिवासियों का विद्रोह। (चौथा)
- ❖ 1798-1799 : दुर्जन सिंह के नेतृत्व में चुआड विद्रोह।

(2) 19 वीं शताब्दी के विद्रोह : (कुल 25 थे)

- ❖ 1812 : वायनाड़ी मरण कुरीचियार और कुरुमबर का विद्रोह।
- ❖ 1825 : सिंगफों ने असम के सादिया में ब्रिटिश पत्रिका पर हमला किया और आग लगा दी।
- ❖ 1832 : कोल विद्रोह; हो, मुंडा, भूमिज और उरांव के नेतृत्व में।
- ❖ 1833 : गंगा नारायण सिंह के नेतृत्व में जंगल महल में भूमिज विद्रोह।
- ❖ 1837 : पोटो हो का विद्रोह।
- ❖ 1843 : सिंगफो प्रमुख निरंग फिदु ने ब्रिटिश गैरिसन पर हमला किया और कई सैनिकों को मार डाला।
- ❖ 1849 : कदमा सिंगफो ने असम में ब्रिटिश गांवों पर हमला किया और कब्जा कर लिया।
- ❖ 1850 : प्रमुख बिसोई के नेतृत्व में खोंड जनजाति ने उड़ीसा की सहायक नदियों में विद्रोह किया।
- ❖ 1855 : सिद्धू और कान्हू के नेतृत्व में राजमहल हिल्स में अंग्रेजों के खिलाफ संथाल समुदाय द्वारा संथाल हूल।
- ❖ 1857 : 1857 के व्यापक विद्रोह के हिस्से के रूप में छोटानागपुर में चैरो और खारवार विद्रोह; राजा नीलमणि सिंह के नेतृत्व में पुरलिया में भूमिज और संथालों का विद्रोह।
- ❖ 1857-1858 : भील ने 1857 के विद्रोह के हिस्से के रूप में भागोजी नाइक और काजर सिंह के नेतृत्व में विंध्य और सतपुड़ा पर्वतमाला के बीच विद्रोह किया।

- ❖ 1858-1895 सरदारी आंदोलन
- ❖ 1859 : एबरडीन की लड़ाई में अंडमानी।
- ❖ 1860 : मिजो ने त्रिपुरा राज्य पर छापा मारा और 186 ब्रिटिश विषयों को मार डाला।
- ❖ 1860-1862 : पूर्वी बंगाल और असम में जयंतिया पहाड़ियों में सिटिंग विद्रोह।
- ❖ 1861 : जुआंग समुदाय ने उड़ीसी में विद्रोह किया।
- ❖ 1862 : कोया समुदाय ने गोदावरी जिले में मुतादेर्स के खिलाफ विद्रोह किया।
- ❖ 1869-1870 : संथालों ने एक स्थानीय सम्राट के खिलाफ धनबाद में विद्रोह किया। विवाद सुलझाने के लिए अंग्रेजों ने की मध्यस्थता।
- ❖ 1879 : नागा ने असम में विद्रोह किया।
- ❖ 1879 : कोया ने तमंदोरा के नेतृत्व में विशाखापटनम हिल ट्रैक्ट एजेंसी के मलकानगिरि में विद्रोह किया।
- ❖ 1883 : हिन्द महासागर में अंडमान और निकोबार द्वीप समूह के प्रहरी आदिवासी लोगों ने अंग्रेजों पर हमला किया।
- ❖ 1889 : मुंडा द्वारा छोटा नागपूर में अंग्रेजों के खिलाफ जन आन्दोलन।
- ❖ 1891 : एंग्लो-मणिपुरी युद्ध जहां अंग्रेजों ने मणिपुर राज्य पर विजय प्राप्त की।
- ❖ 1892 : लुशाई लोगों ने बार-बार अंग्रेजों के खिलाफ विद्रोह किया।
- ❖ 1899-1900 : बिरसा मुंडा के नेतृत्व में मुंडा आदिवासी समुदाय द्वारा विद्रोह।

(3) 20 वीं शताब्दी के विद्रोह : (कुल 11 थे)

- ❖ 1910 : मध्य प्रांत के बस्तर राज्य में बस्तर विद्रोह।
- ❖ 1913-1914 : बिहार में ताना भगत आंदोलन।
- ❖ 1913 : अरावली रेंज की मानगढ़ पहाड़ियों में भीलों का विद्रोह।
- ❖ 1917-1919 : मणिपुर में ब्रिटिश औपनिवेशिक शासन के खिलाफ उनके सरदारों के नेतृत्व में कुकी विद्रोह जिसे हाओस कहा जाता है।
- ❖ 1920-1921 : ताना भगत आंदोलन फिर हुआ।
- ❖ 1922 : अल्लूरी सीताराम राजू के नेतृत्व में कोया आदिवासी समुदाय ने गोदावरी एजेंसी में अंग्रेजों के खिलाफ विद्रोह किया।
- ❖ 1928-1940 : कोमुरम भीम के नेतृत्व में गोंड आदिवासी विद्रोह।

- ❖ 1932 : मणिपुर में 14 वर्षीय रानी गार्डिन्ल्यू के नेतृत्व में नागाओं ने विद्रोह किया।
 - ❖ 1941 : हैदराबाद राज्य के आदिलाबाद जिले में ब्रिटिश सरकार के खिलाफ सहयोग से गोंड और कोलम ने विद्रोह किया।
 - ❖ 1942 : जयपुर राज्य के कोरापुट में लक्ष्मण नाइक के नेतृत्व में आदिवासी विद्रोह।
 - ❖ 1942-1945 : अंडमान और निकोबार द्वीप समूह की जनजातियों ने द्वितीय विश्वयुद्ध के दौरान जापानी सैनिकों द्वारा अपने द्वीपों पर कब्जे के खिलाफ विद्रोह किया।
- इस प्रकार समय-समय पर कुल 40 से 41 जीतने आदिवासियों द्वारा विद्रोह किए गए थे।

(4) स्वतंत्रता संग्राम के पूर्व में किए गए प्रमुख विद्रोहों का संक्षिप्त वर्णन :

- ❖ 1766-1772-1900 'भूमिज', 'चुआड़' विद्रोह :
- ❖ 1832 : 'कोल' विद्रोह :
- ❖ 1833 : गंगानारायण विद्रोह :
- ❖ 1837 : 'पोटो हो' विद्रोह :
- ❖ 1855 : सिद्धू और कान्हू ('संथाल' विद्रोह) :
- ❖ 1899-1900 : बिरसा मुंडा के नेतृत्व में 'मुंडा' आदिवासी समुदाय का विद्रोह :
- ❖ 1922 : अल्लूरी सीताराम राजू के नेतृत्व में 'कोया' आदिवासी समुदाय ने गोदावरी एजेंसी में अंग्रेजों के खिलाफ विद्रोह :
- ❖ 1928-1940 : कोमुरम भीम के नेतृत्व में गोंड आदिवासी विद्रोह :
- ❖ 1932 : रानी गार्डिन्ल्यू के नेतृत्व में नागाओं ने किए विद्रोह :

(5) प्रमुख आदिवासी क्रांतिकारी योद्धाओं के नाम-विद्रोह और वर्ष की सूची

- ❖ जगन्नाथ सिंह - चुआड़ विद्रोह (1766-71)
- ❖ सुबल सिंह - चुआड़ विद्रोह (1766-71)
- ❖ तिलका माँझी - संथाल विद्रोह (1784-85)
- ❖ दुर्जन सिंह - चुआड़ विद्रोह (1786-99)
- ❖ गंगानारायण सिंह - भूमिज विद्रोह (चुआड़ विद्रोह) (1831-34)
- ❖ रघुनाथ सिंह - चुआड़ विद्रोह (1831-34)

- ❖ बिंदराय मानकी - कोल विद्रोह (1832-33)
- ❖ सिंदराय मानकी - कोल विद्रोह (1832-33)
- ❖ बुधू भगत - कोल विद्रोह (1832-33)
- ❖ पोटो हो - हो विद्रोह (1837)
- ❖ तेलंगा खड़िया - खड़िया विद्रोह (1850-60)
- ❖ सिद्धू-कान्हू मुर्मू - संथाल विद्रोह - (1855)
- ❖ टंट्या भील - भील विद्रोह (1878-89)
- ❖ बिरसा मुंडा - मुंडा विद्रोह (उलगुलान) (1899-1900)
- ❖ जतरा भगत - स्वतंत्रता आंदोलन (1922)
- ❖ अल्लुरी सीताराम राजू - स्वतंत्रता आंदोलन (1928-40)
- ❖ रानी गाईदिन्ल्यू - स्वतंत्रता आंदोलन (1932)

“वास्तव में ‘आदिवासी’ आर्यों से पूर्व का मनुष्य-समूह है। वह इस भूमि का मूल मालिक है। सही अर्थों में वही ही क्षेत्राधिपति है। इसलिए कुछ अध्येताओं ने उन्हें ‘अरिजनल’ कहकर संबोधित किया है। जो उचित भी है। वनराई के बच्चे ही इस भूमि की आदि संतान है। गोंड, भील, करेली आदि आदिवासी जनजातियों के आर्य पूर्व निवास के बारे में महात्मा ज्योतिबा फुले जी ने मार्मिक वचन कहे हैं। वे लिखते हैं -

“गोंड भील क्षेत्री ये पूर्व स्वामी

पीछे आए वहीं ईरानी

शूर, भील मछुआरे मारे गए रारों से

ये गए हकाले जंगलों गिरिवनों में।”^२

आदिवासी ही भारत के मूल निवासी थे उन्हें बाहर से आए आक्रान्ताओं ने उन पर अत्याचार, जुल्म किए, जंगलों में भागने पर मजबूर किया। और इस आधार पर उन्हें वनवासी-जंगली कहा गया। आदिवासियों को ‘वनवासी’ कहना सही नहीं है। साथ ही अंग्रेज उपनिवेशवादियों द्वारा ‘अनुसूचित जनजाति’ नाम भी उपयुक्त नहीं लगता।

इसी बात को यथार्थ रूप देते हुए गंगासहाय मीणा लिखते हैं - “जैसे ‘अनुसूचित जाति’ की जगह ‘दलित’ शब्द गहरे अर्थ रखता है वैसे ही ‘अनुसूचित जनजाति’ केवल आरक्षण या नौकरियों में हिस्सेदारी के संदर्भ में प्रासंगिक हो सकता है। आदिवासी एकता और संघर्ष की परंपरा का बोध नहीं करा पाता। ‘आदिवासी’ शब्द उस चेतना का भी प्रतीक है जिसकी मदद से उन्होंने अपने दुःख दर्दों को समझा है और जो उन्हें मुक्ति की राह में आगे बढ़ा रही है। ‘आदिवासी’ पद में एक आन्दोलनधर्मिता है जो ‘जनजाति’ में नहीं है।” आदिवासी विमर्श की अवधारणा के लिए आदिवासी समाज और सांस्कृतिक रीत-रिवाज, परंपरा, सभ्यता, वेशभूषा, जीवन-यापन आपसी व्यवहार आदि की विशेषताओं की पहचान जरूरी है। “पूर्वोत्तर में कितने अलग-अलग तरह के आदिवासी समाज हैं और उनके बीच कितने तरह के अंतर्विरोध हैं, और वे सभी अपनी अपनी अलग पहचान को कायम रखने के लिए कितना संघर्ष कर रहे हैं। इसके साथ ही पूर्वोत्तर के आदिवासी समुदायों के बाकी भारत के आदिवासी समुदायों में कई तरह के महत्वपूर्ण फर्क हैं। एक बुनियादी फर्क जो हमेशा ध्यान में रखना चाहिए कि मध्य-उत्तर और पश्चिमोत्तर भारत में जो आदिवासी समाज रहते हैं वे सदियों से अपने चारों ओर हिन्दू आबादी से घिरे रहे हैं। इस कारण उनके अंदर बाकी हिन्दूओं से अपनी स्वायत्तता के बोध के बावजूद अलगाव की तीव्र भावना नहीं मिलती। लेकिन पूर्वोत्तर के आदिवासी एक जामाने से मुख्य भारत भूमि से बिल्कुल अलग रहे हैं। इसलिए बाकी भारत के साथ उनका लगाव और जुड़ाव वैसा कभी नहीं हो सकता जैसा मध्य और उत्तर भारतवासियों का है। यही कारण है कि पूर्वोत्तर के आदिवासी समुदायों पर छठ शिड्यूल लागू किया गया है। जिसके फल स्वरूप उनकी जमीन की पूर्ण सुरक्षा है और वहाँ उनके अपने इलाके हैं, जहाँ उन्हीं की परिषदें स्थानीय प्रशासन चलाती हैं।”³

दुनिया भर में 500 मिलियन के करीब आदिवासी रहते हैं और 7000 भाषाएं बोलते हैं, 5000 संस्कृतियों के साथ दुनिया की 22 प्रतिशत भूमि पर इनका कब्जा है। इनकी वजह से पर्यावरण संरक्षित है। साल 2016 में 2680 ट्राइबल भाषाएं विलुप्त होने की कगार पर थी। इसलिए संयुक्त राष्ट्र महासभा ने इन भाषाओं और इस समाज के लोगों के महत्व को समझने और समझाने के लिए 2019 में 'विश्व आदिवासी दिवस' मनाने की घोषणा की गई थी।

निष्कर्ष :

18 वीं शताब्दी, 19 वीं शताब्दी और 20 वीं शताब्दी के अंग्रेज विद्रोह यह घोषित करती हैं कि आदिवासी ही भारत के मूल निवासी थे, हैं, और रहेंगे। स्वतंत्रता आंदोलन के नेता बने उपरोक्त आदिवासी क्रांतिकारियों ने आदिवासियों को औपनिवेशिक कानूनों का विरोध और लगान देने से इनकार करने के लिए सबको प्रोत्साहित किया। गुरिल्ला युद्ध, धार्मिक प्रथाओं को चुनौती देने और सामाजिक परिवर्तनों को शामिल करते हुए उलगुलान आंदोलन शुरू किया था। जिसे सही मानते हुए वर्तमान भारतवर्ष की केंद्र सरकार द्वारा सन् 2021 में जनजाति गौरव के ऐतिहासिक संघर्षमयी योगदान को स्वीकार करते हुए 'बिरसा मुंडा जयंती' को प्रतिवर्ष 'राष्ट्रीय जनजाति गौरव दिवस' के रूप में मनाए जाने की घोषणा भी की गई।

संदर्भ सूची

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- (2) रामणिका गुप्ता (संपादक) आदिवासी कौन, राधाकृष्ण पेपरबैक, नई दिल्ली, संस्करण 2022 पृ - 27
- (3) अखिलेश (संपादक) वीर भारत तलवार, आदिवासी और आदिवासी साहित्य की अवधारणा, तद्भव पत्रिका अंक 34, नवम्बर 2016 पृ - 30

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આજના ગુજરાતી કાવ્યોમાં આધુનિક જીવનની છબીઓ

પટેલ કલ્પનાબેન રણછોડભાઈ
રીસર્ચ સ્કોલર,
ગુજરાતી વિભાગ,
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી, સુરત

સારાંશ :

આજના ગુજરાતી કાવ્યોમાં આધુનિક જીવનનું જીવંત પ્રતિબિંબ જોવા મળે છે. આ કાવ્યો ટેકનોલોજીની ગતિશીલતા, વ્યસ્ત નગરીય જીવનશૈલી, માનવસંબંધોની ઉથલપાથલ અને ભૌતિકતાવાદના અસરોને વર્ણવે છે. ગુજરાતના કવિઓ આધુનિક યુગની એકલતા, આસ્થાકાંતિ અને માનસિક સંઘર્ષોને સર્જનાત્મક રીતે અભિવ્યક્ત કરે છે.

આધુનિક કવિતામાં પરંપરાગત છંદ અને શૈલીમાંથી બહાર આવીને નવા પ્રયોગો જોવા મળે છે, જેમ કે પ્રતિકાત્મક ભાષા, મુક્ત છંદ અને વિચારશીલ અભિવ્યક્તિ. નગરીય અને ગ્રામ્ય જીવન વચ્ચેનો તફાવત, કુદરતી સંસ્કૃતિનો વિનાશ, અને મશીનીકરણના પ્રભાવને આ કાવ્યોમાં હૃદયસ્પર્શી રીતે વ્યક્ત કરવામાં આવે છે.

આ રીતે, આજના ગુજરાતી કાવ્યો આધુનિક જીવનની પ્રત્યક્ષ છબીઓને પકડીને તેનાથી સંકળાયેલી સમસ્યાઓ અને સંભવિત ઉકેલ માટેનું માર્ગદર્શન પૂરું પાડે છે.

પ્રસ્તાવના:

ગુજરાતી સાહિત્યે હંમેશા સમાજના વિચારધારા અને જીવનશૈલીનું પ્રતિબિંબ વ્યક્ત કર્યું છે. કાવ્ય જેવું સાધન મનુષ્યના આંતરિક અને બાહ્ય અનુભવોને ઉત્તમ રીતે રજૂ કરે છે. આધુનિક યુગે માનવીના જીવનમાં વિવિધ પરિવર્તનો લાવ્યા છે, જેમાં ટેકનોલોજીનો પ્રભાવ, વ્યસ્ત નગરીય જીવનશૈલી, ભૌતિકતાવાદ અને માનવસંબંધોની કટુતા મુખ્ય છે. આ પરિવર્તનો કવિઓના સર્જનાત્મક વિચારધારા પર પણ પોતાનો પ્રભાવ

છોડી ગયા છે.

આધુનિક ગુજરાતી કવિતાઓ આ નવા યુગના સંઘર્ષો અને સંઘર્ષોથી પ્રેરિત છે. તે માનવ જીવનની વાસ્તવિકતાને માત્ર દર્શાવે છે નહીં, પરંતુ તેની અંદર રહેલી ભાવનાત્મક ઊંચાઇઓ અને કુદરત પ્રત્યેની વેદનાને પણ વ્યક્ત કરે છે. મશીનીકરણના કારણે ઉદભવતા તણાવ, ટેકનોલોજીથી બદલાતા સંબંધો, અને આધુનિક જીવનની એકલતા આ કવિતાઓમાં સ્પષ્ટ રીતે ચમકે છે.

કવિઓના સર્જનમાં આધુનિક જીવનની વિશિષ્ટ ઝાંખી મળે છે, જે માનવ જીવનની આબેહૂબ મૂર્તિ ઊભી કરે છે અને તેને એક દર્પણ તરીકે સમાજ સામે મૂકે છે. આ કવિતાઓના માધ્યમથી કવિઓ માત્ર સમયના સંકેતો જ નથી આપતા, પરંતુ ભાવિ પેઢીને ચિંતનશીલ બનાવવાના પ્રયાસ કરે છે.

આ રિસર્ચ પેપરનો ઉદ્દેશ છે ગુજરાતી કાવ્યધારા હેઠળ આધુનિક જીવનની છબીઓનું વિશ્લેષણ કરવો, જે જીવનના વિવિધ પાસાઓને સમજવામાં સહાયરૂપ બને છે. ગુજરાતી કવિતાનું આ અંગ માત્ર કવિઓના સર્જનમાટે મહત્વનું નથી, પરંતુ સમાજના ભાવિ ચિંતન માટે પણ શ્રેષ્ઠ દિશા પ્રદાન કરે છે.

અધ્યયનના હેતુ:

1. આજના કાવ્યોમાં આધુનિક જીવનના તત્ત્વોની ઓળખ કરવી.
2. આ તત્ત્વો કાવ્યના વિષયવસ્તુ અને શૈલીમાં કેવી રીતે પ્રગટ થાય છે તે સમજવું.
3. આ કાવ્યોમાં પેઢી, સમાજ અને માનસિકતાના બદલાવને કેવી રીતે દર્શાવવામાં આવ્યો છે તે શોધવું.

અધ્યયન પદ્ધતિ:

- જાણીતા કવિઓના કાવ્યોના સંદર્ભનો ઉપયોગ (જેમ કે હસુ, ઉમાશંકર જોષી, મકરંદ દવે, કેતીલ દેસાઈ, વગેરે).
- કાવ્યના વિશ્લેષણ માટે આલેખન અને ભાવવ્યાખ્યા.
- વિષયવસ્તુ અને ભાવ અભિવ્યક્તિના માધ્યમથી આધુનિક જીવનની છબીઓનું મૂલ્યાંકન.

અધ્યયન માટે આ વિષયની પસંદગીનું મહત્વ:

આજના યુગમાં જીવનશૈલી ઝડપથી બદલાઈ રહી છે, અને આધુનિક જીવનના વિવિધ પાસાઓ સાહિત્યમાં સ્પષ્ટપણે જોવા મળે છે. ગુજરાતી કાવ્યધારા કે જે હંમેશા સમયના મિજાજનું પ્રતિબિંબ રહી છે, તેમાં આધુનિક જીવનના પરિવર્તનો મહત્વપૂર્ણ રીતે અભિવ્યક્ત થાય છે. આ વિષયના અધ્યયન માટે નીચેના કારણો આકર્ષક છે:

- સમાજના વિકાસનો અભ્યાસ:** કવિતાઓ આધુનિક જીવનના સંઘર્ષો, ટેકનોલોજીનો વધતો પ્રભાવ, અને માનવ જીવનમાં આવતા પરિવર્તનોને મૂલ્યવાન રીતે પકડી રાખે છે. આ વિષય આધુનિક સમાજના વિકાસને વધુ સારી રીતે સમજવા માટે સહાયરૂપ છે.
- ભાવવિશ્વ અને માનસશાસ્ત્રનું અનુસંધાન:** આધુનિક કવિતાઓ માણસની આંતરિક વ્યથા, એકલતા, અને તણાવને અભિવ્યક્ત કરે છે. આ વિષય માનસિક વિકાસ અને મનોવિજ્ઞાનિક પ્રશ્નોને સમજાવવા માટે મહત્વપૂર્ણ છે.
- સાહિત્યના નવો મિજાજ:** આધુનિક ગુજરાતી કાવ્યમાં પરંપરાગત શૈલીઓમાં પ્રયોગ જોવા મળે છે. ટેકનોલોજીના પ્રભાવથી જીવનમાં થયેલા પરિવર્તનોને નવો

શૈલીમાં રજુ કરવાથી સાહિત્યમાં નવું ધ્યાનઆકર્ષણ થાય છે.

4. કવિતાનો સામાજિક ઉદ્દેશ: કવિતા માત્ર કલાત્મક અભિવ્યક્તિ જ નહીં, પણ સમયના પડકારો માટે વિચારમંચ પણ છે. આ વિષય કવિતાના આદર્શ અને તેનાથી પ્રદાન થતી જીવનમૂલ્યને સમજવામાં મદદરૂપ થાય છે.
5. ભવિષ્યનું માર્ગદર્શન: આધુનિક જીવનના પ્રત્યક્ષ અને પરોક્ષ અભિવ્યક્તિ દ્વારા કવિતાઓ ભવિષ્ય માટે એક આદર્શ ભવાણી બનાવે છે. આ વિષય પેઢીઓ માટે સાહિત્યની મહત્વતા અને તેનો સામાજિક પ્રભાવ સમજવા માટે જરૂરી છે.

આજના ગુજરાતી કાવ્યોમાં આધુનિક જીવનના તત્ત્વોની ઓળખ:

આધુનિક જીવનમાં સમાજ, માનવી અને તેના આસપાસની પરિસ્થિતિઓમાં આવેલા પરિવર્તનો આજે કાવ્યમાં સ્પષ્ટપણે પ્રતિબિંબિત થાય છે. આ તત્ત્વો કવિઓના સર્જનમાં મૂલ્યવાન રીતે પ્રગટ થાય છે, જે જીવંત અને વૈચારિક અનુભવોને વ્યક્ત કરે છે. નીચે આધુનિક જીવનના મુખ્ય તત્ત્વોની ઓળખ કરેલ છે:

1. ટેકનોલોજીનો પ્રભાવ:

- ટેકનોલોજીના કારણે જીવન ઝડપથી મશીનમય બનતું જાય છે, જે નગરીય જીવનશૈલી અને માનવીય સંબંધોમાં અંતર લાવે છે.
- આ તત્ત્વ કાવ્યમાં વિજ્ઞાન અને મશીનીકરણથી થતા આદરશ અને વાસ્તવિકતા વચ્ચેના સંઘર્ષને વ્યક્ત કરે છે.

2. નગરીય જીવનની વ્યસ્તતા:

- શહેરોમાં વ્યસ્ત જીવનશૈલી અને સમયનો અભાવ કાવ્યમાં વ્યથા અને માનસિક તાણના રૂપમાં પ્રગટ થાય છે.
- આ તત્ત્વ કવિઓના સર્જનમાં નગર અને ગામ વચ્ચેની તફાવતના માધ્યમથી વ્યક્ત થાય છે.

3. માનવસંબંધોની એકલતા:

- આધુનિક જીવનમાં પરિવાર અને સામાજિક બાંધણીઓનું શિથિલ થવું અને માણસની એકલતા સ્પષ્ટ છે.
- આ તત્ત્વ કવિતામાં એકાંત, અધૂરાપણું અને ખાલીપણાની અભિવ્યક્તિ દ્વારા દેખાય છે.

4. ભૌતિકતાવાદ અને લાલચ:

- આર્થિક વિકાસ સાથે ભૌતિક લાલચ અને તૃષ્ણા વધી છે, જે માનવીને આધ્યાત્મિકતાથી દૂર કરે છે.
- આ તત્ત્વ કાવ્યમાં જીવનની નાનકડી સુખદ ક્ષણો અને ભૌતિક વ્યાપાર વચ્ચેના તફાવતને સ્પષ્ટ કરે છે.

5. પર્યાવરણનું વિનાશ અને કુદરતી સંસ્કૃતિનું ક્ષય:

- આધુનિક જીવન કુદરતી સંસાધનોનો દુરુપયોગ કરી પર્યાવરણની ક્ષતિ લાવે છે.
- આ તત્ત્વ કવિતામાં કુદરતના વિલાપ અને માનવીય લાલચના પરિણામ તરીકે દર્શાવાય છે.

6. તણાવ અને માનસિક સંઘર્ષ:

- આધુનિક યુગમાં ઉત્પન્ન તણાવ અને માનસિક સમસ્યાઓ કાવ્યમાં વ્યક્ત થાય છે.
- આ તત્ત્વ કવિઓ દ્વારા વ્યક્તિગત અનુભવો અને આધુનિક માનસિક સંકટોના રૂપમાં રજૂ થાય છે.

7. આદરશ અને વાસ્તવિકતાના વિસંવાદ:

- આધુનિક જીવનમાં માનવીના આદરશો અને તેની વાસ્તવિકતા વચ્ચેના વિસંવાદને કાવ્યમાં વ્યક્ત કરવામાં આવે છે.
- આ તત્ત્વ આધુનિક માનવીના આંતરિક સંઘર્ષ અને આસપાસની પરિસ્થિતિઓથી જંગ પ્રગટ કરે છે.

8. પ્રયોગશીલતા અને નવો શૈલીમિજાજ:

- આધુનિક કવિતામાં મુક્તછંદ, પ્રતિકાત્મક ભાષા અને વિવિધ નવી અભિવ્યક્તિઓ જોવા મળે છે.

- આ તત્ત્વ કવિઓના મૌલિક પ્રયોગો દ્વારા કાવ્યમાં રજૂ થાય છે.

ઉદાહરણો અને વિમર્શ:

આજના ગુજરાતી કાવ્યોમાં આધુનિક જીવનના તત્ત્વોને વિશિષ્ટ ઉદાહરણો દ્વારા વ્યક્ત કરવામાં આવ્યા છે. આ કાવ્યોમાં ટેકનોલોજી, નગરીય જીવનશૈલી, પર્યાવરણીય સમસ્યાઓ, અને માનવસંબંધોની વિમુક્તતા જેવી સમસ્યાઓ દર્શાવવામાં આવી છે. અહીં કેટલાક પ્રચલિત કવિતાના ઉદાહરણો અને તેમના વિમર્શનો સમાવેશ કરવામાં આવ્યો છે:

ઉદાહરણ 1 : માનવસંબંધોની વિમુક્તતા

ઉમાશંકર જોષીની કવિતા "મૂંગા પડ્યાં" માનવસંબંધોની તૂટણ અને એકલતાનું ભાવવેચન કરે છે.

વિમર્શ:

આ કવિતા વ્યક્તિગત જીવનમાં ટેકનોલોજીના વધતા પ્રભાવને સમજાવે છે, જ્યાં એકબીજાને જોવા અને સાંભળવા માટેનો સમય નથી. કુટુંબ અને મિત્રતાની ભાવનાને ખોઈને માણસ તણાવભર્યું જીવન જીવી રહ્યો છે.

ઉદાહરણ 2 : ટેકનોલોજીનો પ્રભાવ

મકરંદ દવેની કવિતા "મશીનમય મગજ" ટેકનોલોજીના કારણે માણસની માનસિક આઝાદી પર પડતા પ્રભાવને વર્ણવે છે.

વિમર્શ :

કવિતામાં પ્રતિકાત્મકતા ઉપયોગમાં લેતા કવિ દર્શાવે છે કે મશીન આપણું મગજ કબજે કરી રહ્યા છે. કવિ ટેકનોલોજીના સારને સમજીને તેને જીવન માટે સાધન તરીકે મર્યાદિત રાખવાની અપેક્ષા વ્યક્ત કરે છે.

ઉદાહરણ ૩ : નગરીય જીવનની વ્યસ્તતા

મધુ રાયની કવિતા "વિહંગાવલોકન" નગરની જિંદગીના વર્ણન માટે પ્રખ્યાત છે.

વિમર્શ:

આ કવિતામાં નગરીય જીવનની ઝડપ અને વ્યસ્તતાને મુક્તછંદમાં દર્શાવાય છે. કવિ મનુષ્યના ગામડાથી નગર તરફના સંક્રમણ અને તેના પરિણામસ્વરૂપ તણાવને મૌલિક રીતે રજૂ કરે છે.

ઉદાહરણ ૪ : પર્યાવરણનું વિનાશ

હસુ યાજ્ઞિકની કવિતા "વૃક્ષોના આંસુ" કુદરતી સંસ્કૃતિના વિનાશ પર ભાર મૂકે છે.

વિમર્શ:

આ કવિતા પ્રકૃતિની વેદનાને વ્યક્ત કરે છે, જ્યાં વૃક્ષો કાપવામાં આવે છે અને નદીઓ પ્રદૂષિત થાય છે. આ કવિતા માધ્યમથી કવિ પ્રકૃતિ અને માનવજીવન વચ્ચેના સંબંધ પર ધ્યાન આકર્ષે છે.

ઉદાહરણ ૫ : આદરશ અને વાસ્તવિકતાના વિસંવાદ

કેતીલ દેસાઈની કવિતા "સપનાનો ખંડેર" આદરશો અને વાસ્તવિકતાના તફાવતને લઈને ઊંડા સંઘર્ષનું પ્રતિનિધિત્વ કરે છે.

વિમર્શ:

આ કવિતા જીવનમાં ઘડાતા આદર્શો અને જીવાતા વાસ્તવિકતાના તફાવતને સ્પષ્ટ રીતે દર્શાવે છે. માનવજાતના આ આંતરિક સંઘર્ષને એક અલૌકિક રીતે રજૂ કરવામાં આવ્યું છે.

સામાન્ય વિમર્શ:

1. આ કવિતાઓમાં ચિંતનશીલ ભાવ અને વૈચારિક દ્રષ્ટિકોણનો ઉપયોગ થાય છે, જે આધુનિક જીવનની જટિલતાઓને દર્શાવે છે.
2. કવિતા જીવનના તત્ત્વોને માત્ર આવરી લેતી નથી, પરંતુ તેને ઘડવાનું, સરળ બનાવવાનું અને વિચારસરણી બદલવાનું કાર્ય પણ કરે છે.
3. આ કવિતાઓ સમાજ માટે મિરર તરીકે કાર્ય કરે છે, જે જીવનની સમસ્યાઓનું દર્પણ છે અને ઉકેલ માટેનો માર્ગદર્શક પણ.

નિષ્કર્ષ:

આજના ગુજરાતી કવિતાઓમાં આધુનિક જીવનની છબીઓ જીવંત અને સ્પષ્ટ રૂપે પ્રગટ થાય છે. ટેકનોલોજીની ગતિશીલતા, ભૌતિકતાવાદ, નગરીય જીવનશૈલીની વ્યસ્તતા, અને પર્યાવરણના વિનાશ જેવા તત્ત્વો કવિતાઓમાં અભિવ્યક્ત થાય છે. કવિઓએ પોતાની રચનાઓમાં આ તત્ત્વોને મૌલિક પ્રયોગશીલ શૈલી દ્વારા વ્યક્ત કરીને સાહિત્યની નવી દિશા દર્શાવી છે. આ કવિતાઓ માત્ર આકર્ષક અને વૈચારિક જ નથી, પરંતુ સમયના પડકારો માટેનો પ્રતિસાદ પણ છે. તે મનુષ્યને તેના જીવનના આંતરિક અને બાહ્ય સંઘર્ષોની અનુભૂતિ કરાવે છે અને આ પ્રશ્નો માટે વિચારવ્યુહ તૈયાર કરે છે.

અધ્યયન દર્શાવે છે કે આજના કવિઓ કુદરત પ્રત્યેની સંવેદનશીલતા, માનવસંબંધોની ટૂટી રહેલી દોરી અને આધુનિક જીવનની એકલતાને કાવ્યમધ્યમથી જીવંત કરે છે. તેમની રચનાઓમાં વિશ્વવ્યાપી મૂડ અને સમાજના પ્રત્યેક સ્તરના માણસોની વેદના ઉંડાણપૂર્વક પ્રવાહી હોય છે. આધુનિક કવિતાઓની અભિવ્યક્તિ માત્ર સાહિત્યના અભ્યાસ માટે જ નહીં, પરંતુ આધુનિક યુગની ચિંતાઓ અને પ્રશ્નોને ઉકેલવા

માટે પણ એક મહત્વનું સાધન છે. ગુજરાતી કવિતાનું આ અધ્યયન ન કેવળ કાવ્યધારાને સમૃદ્ધ બનાવે છે, પરંતુ તેનાથી પેઢીઓને પ્રેરણા મળે છે કે કેવી રીતે વાસ્તવિકતા અને આદરશ વચ્ચે સંતુલન સાધી શકાય. આ રીતે, આજના ગુજરાતી કાવ્યોમાં આધુનિક જીવનની છબીઓ માનવીય અનુભૂતિઓ અને વાસ્તવિકતાનું સચોટ પ્રતિબિંબ છે, જે આગામી પેઢીઓ માટે યથાર્થ અને ભાવનાત્મક માર્ગદર્શન પ્રદાન કરે છે.

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Emergence and development of microfinance in India

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Abstract :

Microfinance plays an important role in lifting the poor out of poverty and empowering the poor. Access to microfinance facilities improves the living standards of the poor. Microfinance plays an important role in empowering poor women by alleviating their poverty. The present article is based on secondary information. Also, descriptive research method has been used in the article. The process from micro credit to micro finance in India has contributed significantly to the economic development of the country by eradicating poverty in the country. In the early days, the cooperative sector contributed to the development of micro-credit facilities in India, but in the post-independence period, the contribution of the cooperative sector was less than expected. The NGO sector has made a significant contribution to financial inclusion in India. The government sector has also played an important role in expanding microfinance services, such as IRDP, SGSY, NRLM, NULM, pradhan mantri jandhan yojana, pradhan mantri mudra yojana, NABARD's initiatives SIDBI's microfinance related initiatives etc. As a result of economic reforms, private credit institutions have also expanded and developed a lot in the country.

Key words :

micro finance, micro credit, India, emergence, development

Introduction :

Poverty is one of the main factors that hinder economic development. Microfinance plays an important role in overcoming this barrier. Microfinance has proven to be an instrumental tool in breaking the poverty trap. Microfinance is a blessing for the poor. Microfinance plays an important role in alleviating the poverty of the poor and improving their standard of living. The most positive impacts of microfinance services have been on women. Microfinance plays an important role in empowering women. Microcredit and microfinance are not synonymous concepts. There is a thin line between these two concepts. Microfinance refers to loaned capital, while microfinance

encompasses all monetary services, including microcredit. Mohammad Yunus who is the founder of Grameen Bank has made many efforts towards making micro finance services reach the poor. Yunus states that the term microfinance did not exist before the seventies but now it has become an important tool in the development process. (Pitt et al., 2006), (UN foundation, 2018), (YC, 2008) the microcredit committee held in Washington DC in 1997 considered microfinance as an important tool for poverty reduction. In the context of India, the history of microfinance services is very long. Initiatives from micro credit to micro finance have played a significant role in the development of the country. The co-operative sector of the country, government sector, NGO as well as the private sector have played an important role in the expansion of microfinance services in the country.

Review of literature :

Microfinance plays an important role in women's empowerment. Accessing credit through microfinance has increased women's self-confidence and income, which has resulted in increased participation of women in the decision-making process at home, and also increased independence in the use of money. Microfinance facilities have also improved women's skills and contributed to empowering women to defend themselves against domestic violence. (Mayoux, 1998)

Women live poorer than men in low-income households. Women spend a large part of their income on children and household welfare. Priority to women in microfinance is expected to result in positive results in lifting the household out of poverty. If women contribute all their income without empowering themselves, this is tantamount to exploiting women. (Mumtaz, 2000)

Credit unions in Latin America were generally established in the 1950s, 1960s, and 1970s with the aim of helping the poor, and MFIS began in Latin America in the 1980s through NGO initiatives. The geographical distribution of MFIS in Latin America is very uneven. The researcher states that Asian MFIS are more efficient than Latin American MFIS. (Ramírez, 2007)

Nobel laureate Mohammad Yunus states that every poor person has potential but they don't get a chance to show their skills. Capital is indispensable for showing skill. This capital does not reach the poor. The poor have to go through many struggles to get credit and the loans they get through the struggle end up in a debt trap. Everyone has innate abilities to rise out of poverty but lack of resources can result in them not rising

out of poverty. They can get out of poverty quickly if they are provided with credit to get out of poverty. (UN foundation, 2018),(YC, 2008)

When self-help groups were initiated for the purpose of providing financial assistance to the poor, it was expected that cooperatives would step up to provide these services. Although this has been proved in the case of agricultural credit societies, the role of agricultural credit societies and co-operative banks in SHGs. Banks have been limited in terms of linkages. Moreover, the self-help group and bank linkage approach has the potential to bring about significant improvements in cooperatives. Self-help groups play an important role in empowering women by helping them financially. Self-help groups also play an important role in promoting financial inclusion and making livelihoods sustainable in different regions of India. (Harper et al., 2005)

Microfinance plays an important role in raising the income level of the poor and improving the living standards of the poor. Microfinance and self-help groups aim at income generation, development of saving habits, self-employment and rural sector empowerment. Past experiences have proven that microfinance can significantly improve the livelihoods of poor and low-income people. Microfinance plays an important role not only in eradicating poverty but also in providing a regular source of livelihood. (Venkatesh, 2009)

Methodology :

The descriptive study method has been used in the present research article. The article is based on a review of literature and secondary data. All the secondary data covered in the study is taken from national and international level journals.

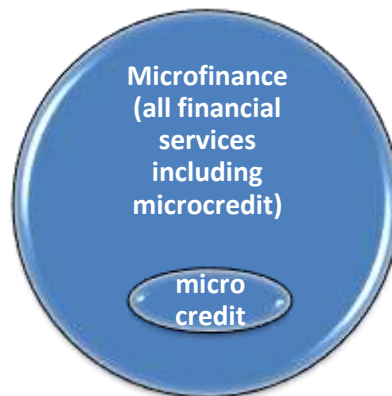
Microcredit and microfinance :

Microfinance and microfinance, both seemingly synonymous terms, have a thin line of distinction, like macro economics and micro economics. A microcredit is a small amount of money lent to an individual with or without interest. Microfinance is a system of thrift, credit, financial services and production for the poor. (IIBF, 2012) the basic difference between microfinance and microfinance is the type of services they provide. It comes when microfinance refers to all financial services including microcredit.

Mohammad yunus, the founder of grameen bank, states that the term microfinance did not exist before the seventies, but now it has become a key factor in the development process. It involves the provision of financial services by institutions to consumers. (Kashefa, 2018) the microcredit committee held in Washington DC in 1997 considered

microfinance an important tool for poverty reduction.

Figure – 1 – microfinance and microcredit



(source – researcher's creation)

Microfinance is changing people's lives. The UN declared 2005 the “international year of micro credit” to promote micro-enterprises and build the financial sector. Kofi A. Annan (seventh secretary general of the United Nations (1997 to 2006), Nobel Peace Prize - 2001) states that through access to microfinance, poor households can earn more, build wealth and protect themselves against unexpected shocks and losses. Microfinance plays an important role for poor and low-income families, the poor can invest more in nutrition, housing, health and education. Through microcredit, the poor can break the cycle of poverty. (International Year of Microcredit 2005, n.d.)

Figure – 2 - microfinance and development



(source – researcher's creation)

The earliest known writings on microfinance date from the middle of the nineteenth century. Lysander spooner discussed the advantages of many small loans as a way of reducing poverty among those who are poor. The indonesia people's credit bank was established in indonesia in 1895, the largest microfinance institution in indonesia. In 1959, akhtar hameed khan introduced revolutionary ideas in the field of microfinance. His “comilla cooperative pilot project” is considered a model for microfinance and rural development initiatives in developing countries. Muhammad yunus is recognized as the founder of modern microfinance. Yunus realized the concept of grameen bank, for which he also received the nobel prize. SHGBLP was started in India in 1992 by nabard. Today, microfinance is spread at every level of the world with the aim of providing financial system to the poor. (Khandelwal, 2007)

Emergence and development of microfinance in India

To bring the poor out of the poverty trap, providing financial support to the poor in a form that reduces their dependency and makes them independent is essential. Microcredit facility is a boon for the poor. In the context of the rural poor, the need for credit arises for many reasons such as social reasons, economic reasons, health and education etc.

The cooperative sector has played a major role in meeting the credit needs of the poor in India and protecting the poor from exploitation through informal sources of credit. The agricultural credit department was established by the reserve bank of India in 1935 to promote rural credit. During this period the government wanted to promote rural credit by strengthening cooperatives with the help of cooperatives. According to the all India rural credit survey report 1954, informal sources accounted for 70 percent of the credit available in the rural sector. Then the share of co-operatives was 6.4 percent and the share of commercial banks was 0.9 percent. (Amarnani et al., 2010)

The lead bank scheme was introduced by RBI in 1969. This started the process of district credit planning and coordination among various financial intermediaries. 14 commercial banks were nationalized during this period. (RBI, 2020) according to SADHAN (2004), the share of the formal financial sector in total rural credit utilization increased to 30 percent in 1971 as compared to 1954.

Sewa, started with the objective of wage justice for women, started seva co-operative

bank in Gujarat in 1974 to help women gain self-employment by providing credit facilities. Today the service is spread over 18 states and has 2.5 million members. (SEWA, n.d.) regional rural banks were conceptualized in 1975 to increase the coverage of financial services, resulting in the creation of a network of banks in rural areas. (Ministry of finance, n.d.)

In 1978-79, the ministry of rural development launched the integrated rural development program aimed at eradicating rural poverty, which has been in effect since 1980. The main objective of the program was to link up with the banking sector to provide subsidized loans to the poor self-employed. A scheme for the development of women and children in rural areas was launched in 1982 as part of the IRDP. (Rath, 1985) according to the "all India debt and investment survey" of 1981, the share of the formal financial sector in total credit has increased to more than 60 percent. (RBI, 1999) Mysore resettlement and development agency abbreviated as myrada is an NGO. This NGO was registered in 1968. This organization was one of the pioneers in the concept of self-help groups in India. Myrada started developing self-help groups to improve the livelihood of poor families. From 1984-85, the process of linking SHGs with banks. (myrada, n.d.) like MYRADA, PRDAN is a leading organization promoting SHGs which started in 1983 and since 1987 has been linked to government programs for poverty alleviation. (pradan, 2021) financial services were seen as a social responsibility in the country. Given the rising rates of default, the government announced a formal loan waiver in 1989, which reinforced the view that lending to the poor was unprofitable. (Amarnani et al., 2010)

SBLP started in 1989 as an action research project. The SBLP model mainly refers to linkages of SHGS with banks. This model emphasizes linking SHGs with banks to give them access to credit facilities. In this regard, nabard started a pilot project in 1992 and under this project, the objective was to connect 500 SHGs with banks within 1 year and provide credit facilities to them. As a result, by 1993, instead of 500, 600 SHGs were linked with banks and provided credit. With positive results in this direction, nabard continued this operation in the following years. (Malakar & Gautam, 2016), (NABARD, n.d.)

The rashtriya mahila kosh was established in march 1993 by the women and child development department of the ministry of human resource development to boost the funding of self-employed women in the unorganized sector. Rashtriya mahila kosh

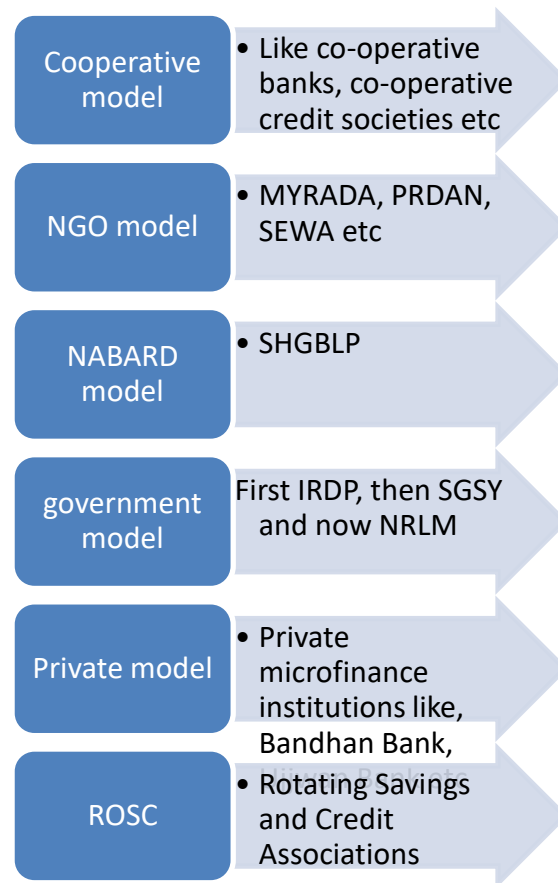
what facilities are provided by uresh banks? And what is the need of the poor? It is to bridge the gap between. (PIB, n.d.) seeing the success of SBLP, rbi included lending to SHGs in its priority areas of lending in 1996. In 1996, RBI had suggested 3 models of SHG-BLP. Sidbi foundation for micro credit was started by SIDBI in January 1999. SFMC aims to build a national network of strong and sustainable microfinance institutions to provide microfinance services to the poor, especially to women. (RBI, n.d.)

The irdp and some of its accompanying schemes were evaluated in 1983-84 by the program evaluation institute of the ministry of rural reconstruction. The PEO in its report released in 1985 said that IRDP needed a lot of reform. Based on the suggestions of PEO, IRDP was revised and reconstructed in the name of SGSY. Schemes like TRYSEM, SITRA, MWS, DWCRA were also integrated with IRDP. SGSY was a centralised scheme. The objective of SGSY was to create self-employment to alleviate poverty through a self-help group approach. (K P, 2021) private microfinance institutions also exist in India. Economic reforms in the country in 1991 have contributed significantly to the expansion and development of these private credit institutions. The united nations has declared the year 2005 as the “international year of micro credit”. (UN, n.d.) in 2006, NABARD introduced the JLG scheme for landless farmers. (Sheetal, 2023)

Based on the suggestions of prof. Radhakrishnan committee, the ministry of rural development, government of India restructured SGSY and started NRLM in the year 2010. The mission was launched on 3 june 2011 from banswala district of rajasthan. Then from the year 2013, this mission has been started in all areas of the country. Currently this mission is known as DAY-NRLM. (Chatterjee, 2016) e-shakti was launched by nabard in the year 2015 as a pilot project for self-help groups. (PIB, 2017), (Sheetal Mali, n.d.-a)

Thus cooperative sector, NGOs, private sector and government have all made several efforts to spread the scope and development of microfinance services in the country. The journey from microcredit to microfinance in India has been a long one.

Figure – 3– microfinance model



(source – researcher's creation)

In recent years, India's microfinance industry has experienced tremendous expansion. Approximately 6 crore distinct microfinance clients were supplied by different regulated companies, including as Small Finance Banks and NBFC-MFIs, as of June 30, 2022. (FY 21-22_MFIN, n.d.) An estimated 1.67 crore loans were disbursed annually by the microfinance sector. With a notable rise in both clientele and loan disbursements, the industry has demonstrated an impressive rate of expansion. Significant changes may be seen in the six-year statistics on SCB credit flow to micro and small businesses.(NCAER Microfinance Final Report 31-12-2021, n.d.), (Mf-India-2022-23, n.d.)

In India, microfinance institutions (MFIs) have made a substantial number of loan disbursements, improving millions of people's financial well-being. Microfinance-focused Non-Banking Financial Companies (NBFCMFIs) have played a significant role in reaching people who are frequently shut out of traditional banking services,

accounting for 41% of all loans disbursed and 38% of all outstanding portfolios. In India, private sector banks have disbursed 77 lakh loans in total, demonstrating the significant influence of microfinance in meeting the credit requirements of those who are economically marginalized. The purpose of this industry extends beyond merely offering financial aid; it also promotes entrepreneurship and raises the socioeconomic standing of communities across. (Saha et al., 2023)

As on 26 April 2024, 92,01,088 self-help groups were formed under this mission, covering 10,21,84,617 rural women. (MORD, GOI, n.d.) In 2023-24, a total of 56,42,704 self-help groups were formed in the country. These self-help groups were provided with financial assistance of Rs 20,744,817.43 (in lakhs). Out of these 56,42,704, 33,45,467 self-help groups were formed under the National Rural Livelihood Mission. These groups were provided with financial assistance of Rs. 11,926,783.41 (in lakhs). This year, the highest number of SHGs formed under the National Rural Livelihood Mission in the country was in West Bengal (7,29,550). The lowest number of SHGs were formed in the Union Territories of Andaman & Nicobar (11), Ladakh (22), Lakshadweep (9), Dadra & Nagar & Haev and Daman & Diu (30). (DAY-NRLM, n.d.), (Sheetal Mali, n.d.-b)

Conclusion

Microfinance has played an important role in the development of India. Microfinance has played an important role in eradicating poverty in the country, improving the living standards of the poor, creating new livelihood options, promoting women's development and empowerment, and promoting entrepreneurship. The cooperative, government, private and NGO sectors play a very active role in the development and expansion of microfinance in the country today.

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A Study on Awareness of Cyber Crime and Cyber Laws

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Abstract:

Most people now use the internet on a regular basis for their daily transactions. Both the number of people using the internet and cybercrimes has increased dramatically. Crimes committed through the use of computers and networks are referred to as cybercrimes. In both the private and professional spheres, the threat of cybercrime is constant and growing. The emergence of the internet has given ancient crimes a new look. The aim of this study is to raise awareness about cybercrimes. Which are taking place in the modern world and to raise awareness of the need for greater cyber security? This study aims to examine how knowledgeable internet users of various ages and educational backgrounds are of cybercrime. Both goals have been analyzed using the linear regression model. This study concludes that there is a correlation between the respondents' age groups and educational backgrounds. Therefore, it is the responsibility of every internet user to be aware of cybercrime and security, as well as to assist others by raising awareness among them.

Introduction:

The internet in India is growing rapidly. It has given rise to new opportunities in the field of entertainment, business, sports, education, and many more. With the advent and increasing use of internet, the businesses have crossed the barriers of local markets and are reaching out to customers located in every part of the world. Computers are widely used in enterprises not only as a tool for processing information, but also for gaining strategic and competitive advantage. Computers can be used both for constructive and destructive reasons.

The abuse of internet has given birth to new age crimes which are addressed by the Information Technology Act, 2000. As information around the globe has become more accessible, it has also become more vulnerable to misuse. India is on the radar of cyber criminals with growing cyber- attacks on Indian establishment. India rank

third as a source of *malicious activity* on the internet after US and China, second as source of *malicious code* and fourth and eight as source or origin for *web attacks* and *network attacks*.

According to the Indian Computer Emergency Response Team (CERT-In), 27,482 cases of cybercrime were reported from January to June (2017). These include phishing, virus or malicious code, defacements, scanning or probing, site intrusions, ransom ware and denial-of-service attacks.

It has been shown that in the first six months of 2017, at least one cybercrime was reported every 10minutes in India which is higher as compared to every 12 minutes in 2016. India has seen a total of 1.71 lakh cybercrimes in the past 3.5 years and the number of crimes so far this year has been 27,482, which indicates that the total number is likely to cross 50,000 by this December. Analysis of data from 2013 to 2016 shows that 6.7% of all cases accounted for network scanning and probing while virus or malware accounted for 17.2%.

According to the latest report National Crime Records Bureau(NCRB), a total of 11,592 cases were registered under the cyber-crimes (which includes cases under Information Technology Act, offences under related sections of IPC and offences under Special and Local Laws (SLL)) in comparison to 9,622 cases registered during the previous year (2014) which shows an increase of 20.5% over the previous year. Uttar Pradesh has reported the highest number of such crimes followed by Maharashtra and Karnataka.

The growing internet usage rate has created a problem for people who spend long hours browsing the Cyber World. In 2017, the number of mobile phone internet users grew 12.49 percent compared to the previous year and 23.93 percent of the population accessed the internet from their mobile phone. This figure is expected to grow to 34.85 percent in 2022. (statista.com, 2017). Thus, increased internet usage has opened the gate of cyber-crime to flood in. Lack of awareness on such issues will lead to the damage of financial, emotional, moral or ethical grounds.

Under such alarming scenario, besides tackling the cybercrimes, another issue that needs to be focused on higher priority is – creating awareness on “cybercrimes and security” among the internet users. Thus the current study focuses in finding out the answers to alarming questions i.e. “Are the people really aware that they are

vulnerable to various cyber-crimes?” “If they are aware then up to what extent?”, and “If they are not aware, then what measures can be adopted to make them more aware and updated.

Understanding the Cyber Crimes:

Cyber-crime refers to any crime that involves a computer or a network. It is an unlawful act where in the computer is either a tool or a target or both. It is the criminal activities committed through the use of electronic communications media. It is taking something of the computer over the internet.

The term Cyber Crime has been defined neither in Indian Parliament nor in the Information Technology (IT) Act, 2000. In India, IT Act, 2000 deals with the offenses related to cyber- crime. Registration of Cyber Crimes in India takes place under the three broad heads which are the IT Act, the Indian Penal Code (IPC) and other State Level Legislations (SLL). Several Cyber Cells have been put up to handle exclusively the cases which are registered under cyber-crimes in India.

It is a fast growing area of crime. Cyber criminals are exploiting the Internet to commit a diverse range of criminal activities. In the past , cyber-crime was committed mainly by individuals or small groups but now the cyber criminals constitutes of various groups/category such as Professional hackers, organized hackers, children and adolescents between the age group of 6- 18 years, scammers, phishers, insiders, malware authors, spammers, etc.

Categories of Cyber Crimes:

The major categories of cyber-crimes can be broadly classified under the following four groups on the basis of their target and impacts:

1. Crimes against Individuals:

These type of crime are done to harm particular individuals. These includes hacking , cracking, harassment via emails, cyber-stalking, cyber bullying, defamation, dissemination of obscene material, email spoofing, SMS spoofing, carding, cheating and fraud, child pornography, assault by threat, denial of service attack, forgery, and phishing.

2. Crimes against Property:

There are cybercrimes done to harm the property of an Individual. They can be classified as – Intellectual property crimes, cyber-squatting, cyber vandalism, hacking computer system, computer vandalism, computer forgery, transmitting

viruses and malicious software to damage information, Trojan horses, cyber trespass, Internet time thefts, robbery or stealing money while money transfers ,etc.

3. Crimes against Government /Firm /Company /Group of individuals:

These types of crimes include cyber terrorism, possession of unauthorized information, distribution of pirated software, web jacking, salami attacks, logic bombs, etc. The criminals in these want to terrorize the citizens of the country.

4. Crimes against Society:

All the above mentioned crimes have their direct or indirect influence on the society at large. Therefore, all such crimes are included in this such as pornography, online gambling, forgery, sale of illegal articles, phishing, cyber terrorism, etc.

Literature Review:

Aparna and Chauhan (2012):

The authors in their paper conducted a research in Tricity on cybercrime awareness and revealed that awareness can be increased by giving due importance to cybercrime which can be an efficient tool to decrease or prevent the cybercrimes. They also concluded that it remains the responsibility of the net users as well as the government to ensure a safe, secure, and trustworthy computing environment.

Mehta and Singh (2013):

The author conducted a survey to study the awareness about cyber laws in Indian society .He found that there is a significant difference between the awareness level of male and female users of internet services. The male netizens are more aware of cyber laws as compared to women users.

Agarwal (2015):

The author in her paper discussed the types of cyber-crime and the cyber laws made to deal with it. Her objective was to analyze whether the internet users are aware of cyber-crimes. She also insisted that it is the duty of all the internet users to be aware of cyber-crimes and cyber laws.

Hasan *et al.*, (2015):

Conducted a survey to analyze the cybercrime awareness in Malaysia and found that female students are more aware of cybercrime as compared to male students.

Archana Chanuvai Narahari and Vrajesh Shah (2016):

The author in this conducted a survey on 100 respondents to analyze whether netizens are really aware of cyber-crimes. They found that the respondents are

somewhat aware of the cyber-crimes, cyber security but still there is a need to increase awareness among them. Also, they suggested a conceptual model explaining how to uphold and implement the awareness programmes among internet users regarding cybercrimes.

Research Methodology:

To test the awareness of cyber-crime and security, the following methodology has been applied:

A) Objectives of the study:

1. To examine the relationship between education level of the respondent and the awareness of cyber-crime and security.
2. To examine the relationship between various age groups of the respondent and the awareness of cyber-crime and security.
3. To find out the internet usage of the respondents.
4. To find out the level of awareness on safety while using personal computers and internet among internet users regarding cyber-crimes.

B) Sampling Design:

A structured questionnaire was administered for the purpose of research on 160 respondents. It was divided into four sections:

Section A dealt with the demographic characteristics of the respondents. Section B dealt with the internet usage of the respondents.

Section C dealt with the level of awareness of cyber-crime and security

Section D dealt with the level of awareness on safety while using personal computers and internet.

All the data was collected using **likert** scale 5 point. (1= Strongly disagree, 2 = Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree). Samples are drawn from various regions of Delhi-NCR.

C) Methods of Data Collection:

Primary Data was collected from 160 respondents through questionnaire to analysis whether the people really are aware that they are vulnerable to various cyber-crimes or not.

Secondary Data: Substantial data was collected from various books, published nationals and international journals, various websites, etc.

D) Research Tools:

For the findings of the study, Linear Regression technique was performed using SPSS Software version 23.

E) Hypotheses:

On the basis of mentioned objectives, the present study aims at test the following hypothesis (null hypothesis):

1. **H₀₁:** There is a relationship exists between the Educational level of the respondent and the awareness of cyber-crimes among them.
2. **H₀₂:** There is a relationship exists between the various age groups of the respondent and the awareness of cyber-crimes among them.

Analysis and Interpretation:

A study was conducted on 160 respondents to identify whether they are aware of cyber-crimes or not. Findings of the study are as follows:

- a) **H₀₁:** There is a relationship exists between the Educational level of the respondent and the awareness of cyber-crimes among them.

Table 1 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.913 ^a	.833	.830	.3472

a. Predictors: (Constant), Familiarity with the term "Cyber Crime", Awareness about Cyber Cell, Awareness on IT Act Among Internet Users.

Table 2 ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	84.260	3	28.087	241.143	.000 ^b
Residual	31.050	145	.214		
Total	115.310	148			

a. Dependent Variable: Educational level of the respondent

b. Predictors: (Constant), Familiarity with the term "Cyber Crime", Awareness about Cyber Cell, Awareness on IT Act Among Internet Users.

Table 3 Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.354	.283		1.667	.108
	Familiarity with the term "Cyber Crime"	.546	.096	.556	9.371	.002
	Awareness about Cyber Cell	.179	.292	.125	.613	.546
	Awareness on IT Act among Internet Users	.314	.176	.345	1.786	.086

a. Dependent Variable: Educational level of the respondent

To test the hypothesis, is a significant and positive relation exists between Educational level of the respondent and the awareness of cyber-crimes among them, Linear Regression Model has been used on the three factors i.e. Familiarity with the term "Cyber Crime", Awareness about Cyber Cell, Awareness on IT Act Among Internet Users. The R value in Table 1 represents that the simple correlation is 0.913 (the "R" Column) which indicates a high degree of correlation. Table 2 indicates that the regression model statistically significantly predicts the dependent variable as the value of p is 0.00003 which is less than 0.05 (i.e. the regression model is a good fit for the data). Table 3 puts more clarity by showing the values for all the above three factors i.e. Familiarity with the term "Cyber Crime", Awareness about Cyber Cell, Awareness on IT Act among Internet Users and indicates that the values are statistically significant at 0.05 for only one factor i.e. Familiarity with the term "Cyber Crime"(0.002). Hence the hypothesis (H_{01}) is partially accepted for this factor and rejected for Awareness about Cyber Cell, Awareness on IT Act among Internet Users.

- b) **H₀₂: There is a relationship exists between the various age groups of the respondent and the awareness of cyber-crimes among them.**

Table 1 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.903 ^a	.815	.792	.255

a. Predictors: (Constant), Familiarity with the term "Cyber Crime", Awareness about Cyber Cell, Awareness on IT Act Among Internet Users.

Table 2 ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	24.133	3	8.044	5.929	.001 ^b
Residual	219.794	162	1.357		
Total	243.928	165			

a. Dependent Variable: Age groups of the respondent.

b. Predictors: (Constant), Familiarity with the term "Cyber Crime", Awareness about Cyber Cell, Awareness on IT Act Among Internet Users

Table 3 Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	4.787	.419		11.429	.000
Familiarity with the term "Cyber Crime"	-1.763	.207	-.813	-8.513	.000
Awareness about Cyber Cell	-.098	.067	-.137	-1.460	.157
Awareness on IT Act among Internet Users	.055	.040	.122	1.370	.183

a. Dependent Variable: Age groups of the respondent.

Figure : Showing the various kinds of Cyber Crimes in day-to-day lives

To test the hypothesis, is a significant and positive relation exists between Educational level of the respondent and the awareness of cyber-crimes among them, Linear Regression Model has been used on the three factors i.e. Familiarity with the term "Cyber Crime", Awareness about Cyber Cell, Awareness on IT Act Among Internet Users. The R value in Table 1 represents that the simple correlation is 0.903 (the "R" Column) which indicates a high degree of correlation. Table 2 indicates that the regression model statistically significantly predicts the dependent variable as the value of p is 0.001 which is less than 0.05 (i.e. the regression model is a good fit for the data). Table 3 puts more clarity by showing the values for all the above three factors i.e. Familiarity with the term "Cyber Crime", Awareness about Cyber Cell, Awareness on IT Act among Internet Users and indicates that the values are statistically significant at 0.05 for only one factor i.e. Familiarity with the term "Cyber Crime"(0.00002). Hence the hypothesis (H_{02}) is partially accepted for this factor and rejected for Awareness about Cyber Cell, Awareness on IT Act Among Internet Users.

c) The figure 1 shows the very important part of our research i.e. regarding awareness on various types of cybercrimes concluded that (42%) of the respondents are aware of all the types of cyber-crimes whereas 26% are aware of Hacking, 4% are aware of phishing, cyber stalking and defamation, 12% are aware of Virus/Worms and 8% are aware of identity theft.

d) 40% agreed that Government organizations are more vulnerable to cybercrimes. 63% felt financial institutions, like Banks, finance companies etc. are more vulnerable for cybercrimes. 50% said Private sectors are the victims and 10% opted for Educational institutions, 65% thought there is threat to Law enforcement agencies like police, CBI, courts etc. 32 % felt any individual can be victim of cybercrime.

Conclusion and Suggestions:

With the increase in the users of internet, the increase in cyber-crimes can also be seen. There are various kinds of cyber-crimes which are happening in day-to-day

life. But the people are not aware of all such types. Majority of the people know only about hacking and virus/worms. They are not aware of phishing, defamation, identity theft, cyber stalking etc. It is the need of today's world to have knowledge about these crimes which are associated with the internet. The study shows that 48% of the respondents share their personal details with other persons even they don't know them closely. 55% of respondents have agreed that their PCs are often damaged by viruses. The internet users struggled with spam emails, phishing calls and emails asking for their sensitive information like mobile no., bank account, address, etc. It is the duty of each one of us to be aware of the basic cyber security. Cyber security refers to the technologies and processes that are designed to protect computers, networks and data from unauthorized access and attacks delivered via the internet by cyber criminals. The people should be aware of the basic cyber securities such as they should:

- a) Install a security suites such as Avast Internet Security, Kaspersky antivirus, McAfee antivirus, Norton Antivirus, etc. to protect the computer against threats such as viruses and worms.
- b) Activate Network Threat Protection, Firewall, and Antivirus.
- c) Always use strong passwords preferably alphanumeric.
- d) Communicate personal information only via phone or secure web sites.
- e) Do not click on links, download files or open attachments in emails from unknown senders.
- f) Beware of links in emails that ask for personal information or popups.
- g) Check that all antivirus software and computer operating system are up-to-date.
- h) Double check the spelling of a website, URL, HTTP addresses etc.

Government is also making efforts to have a control on cyber-crimes. It has made cyber laws to help people learn about various cyber-crimes and cyber security. Information Technology(IT) Act 2000 deals with cyber related crimes. Not only the government but people should also work hand in hand to catch the criminals. People who have been a victim of any of these cyber-crimes should come forward and file a complaint against them in special cybercrime cells. This will definitely help to tackle the cyber-crimes. Thus, awareness of cyber-crimes and security is a need of an hour.

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Economic Study Of Tourist Places In Gujarat (With Reference To Heritage Tourist Destinations Of Gujarat)

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Abstract:-

This research examines the economic implications of heritage tourism at prominent sites in Gujarat, including Rani ki Vav, Modhera Sun Temple, Champaner-Pavagadh, and Adalaj Stepwell, through the application of the Travel Cost Method (TCM). Using data collected from 120 tourists and secondary sources, the study evaluates tourist expenditure patterns and their influence on local economies and cultural preservation. Regression analysis reveals that tourist spending is positively associated with income levels, while frequent visits correspond to reduced per-trip expenditure. Findings highlight the potential of heritage tourism in fostering regional economic growth and promoting cultural sustainability. High visitor satisfaction levels indicate the effectiveness of Gujarat's tourism campaigns, such as "Kuch Din Toh Gujaro Gujarat Mein." However, the research emphasizes the need for strategic interventions to enhance the tourism experience. These include infrastructure upgrades, digital transformation through online ticketing and virtual tours, and community participation in tourism management to ensure equitable economic benefits. By providing actionable insights for policymakers, this study underscores the importance of balancing economic development with heritage conservation. The findings aim to guide sustainable tourism practices that enhance visitor experiences while preserving the cultural and historical significance of Gujarat's heritage sites

Key Words

Heritage Tourist Places of Gujarat, Travel Cost Method, Primary data Collection, Optimum Utilization from Spending.

I Introduction

Tourism has been an integral part of human society since ancient times, evolving from essential migration for survival to an exploration of new places and cultures. In modern contexts, tourism represents a dynamic interaction between economic growth and

environmental sustainability. India, recognized for its cultural diversity and historical richness, holds a prominent position in global tourism. Among its states, Gujarat is celebrated for its heritage sites, including the UNESCO-listed Rani ki Vav, Modhera - Sun Temple, and Champaner-Pavagadh Archaeological Park, which attract visitors for their cultural and historical significance.

Tourism, while fostering economic growth, also raises critical environmental and societal concerns. The influx of tourists can lead to resource depletion, environmental degradation, and challenges in managing cultural heritage sustainably. These dynamics necessitate a comprehensive understanding of tourism's economic and environmental impacts to ensure balanced development.

This research focuses on heritage tourism in Gujarat, employing the Travel Cost Method (TCM) to analyze visitor behavior, expenditure patterns, and their implications on the local economy and environment. The study investigates how tourist spending influences infrastructure, cultural preservation, and environmental conservation. By examining these factors, the research aims to contribute valuable insights for policymakers, enabling sustainable development strategies that enhance Gujarat's tourism appeal while preserving its invaluable heritage and natural environment.

This study underscores the need for a symbiotic relationship between economic growth and environmental stewardship, paving the way for sustainable tourism practices that can serve as a model for other regions with heritage significance.

II Review of Literature

The existing literature on tourism highlights its dual role as a driver of economic growth and a factor influencing environmental and social dynamics. Various studies have focused on methods to assess the value of tourism and its broader impacts. This review synthesizes insights from key research that contribute to understanding heritage tourism's economic and environmental dimensions.

Randall (1994) discussed the challenges in applying the Travel Cost Method (TCM) to assess tourism's economic value. The study demonstrated how TCM captures visitors' willingness to pay for recreational experiences and identifies the economic worth of natural and cultural sites through the evaluation of travel costs. This approach offers valuable insights for valuing Gujarat's heritage tourism sites, where cultural significance is a major draw for visitors.

De and Devi (2011) applied TCM to evaluate the recreational and conservation benefits

of a natural tourist site in Cherrapunjee, Meghalaya. Their findings revealed the significant socio-economic and cultural factors influencing visitor decisions, providing a framework for analyzing similar factors in Gujarat's heritage sites. The study highlighted the correlation between income levels, educational background, and visitor behavior, offering a comparative perspective for this research.

Gotham et al. (2021) used TCM to estimate the economic value of urban parks in Nepal. Their research emphasized the role of tourism in generating employment and income while preserving cultural and natural resources. By using questionnaires and interviews, they identified factors influencing visitor spending, a method that can be adapted for this study to understand expenditure patterns in Gujarat.

Shofwan et al. (2022) examined the economic value of a water park in Indonesia using TCM, identifying factors such as distance, group size, and income as determinants of visitation patterns. Their findings on the negative impact of increased travel costs on visitor frequency provide insights into optimizing pricing and infrastructure for Gujarat's tourism sites.

Egan et al. (2023) explored the recreational impact of oil spills on a World Heritage site in New Zealand, combining TCM with contingent valuation. The study underscored the environmental vulnerabilities of heritage sites, emphasizing the need for proactive conservation measures. This aligns with the necessity to address environmental challenges in Gujarat's tourism hotspots. These studies collectively underline the importance of TCM as a tool for valuing tourism sites and understanding visitor behavior. They also highlight the necessity of balancing economic growth with environmental sustainability. This review establishes the groundwork for applying similar methodologies to Gujarat's heritage sites, providing a robust framework for evaluating their economic and environmental impacts.

III Objective

1. To assess the economic impact of heritage tourism at major sites in Gujarat by examining tourist spending patterns and their contribution to local economies and employment generation.
2. To evaluate visitor priorities and satisfaction levels across selected heritage destinations, identifying key factors that influence tourist preferences and enhance their overall experience.
3. To know the importance of a tourist destination by knowing the priority of

visitors to visit a particular tourist destination out of all the nearby tourist destinations.

IV Introduction of Study subject

According to the World Travel & Tourism Competitiveness Index 2021, India ranks 54th globally in terms of tourism. This indicates India's growing popularity as a destination for international tourists. Tourism is recognized as a significant social, cultural, and economic activity that transcends routine life, enabling people to explore national and international destinations for leisure or work-related purposes.

Migration and tourism are distinct in their characteristics. Migration involves long-term relocation, often driven by occupational or economic changes, while tourism typically involves short-term travel lasting more than 24 hours but less than a year. The primary motivation behind tourism is leisure, recreation, and relief from the stress of everyday life.

Current trends in tourism highlight a variety of purposes, such as recreation, environmental exploration, cultural engagement, and even business or special interest activities. Despite facing setbacks due to the COVID-19 pandemic, the tourism sector in India has shown resilience and continues to play a vital role in generating economic growth, employment, and cultural exchange.

Table1: Current Purposes of Tourism

Sr.no	Specific Purpose	Sr.no	General Purpose
1	Tourism For Social Events	1	Environmental Services
2	Tourism For Recreational Activities	2	Adventure Activities
3	Tourism For Cultural Or Historical Reasons	3	Artistic Activities
4	Tourism For Sports	4	Creative Activities
5	Tourism For Special Reasons (Negative Context)		-

Source: tourism reports (22-02-2022)

As per the Annual Report on Tourism (2020-21), the contribution of the tourism sector to India's GDP and employment has remained steady over the years. While the pandemic significantly impacted tourism, the sector has started recovering, emphasizing the enduring importance of travel and tourism for societal and individual

well-being. The Indian government, through campaigns like Incredible India, has been actively promoting the country's cultural and natural heritage to attract both domestic and international tourists. Similarly, state governments have also initiated specific campaigns to boost tourism. For instance, Gujarat promotes itself with the slogan "Kuch Din Toh Gujarati Mein," encouraging visitors to explore the state's rich heritage and tourist spots.

V Introduction of Heritage Places

The study focuses on four prominent tourist destinations in Gujarat, selected for their cultural, historical, and architectural significance. These locations were chosen to provide a comprehensive understanding of the economic and environmental impacts of tourism in the state.

1. Modhera Sun Temple (Mehsana)

A UNESCO World Heritage Site, the Modhera Sun Temple is renowned for its intricate architecture and historical significance. This temple attracts a large number of tourists, particularly during festivals such as Uttarayan and Modhera Dance Festival, showcasing Gujarat's rich cultural heritage.

2. Rani Ki Vav (Patan)

Another UNESCO World Heritage Site, Rani Ki Vav is a stepwell known for its exquisite craftsmanship and historical importance. It serves as a significant tourist attraction and contributes to local economic activities while preserving cultural heritage.

3. Champaner-Pavagadh

This site is a UNESCO World Heritage Site that combines historical, cultural, and natural elements. It includes a cluster of historical monuments such as mosques, temples, and palaces, situated amidst a rich natural landscape. It is a vital area for understanding the interplay between tourism, heritage conservation, and environmental management.

4. Adalaj Stepwell (Gandhinagar)

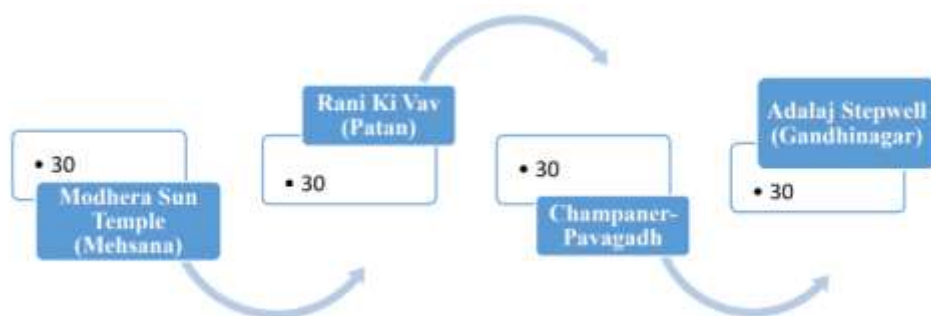
Adalaj Stepwell is an architectural marvel known for its intricate carvings and utility in ancient times. It attracts a significant number of tourists and offers insights into the historical water conservation techniques practiced in Gujarat.

VI Methodology of Study

The research methodology for this study combines both primary and secondary data

collection to comprehensively assess the economic and environmental impacts of tourism in Gujarat. This approach is designed to provide an in-depth understanding of the dynamics of tourism in the region.

Primary data was collected through a structured questionnaire, targeting tourists visiting selected sites in Gujarat. The selection of these sites was based on their popularity and, in some cases, UNESCO recognition. A sample of 120 tourists was chosen for detailed analysis, covering the period from October 2023 to September 2024, with specific focus on peak seasons and vacation periods to capture diverse patterns of tourist behaviour. Sampling Methodology and samples Four key tourist destinations in Gujarat were selected for this study based on their significance and tourism value.



By integrating both quantitative and qualitative data, this methodology ensures a comprehensive evaluation of tourism's economic and environmental effects in Gujarat. The results of this study aim to contribute valuable insights for promoting sustainable tourism development while safeguarding the state's cultural and natural heritage.

B. Regression Analysis in Methodology:

The study employs a multiple linear regression model to analyze the determinants of tourist expenditure. The dependent variable is total expenditure, while the independent variables include:

Monthly Income : Representing tourists' income levels.

Number of Meetings : Frequency of interactions or trips associated with the location.

Annual Trips : Frequency of annual visits to tourist destinations.

$$\text{Total Expense} = \beta_0 + \beta_1(\text{Monthly Income}) + \beta_2(\text{No. of Trip}) + \beta_3(\text{Annual frequency}) + \varepsilon$$

The regression analysis was performed to:

1. Quantify the relationship between income, frequency of meetings, and trips with total expenditure.

2. Identify which factors positively or negatively impact tourist spending.
3. Provide actionable insights to support sustainable tourism strategies and improve destination management.

VIII Result and Discussion

1. Result

A. Spending Structure on various variables at tourist places

This section presents the key findings of the study, followed by an interpretation of these results in the context of the economic and environmental impacts of tourism at the selected UNESCO heritage sites in Gujarat. The analysis is based on the primary data collected from 120 tourists and the secondary data gathered from government reports and relevant literature.

Table 2 : Spending Structure on various variables at tourist places

Variables	Range	Places				
		Champaner	Surya Mandir	Rani ki Vav	Adalaj Stepwell	Total
Entertainment Cost	<200	9	6	16	34	65
	200-400	6	6	1	29	42
	401-600	14	7	1	1	23
	601-800	1	1	2	0	4
	801-1000	3	1	1	0	5
	Total	30	30	30	30	120
Photography	0	29	30	30	30	119
	200	1	0	0	0	1
	Total	30	30	30	30	120
Food & Beverages	<300	16	18	6	10	50
	300-600	11	15	5	4	35
	601-1000	2	7	8	16	33
	1001-2000	1	3	11	13	28
	>2000	0	0	7	0	7
	Total	30	30	30	30	120
Any Other Cost	<100	24	29	29	30	112
	100-200	18	0	4	0	22
	201-300	4	1	0	0	5
	301-400	2	0	0	0	2
	401-500	1	0	0	0	1

	>500	1	0	0	0	1
	Total	30	30	30	30	120

This data provides insights into various cost categories at four major tourism places in Gujarat: Champaner, Surya Mandir, Rani ki Vav, and Adalaj Stepwell.

1. Entertainment Cost: Most visitors spend less than 200 (65 out of 120), with a notable drop in spending for higher ranges (200-400 and 401-600). Adalaj Stepwell shows the highest spending in the 200-400 range.
2. Photography Costs: Most visitors incur no cost (119 out of 120), with a small number spending on photography, predominantly at Champaner.
3. Food & Beverages: The majority spend less than 300 (50 out of 120), with significant numbers also spending between 300-600 (35 out of 120). Rani ki Vav and Adalaj Stepwell show the highest spending across these ranges.
4. Any Other Cost: Most visitors spend less than 100 (112 out of 120), with smaller groups spending in the higher ranges. Champaner and Surya Mandir show higher costs in the 100- 200 range, whereas Rani ki Vav and Adalaj Stepwell show more diverse spending across the ranges.

This data reflects varied spending patterns, with significant differences in costs across places, potentially influencing tourism management strategies in Gujarat.

The data reflects that for the tourism places in Gujarat, including Champaner, Surya Mandir, Rani ki Vav, and Adalaj Stepwell, entertainment, food, photography, and other costs were relatively minimal, with most tourists visiting these places without incurring significant costs. Notably, staying at a hotel was not included in the study as these places are located near city areas, and only one tourist stayed near Champaner, while others were day visitors. This highlights the short-duration nature of visits and the absence of accommodation costs for most tourists.

Spending Structure at Heritage Sites in Gujarat

The bar chart illustrates the spending patterns of tourists at four prominent heritage sites in Gujarat: Champaner, Surya Mandir, Rani ki Vav, and Adalaj Stepwell. The expenditures are categorized into four main components:

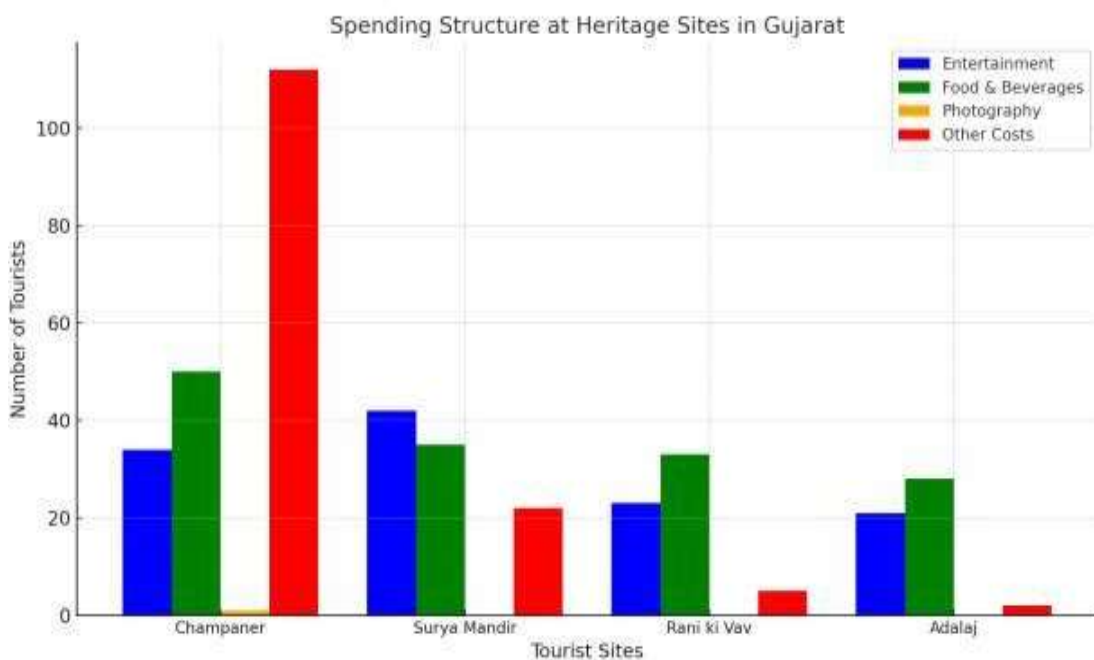
1. Entertainment: Represents costs incurred for leisure activities at the sites.
2. Food & Beverages: Includes expenses on meals and refreshments.
3. Photography: Reflects spending on photography-related activities, which is minimal.

4. Other Costs: Covers miscellaneous expenditures, predominantly small amounts.
- 5.

Key observations:

- 'Other Costs' dominate the spending categories across all sites, highlighting smaller incidental expenses.
- Food & Beverages constitute a significant portion of expenditures, especially at Champaner and Surya Mandir.
- Entertainment costs vary but remain a notable part of overall spending.
- Photography expenses are negligible, indicating limited spending in this area.

This visualization helps identify spending trends, which can guide site-specific tourism management strategies. For example, enhancing food services or entertainment facilities could increase tourist satisfaction and spending.



B. Satisfaction Level of Tourist in various aspects:

The following table presents the distribution and percentage of ratings across four key variables—Road Rating, Crowd Rating, Cleanliness Rating, and Satisfaction Rating—at four popular tourism destinations in Gujarat: Champaner, Surya Mandir, Rani ki Vav, and Adalaj Stepwell. The percentages for each rating category are calculated based on the total responses for each variable at the respective locations.

Table 3 Ratings in Various aspects by tourists for tourism place

Variables	Champaner	Surya Mandir	Rani ki Vav	Adalaj Stepwell	Total
Road Rating					
Medium	9 (30%)	5 (16.7%)	2 (6.7%)	3 (10%)	19
Good	12 (40%)	25 (83.3%)	23 (76.7%)	27 (90%)	87
Very Good	9 (30%)	0 (0%)	5 (16.7%)	0 (0%)	14
Total	30 (100%)	30 (100%)	30 (100%)	30 (100%)	120
Crowd Rating					
No Crowd	7 (23.3%)	1 (3.3%)	2 (6.7%)	2 (6.7%)	12
Normal	9 (30%)	16 (53.3%)	14 (46.7%)	14 (46.7%)	53
Very Crowded	14 (46.7%)	13 (43.3%)	14 (46.7%)	14 (46.7%)	55
Total	30 (100%)	30 (100%)	30 (100%)	30 (100%)	120
Cleanliness Rating					
Very Clean	9 (30%)	6 (20%)	8 (26.7%)	3 (10%)	26
Clean	12 (40%)	15 (50%)	15 (50%)	17 (56.7%)	59
Average	7 (23.3%)	7 (23.3%)	6 (20%)	9 (30%)	29
Not Clean	2 (6.7%)	2 (6.7%)	1 (3.3%)	1 (3.3%)	6
Total	30 (100%)	30 (100%)	30 (100%)	30 (100%)	120
Satisfaction Rating					
Satisfied	1 (3.3%)	0 (0%)	0 (0%)	0 (0%)	1
Satisfied (Majority)	19 (63.3%)	29 (96.7%)	19 (67.9%)	29 (96.7%)	96
Very Satisfied	10 (33.3%)	1 (3.3%)	9 (32.1%)	1 (3.3%)	21
Total	30 (100%)	30 (100%)	28 (100%)	30 (100%)	118

Visitor Satisfaction at four tourist destinations in Gujarat.

- ❖ For Road Condition, most visitors rated Surya Mandir and Adalaj Stepwell as "Good," with significant ratings for Champaner and Rani ki Vav as "Medium" or "Very Good."
- ❖ In terms of Crowd Density, Rani ki Vav and Adalaj Stepwell saw higher percentages

of "Very Crowded" visitors, while Champaner and Surya Mandir had a more balanced distribution between "No Crowd" and "Normal" categories.

- ❖ Regarding Cleanliness, most visitors across all places rated the sites as "Clean," with Surya Mandir and Adalaj Stepwell receiving higher ratings for "Very Clean."
- ❖ For Visitor Satisfaction, most visitors were satisfied, particularly at Surya Mandir and Adalaj Stepwell, with a small portion indicating "Very Satisfied" or "Slightly Satisfied" responses.

C. Regression module

Result of regression analysis are as under:

Table 4.1 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.630	0.397	0.381	970.441

- ❖ The regression model explains **39.7% of the variation** in **Total Expense**.
- ❖ The correlation ($R=0.630$) is **moderately strong**.
- ❖ Adjusted $R^2=0.381$, considering the sample size.
- ❖ Standard error is 970.441, reflecting moderate prediction accuracy.

Table 4.2 ANOVA

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	71,867,248.886	3	23,955,749.629	25.437	0.000
Residual	109,243,650.281	116	941,755.606		
Total	181,110,899.167	119			

- ❖ The regression model is statistically significant ($F=25.437, p<0.001$).
- ❖ Independent variables jointly explain a significant portion of the variance in Total Expense.

Table 4.3 Coefficients

Predictor	Unstandardized Coefficients (B)	Std. Error	Standardized Coefficients (Beta)	t- Value	Sig.
(Constant)	3381.132	361.574		9.351	0.000
Monthly Income	212.934	86.119	0.181	2.473	0.015
No. of Trips	-851.423	103.277	-0.603	-8.244	0.000
Annual frequency	-174.442	61.645	-0.204	-2.830	0.005

- ❖ **Intercept:** Baseline spending is 3381.132 units.

- ❖ **Income** ($\beta=212.934, p=0.015$ \beta = 212.934, p = 0.015 $\beta=212.934, p=0.015$):
Spending increases with higher income.
- ❖ **No. of Trips** ($\beta=-851.423, p<0.001$ \beta = -851.423, p < 0.001 $\beta=-851.423, p<0.001$):
More meetings reduce spending significantly.
- ❖ **Annual frequency** ($\beta=-174.442, p=0.005$ \beta = -174.442, p = 0.005 $\beta=-174.442, p=0.005$): Frequent travel reduces spending per trip.

Summary of Findings from Regression Tables:

1. **Income** positively affects tourist spending, indicating higher income leads to higher expenditure.
2. **No. of Trips** has a significant negative impact, suggesting reduced spending when meetings increase.
3. **Annual frequency** also negatively influence expenditure, as frequent travel is associated with reduced spending per trip.

2. Discussion

The results of this study reveal significant insights into the economic and environmental impacts of tourism in Gujarat. Tourists demonstrate a willingness to spend on cultural experiences, reflecting the importance of heritage tourism in the region. The high satisfaction levels reported by tourists indicate the effectiveness of Gujarat's marketing strategies, such as the "Kuch Din Toh Gujarati Mein" campaign. However, the findings also highlight pressing environmental concerns, including increased waste generation and resource depletion at tourist sites. These challenges necessitate the implementation of sustainable practices to mitigate adverse effects on local ecosystems while maximizing economic benefits.

Furthermore, community involvement in tourism development emerges as a crucial factor. Engaging local stakeholders not only enhances the tourism experience for visitors but also ensures that economic gains are equitably distributed among community members. The study underscores the need for collaboration between government, businesses, and local communities to foster a sustainable tourism framework.

IX Conclusion

This study provides a comprehensive analysis of the economic contributions and challenges associated with heritage tourism in Gujarat, with a focus on key sites such as

Rani ki Vav, Modhera Sun Temple, Champaner-Pavagadh, and Adalaj Stepwell. Using the Travel Cost Method (TCM) and regression analysis, the research highlights the critical role of tourism in driving local economic growth and supporting cultural preservation. Findings indicate that higher-income visitors contribute more significantly to site economies, while frequent visitors tend to reduce per-trip expenditures.

Visitor satisfaction levels reflect the effectiveness of Gujarat's tourism campaigns and the appeal of its heritage destinations. However, the study also identifies key challenges, including the need for infrastructure improvements, enhanced site management, and policies to address carrying capacity and visitor management. Community involvement emerges as a pivotal factor for equitable economic benefits and sustainable heritage conservation.

The research underscores the necessity of adopting sustainable tourism practices, such as promoting eco-friendly transport, improving waste management, and leveraging digital tools like virtual tours and smart ticketing systems. Policymakers, stakeholders, and local communities must collaborate to balance economic benefits with the preservation of Gujarat's invaluable heritage, ensuring a sustainable future for its tourism sector.

X Policy implications Policy Implications for Tourism Development in Gujarat

Based on the findings of this study, the following policy recommendations aim to enhance tourism development at heritage sites in Gujarat while addressing economic, environmental, and social challenges:

1. Digital Transformation in Tourism

- ❖ **Smart Ticketing Systems:** Implement online booking systems to streamline visitor management and reduce long queues at heritage sites.
- ❖ **Virtual Tours:** Develop digital platforms offering virtual tours of heritage sites, enhancing global access while reducing physical strain on locations.
- ❖ **Tourism Apps:** Create multilingual apps to provide information about site history, nearby attractions, and eco-friendly practices.

2. Infrastructure Development

- ❖ **Accessibility Improvements:** Invest in accessible pathways, ramps, and facilities for elderly and differently-abled visitors to promote inclusive tourism.
- ❖ **Enhanced Amenities:** Ensure the availability of clean drinking water, hygienic

restrooms, and well-maintained parking spaces at tourist sites.

- ❖ **Sustainable Transport:** Promote the use of electric or non-polluting vehicles within heritage zones to reduce air and noise pollution.

3. Community Participation

- ❖ **Local Employment Opportunities:** Establish programs that prioritize hiring local residents in roles such as guides, security personnel, and maintenance workers at heritage sites.
- ❖ **Cultural Preservation Initiatives:** Support local artisans by integrating handicraft stalls and traditional performances into the tourist experience, ensuring economic benefits reach local communities.
- ❖ **Revenue Sharing:** Create mechanisms to allocate a portion of tourism revenues directly to the development of nearby villages and infrastructure.

4. Tourism Practices

- ❖ **Waste Management:** Implement advanced waste segregation, recycling systems, and encourage the use of biodegradable materials by vendors and tourists to reduce the environmental footprint.
- ❖ **Carrying Capacity Limits:** Introduce policies that monitor and limit visitor numbers during peak seasons to prevent overuse of heritage sites and ensure long-term conservation.
- ❖ **Green Certifications:** Promote eco-friendly practices by offering incentives to businesses that adopt green certifications for accommodations, restaurants, and transport services.

5. Awareness and Education

- ❖ **Visitor Education Campaigns:** Launch awareness drives on the importance of preserving cultural and natural heritage, targeting both domestic and international tourists.
- ❖ **School Collaborations:** Incorporate heritage education into school curricula, fostering a sense of pride and responsibility among younger generations.
- ❖ **Training Programs:** Organize workshops for local stakeholders on tourism practices and hospitality management.

6. Monitoring and Evaluation

- ❖ **Performance Metrics:** Develop a framework to evaluate the economic, environmental, and social impacts of tourism regularly.

- ❖ **Stakeholder Engagement:** Form a multi-stakeholder committee comprising government officials, NGOs, and community leaders to oversee policy implementation and address challenges collaboratively.
- ❖ **Continuous Feedback Mechanisms:** Encourage tourists to provide feedback on their experiences to identify areas for improvement and innovation.

7. Incentivizing Best Practices

- ❖ **Financial Incentives:** Offer tax benefits or subsidies to businesses adopting renewable energy sources, water conservation technologies, and sustainable building materials.
- ❖ **Recognition Programs:** Establish awards for heritage sites and operators demonstrating exemplary commitment to effective tourism management.

By adopting these policy recommendations, Gujarat can position itself as a model for inclusive tourism development, ensuring the preservation of its cultural heritage while maximizing benefits for local communities and minimizing adverse impacts. These measures will not only enhance the visitor experience but also contribute to long-term economic and ecological resilience in the state.

XI limitation of the study and further scope

Limitations

While this study provides valuable insights, it is essential to acknowledge its limitations. The sample size, although substantial, may not fully represent the diversity of tourists visiting Gujarat. Additionally, the study primarily focuses on specific tourist destinations, which may limit the generalizability of the findings to other regions. The reliance on self-reported data for expenditure and satisfaction levels could also introduce bias. Future research should aim to include a broader range of locations and consider longitudinal studies to capture changes over time.

Future Research Directions

Future research in the field of tourism and environmental sustainability in Gujarat should explore the following areas:

Longitudinal Studies: Conduct studies over extended periods to assess the long-term impacts of tourism on local economies and environments.

Comparative Studies: Examine tourism impacts in other states or countries with similar characteristics to identify best practices for sustainable tourism development.

Impact of Digital Marketing: Investigate how digital marketing strategies influence

tourist behavior and spending patterns.

Community-Based Tourism: Explore the potential of community-based tourism initiatives to enhance local participation and benefit-sharing.

These directions can provide a more comprehensive understanding of the complexities of tourism in Gujarat and contribute to developing sustainable tourism policies.

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Harnessing Technology for Inclusive Education: Transformative Learning Experiences for Migrant Women in India

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Abstract

In India, migrant women face numerous challenges in accessing quality education due to socio-economic barriers, language differences, and cultural dislocation. This research explores innovative methodologies to harness technology for inclusive education, aiming to transform the learning experiences of migrant women. *Key areas* of focus include the integration of digital platforms, mobile learning, and community-based digital literacy programs.

Technology can bridge gaps in educational access by providing flexible and adaptive learning environments. Digital platforms enable migrant women to access resources and learning materials irrespective of their location. Mobile learning, through smartphones and tablets, offers portable and cost-effective solutions for continuous education, which is crucial for migrant populations frequently on the move. Community-based digital literacy programs support the building of foundational skills needed to navigate digital environments, ensuring that technology-enhanced education is accessible to all, including those with limited prior exposure.

This paper discusses case studies where technology-driven initiatives have successfully empowered migrant women in India. Examples include online courses tailored to the specific needs of these women, digital storytelling projects that allow them to share their experiences and learn from each other, and mobile applications designed for language learning and vocational training. Additionally, it examines the role of public-private partnerships in developing and scaling these innovative educational solutions. The findings suggest that leveraging technology can significantly enhance the educational outcomes for migrant women, leading to better employment opportunities and improved socio-economic status. The study concludes with policy recommendations to support the implementation of technology-driven inclusive

education programs, emphasizing the need for stakeholder collaboration to create sustainable and impactful educational ecosystems for migrant women in India.

Keywords:

Inclusive Education, Technology, Migrant Women, Digital Platforms, Mobile Learning, Community-based Programs

Introduction

Harnessing Technology for Inclusive Education for Migrant Women in India

In India, internal migration represents a dynamic yet complex social phenomenon, involving the movement of millions seeking better economic opportunities, often from rural to urban areas or between states. According to the 2011 Census, approximately 45.36 crore Indians are categorized as migrants, constituting around 37% of the total population. Among these, women form a significant proportion, frequently migrating for marriage or as part of family units, while also facing profound socio-economic challenges.¹ This demographic faces unique vulnerabilities, particularly in accessing education, which remains a critical factor in socio-economic empowerment and gender equality.

Migrant women encounter a multifaceted set of barriers that impede their educational progress. These include economic constraints, cultural and linguistic differences, and lack of continuity in educational institutions due to frequent relocations. Additionally, social norms and traditional gender roles often restrict women's access to learning opportunities, prioritizing household responsibilities over education.² Such barriers contribute to the perpetuation of poverty and social exclusion, creating a cycle that is difficult to break without targeted intervention.

Technology has emerged as a powerful tool to address these educational disparities. With the rapid growth of digital infrastructure and mobile penetration across India, technology offers innovative solutions to bridge the educational divide. Initiatives leveraging mobile learning platforms, digital literacy programs and community-based e-learning centers have shown promise in reaching marginalized groups, including migrant women.³ These interventions not only provide flexible and cost-effective learning opportunities but also empower women with skills that enhance their economic participation and social mobility.

This paper explores the potential of technology-driven educational solutions to create an inclusive learning environment for migrant women in India. It examines the existing

challenges, evaluates successful case studies, and provides policy recommendations for integrating technology into educational frameworks. By addressing these issues, this study aims to contribute to the broader discourse on gender equality and inclusive development in India's evolving socio-economic landscape.

Challenges Faced by Migrant Women in Accessing Education

Migrant women in India encounter a myriad of challenges that hinder their access to education, exacerbating socio-economic inequalities and limiting their potential for personal and community development. These challenges are multifaceted, encompassing economic, social, cultural, and infrastructural dimensions. Each of these barriers contributes to a complex landscape that requires nuanced, technology-driven interventions.

1. Economic Barriers

Migrant families often live in precarious economic conditions, prioritizing immediate survival needs over long-term investments in education. Women, especially, face additional constraints due to their limited participation in the formal workforce and lack of financial independence.¹ Education for girls is often viewed as a secondary concern compared to household duties or contributing to the family's income. The transient nature of migrant work also means families frequently relocate, disrupting the continuity of education and making school attendance irregular.

2. Social and Cultural Barriers

Traditional gender roles and patriarchal norms prevalent in many communities restrict women's access to education. Early marriages, social stigma associated with female education, and cultural expectations often confine women to domestic spheres, limiting their opportunities for learning.² Furthermore, many migrant women come from diverse linguistic and cultural backgrounds, creating additional barriers in accessing educational content that is predominantly available in mainstream languages like Hindi or English.

3. Geographical and Infrastructural Challenges

Migrant families often settle in informal urban settlements or remote rural areas where educational infrastructure is either inadequate or nonexistent. Schools in these areas may lack basic facilities, trained teachers, or resources tailored to the needs of migrant children and women.³ Additionally, frequent relocations mean that migrant women are unable to establish stable educational trajectories, leading to high dropout rates and low

literacy levels.

4. Lack of Digital Literacy and Access to Technology

While technology offers potential solutions for educational inclusion, a significant digital divide remains. Many migrant women lack basic digital literacy skills and access to technological devices, particularly in rural and economically disadvantaged areas.⁴ This technological gap limits their ability to benefit from online educational programs, mobile learning apps, or digital resources, which are increasingly becoming essential tools in modern education.

5. Language and Curriculum Mismatch

India's diverse linguistic landscape presents a challenge for migrant women whose native languages may differ from the medium of instruction in educational institutions or digital platforms. Educational resources are often designed with a one-size-fits-all approach, lacking the cultural or linguistic adaptability needed to engage women from various backgrounds effectively.⁵

5. Limited Government and Institutional Support

While policies exist to support women's education, their implementation often falls short, especially for migrant populations. Bureaucratic hurdles, lack of awareness about available programs, and limited outreach in migrant-dense areas contribute to the underutilization of government schemes designed to promote educational inclusivity for women.⁶

The challenges faced by migrant women in accessing education in India are deeply rooted in economic, social, and infrastructural inequalities. Addressing these challenges requires a multifaceted approach that integrates technology, policy support, and community-based interventions. By understanding and tackling these barriers, India can move closer to achieving truly inclusive education.

Role of Technology in Inclusive Education for Migrant Women in India

Technology holds transformative potential to address the educational challenges faced by migrant women in India. By offering accessible, flexible, and scalable learning solutions, technology can bridge gaps in traditional educational systems, empowering women with the knowledge and skills necessary for personal and socio-economic advancement. This section explores various technological interventions and their impact on inclusive education, highlighting key innovations and real-world applications.

1. Mobile Learning Platforms

Mobile technology has become a cornerstone in expanding educational opportunities for marginalized communities. With increasing smartphone penetration in India, mobile learning platforms offer an accessible and cost-effective way to deliver educational content. These platforms provide flexibility, allowing migrant women to learn at their own pace and convenience, which is crucial given their responsibilities and transient lifestyles.

Example:

The Diksha app, launched by the Government of India, offers multilingual educational content aligned with national curricula. Such platforms cater to diverse learners, including those from different linguistic backgrounds.¹

2. Digital Literacy Programs

Digital literacy is foundational for leveraging technology-based education. Initiatives aimed at enhancing digital skills enable migrant women to access online educational resources, participate in e-learning programs, and improve their employability. Digital literacy programs often include training on basic computer skills, internet usage, and navigating educational applications.

Example:

The Internet Saathi program, a collaboration between Google India and Tata Trusts, trains rural women to become digital ambassadors in their communities. This peer-learning model has empowered thousands of women to access educational and economic opportunities.²

3. Community-Based E-Learning Centers

Community e-learning centers serve as localized hubs equipped with internet access and digital devices. These centers provide a supportive environment for learning and skill development, offering courses tailored to the needs of migrant women. By fostering a sense of community, these centers encourage women to participate in education and share their knowledge with peers.

Example:

Pratham Education Foundation has established digital learning centers in rural and urban slum areas. These centers focus on literacy, numeracy, and vocational training, ensuring that migrant women have access to quality education and skill development programs.³

4. Open Educational Resources (OER)

Open Educational Resources provide free and customizable learning materials, reducing the cost barriers associated with traditional education. OER platforms offer content in multiple languages, which is particularly beneficial for migrant women from diverse linguistic backgrounds.

Example:

Platforms like SWAYAM offer courses in various Indian languages, covering subjects from basic literacy to advanced vocational skills. This accessibility helps migrant women continue their education despite geographical mobility.⁴

5. E-Governance and Policy Implementation

Technology plays a critical role in the effective implementation and monitoring of educational policies. E-governance platforms streamline processes related to enrollment, attendance tracking, and distribution of educational resources, ensuring that migrant women are not left out of government schemes.

Example:

The National Digital Literacy Mission (NDLM) uses e-governance platforms to track progress and outcomes, ensuring transparency and accountability in educational initiatives.⁵⁷

6. Language and Content Customization

Technological tools can address language barriers by providing educational content in regional languages and dialects. AI-driven platforms can adapt content based on the learner's proficiency, ensuring a personalized learning experience.

Example:

Apps like Byju's and Khan Academy India offer content in multiple Indian languages, making learning more accessible for migrant women who may not be fluent in Hindi or English.⁶⁸

7. Use of Artificial Intelligence (AI) and Data Analytics

AI and data analytics can personalize educational experiences by assessing learners' needs and adapting content accordingly. Predictive analytics can also identify at-risk learners, enabling timely interventions.

Example:

AI-driven chatbots and virtual tutors provide real-time assistance, helping migrant women overcome learning obstacles and stay motivated.⁷

Conclusion

Technology offers innovative solutions to the complex challenges faced by migrant women in accessing education. By leveraging mobile platforms, community e-learning centers, digital literacy programs, and AI-driven tools, India can create a more inclusive educational environment. Ensuring that these technologies are accessible, culturally relevant, and supported by robust policies is essential for empowering migrant women and fostering their socio-economic development.

Case Studies: Technology Interventions in Inclusive Education for Migrant Women in India

Examining real-world case studies provides valuable insights into how technology can address the educational challenges faced by migrant women. These examples highlight both successes and challenges ("bugs") within current initiatives, offering lessons for future improvements and scalability.

1. Internet Saathi Program: Bridging Digital Literacy Gaps

Overview:

Launched by Google India and Tata Trusts, the Internet Saathi program aimed to bridge the digital divide by training rural women in digital literacy. Women were trained to use smartphones and the internet, enabling them to access educational content, healthcare information, and government services.

Successes:

Empowered over 30 million women across 300,000 villages.

Fostered peer-to-peer learning, where trained women became digital ambassadors in their communities.¹

Challenges ("Bugs"):

Limited Follow-Up: Many women lacked continued access to devices after initial training, reducing long-term impact.

Language Barriers: Digital content primarily available in Hindi or English, limiting access for women speaking regional dialects.

Sustainability Issues: Program dependency on external funding raised concerns about long-term viability.²

2. Pratham's Digital Learning Villages: Community-Centric Education

Pratham, one of India's leading NGOs, launched Digital Learning Villages to provide educational resources and digital literacy training in rural and migrant- dense areas. These centers offer courses on basic literacy, numeracy, and vocational skills using tablets and offline digital content.

Provided flexible learning opportunities to over 100,000 learners, including migrant women.

Fostered a community-driven model where local women became instructors, creating a supportive learning environment.³

Challenges ("Bugs"):

Connectivity Issues: Many centers in remote areas faced inconsistent internet access, limiting the use of online content.

Curriculum Relevance: Content was sometimes not tailored to the specific needs and aspirations of migrant women, especially regarding vocational training.

Dropout Rates: High dropout rates due to the transient nature of migrant families and economic pressures.⁴

3. SWAYAM Platform: Government-Led Digital Education

Overview:

The SWAYAM (Study Webs of Active-Learning for Young Aspiring Minds) platform offers free online courses in multiple disciplines, targeting marginalized groups, including migrant women. Courses are provided in various Indian languages, aiming to bridge educational gaps.

Successes:

Over 2,000 courses available in various regional languages.

Enabled flexible, self-paced learning, catering to the needs of women with household responsibilities.⁵

Challenges ("Bugs"):

Accessibility Gaps: Many migrant women lack the digital literacy or devices needed to access SWAYAM effectively.

Limited Offline Options: Reliance on internet connectivity restricts access in remote or underdeveloped areas.

User Interface Issues: Navigation difficulties and lack of user-friendly design deterred less tech-savvy learners.⁶

Footnotes:

4. eVidyaloka: Volunteer-Driven Online Education

Overview:

eVidyaloka connects volunteer teachers from across the globe with students in remote rural areas through digital classrooms. The platform offers lessons in regional languages and aims to provide continuity in education for children from migrant families.

Successes:

Created an interactive learning environment, overcoming teacher shortages in rural areas.

Provided instruction in several regional languages, enhancing comprehension and engagement.⁷

Challenges ("Bugs"):

Infrastructure Dependency: Success hinges on the availability of digital devices and stable internet, which are often lacking in migrant settlements.

Sporadic Attendance: Migrant women often prioritize work and domestic responsibilities, leading to inconsistent attendance.

Scalability Concerns: Volunteer-dependent model raises questions about scalability and long-term sustainability.⁸

Conclusion

These case studies illustrate the transformative potential of technology in addressing educational challenges for migrant women, while also highlighting persistent barriers ("bugs") that need addressing. Key lessons include the importance of language customization, sustainable infrastructure, and follow-up mechanisms to ensure long-term impact. By addressing these challenges, future technology interventions can be more effective and inclusive, contributing to the broader goal of educational equity in

India.

Footnotes

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Policy Implications for Harnessing Technology in Inclusive Education for Migrant Women in India

The integration of technology into education for migrant women in India presents a transformative opportunity to address long-standing disparities. However, realizing this potential requires a comprehensive policy framework that addresses infrastructural, socio-economic, and cultural challenges. Below are key policy implications with detailed recommendations and supporting evidence.

1. Strengthening Digital Infrastructure in Migrant Communities

Implication:

Robust digital infrastructure is essential to ensure that technology-driven education reaches marginalized migrant populations. Policies must prioritize expanding connectivity and providing affordable devices.

Recommendations:

Broadband Expansion Initiatives: Invest in extending affordable broadband and mobile internet connectivity to rural and migrant-dense urban areas.

Community Technology Hubs: Establish digital learning centers equipped with internet access and devices in migrant settlements. These hubs can also serve as community

resource centers.

Device Subsidies: Introduce government-led schemes to provide low-cost or subsidized smartphones and tablets to migrant women, ensuring access to digital learning tools.

Example:

The BharatNet Project aims to connect rural India with high-speed broadband, but its implementation needs prioritization in migrant-dense regions.¹

2. Enhancing Digital Literacy Programs

Implication:

Digital literacy is a prerequisite for accessing technology-based education. Policies should focus on providing structured digital skills training, particularly for women.

Recommendations:

Community-Based Training: Develop digital literacy programs in local languages, delivered through community centers and mobile vans, ensuring cultural relevance and accessibility.

Peer-Learning Models: Encourage trained women to become digital ambassadors within their communities, promoting sustainable, peer-driven learning.

Public-Private Collaboration: Partner with NGOs and tech companies to implement scalable digital literacy initiatives, similar to the Internet Saathi program.

Example:

The Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA) aims to make six crore rural households digitally literate, but targeted efforts for migrant women are necessary.²

3. Developing Multilingual and Contextualized Educational Content

Implication:

Language and cultural barriers often hinder migrant women's educational progress. Policies must mandate the creation of multilingual, culturally relevant content.

Recommendations:

Regional Language Content: Mandate that all digital educational platforms offer content in regional languages and dialects.

Cultural Sensitivity Training: Ensure that digital content developers undergo training to create culturally relevant and gender-sensitive materials.

Adaptive Learning Technologies: Encourage the use of AI-driven platforms that can adapt to different linguistic and educational backgrounds.

Example:

The SWAYAM platform offers courses in several Indian languages, but further expansion to include regional dialects and localized examples is necessary for broader impact.³

4. Promoting E-Governance for Educational InclusionImplication:

Efficient implementation and monitoring of educational policies require robust e-governance systems. Digital platforms can enhance transparency and ensure that educational resources reach the intended beneficiaries.

Recommendations:

Unified Education Portals: Develop centralized e-governance platforms to track enrollment, attendance, and learning outcomes for migrant women.

Data-Driven Decision Making: Use data analytics to identify gaps and monitor the effectiveness of educational interventions.

Integration with Social Schemes: Link educational initiatives with existing social welfare schemes to provide holistic support (e.g., mid-day meals, health programs).

Example:

The Shala Asmita Yojana (SAY) tracks student progress, but extending it to include migrant women's education can enhance accountability and resource allocation.⁴

5. Addressing Socio-Cultural Barriers through Policy Interventions

Implication:

Socio-cultural norms often restrict women's access to education. Policies should focus on changing perceptions and creating supportive environments.

Recommendations:

Awareness Campaigns: Launch campaigns to promote the importance of women's education within migrant communities, involving local leaders and influencers.

Community Support Programs: Establish mentorship and support groups to provide a safe space for migrant women to pursue education. Incentives for Families: Provide financial incentives or scholarships to families that support women's education.

Example:

Conditional cash transfer programs, similar to the Kanyashree Prakalpa scheme in West Bengal, could be expanded to target migrant families nationwide.⁵

Footnote:

6. Ensuring Sustainability through Public-Private Partnerships (PPPs)

Implication:

Sustaining technology-driven education initiatives requires collaboration between government bodies, private sector entities, and NGOs.

Recommendations:

Corporate Social Responsibility (CSR) Initiatives: Encourage corporations to invest in digital education programs as part of their CSR activities.

Innovative Financing Models: Develop models that combine public funding with private investments to support long-term educational projects.

NGO Collaboration: Partner with NGOs to implement and scale grassroots-level educational interventions.

Example:

The Internet Saathi program, funded through a public-private partnership, demonstrated the impact of collaborative models but highlighted the need for continuous engagement and support.⁶

Conclusion

Implementing technology-driven education for migrant women in India requires a multi-pronged policy approach that addresses infrastructure, digital literacy, socio-cultural barriers, and sustainability. By fostering collaboration among stakeholders and ensuring that policies are context-sensitive and inclusive, India can bridge the educational divide and empower migrant women to contribute meaningfully to society.

Footnotes

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While current efforts have shown promising results, addressing the educational challenges of migrant women through technology requires continuous innovation, policy refinement, and collaborative approaches. Future directions must focus on enhancing accessibility, personalization, sustainability, and cultural integration. This section outlines key future directions, supported by evidence and recommendations.

1. Expansion of AI and Data-Driven Personalization Future Direction:

Utilize Artificial Intelligence (AI) and data analytics to personalize learning experiences for migrant women, catering to their diverse needs and educational backgrounds.

Recommendations:

AI-Based Learning Platforms: Develop adaptive learning technologies that assess individual learning levels and provide customized educational content.

Predictive Analytics: Use data analytics to identify at-risk learners and offer targeted interventions to prevent dropouts.

Multilingual Chatbots: Implement AI-driven chatbots that offer real-time support in regional languages.

Example:

Platforms like Khan Academy already use basic personalization tools, but expanding these with advanced AI could better serve diverse learners.

2. Leveraging Blockchain for Credentialing and Skill Recognition

Future Direction:

Blockchain technology can offer secure, verifiable educational credentials, especially useful for migrant women who frequently change locations.

Recommendations:

Portable Learning Records: Create blockchain-based digital certificates that women can carry across states, ensuring their qualifications are recognized.

Skill Verification Systems: Implement platforms where informal skills learned through community programs are officially verified and recorded.

Example:

MIT Open Learning is piloting blockchain credentials; a similar system tailored to migrant education could enhance employability and mobility.

3. Development of Offline Learning Solutions

Future Direction:

Focus on offline digital solutions to ensure uninterrupted learning in areas with limited internet connectivity.

Recommendations:

Preloaded Educational Devices: Provide tablets with preloaded educational content that can be updated periodically.

Offline Learning Apps: Develop apps that allow content download for offline use, especially in remote areas.

Example:

Programs like Kolibri by Learning Equality offer offline access to digital content and could be adapted for India's linguistic and cultural needs.

4. Integration of Vocational and Life Skills Training

Future Direction:

Expand educational programs to include vocational and life skills training, directly linking education to employment opportunities.

Recommendations:

Industry Partnerships: Collaborate with industries to design skill-specific courses that

match market needs.

Micro-Certifications: Introduce short-term, modular courses that provide micro-certifications in high-demand skills.

Entrepreneurship Training: Include modules on financial literacy and entrepreneurship, empowering women to start their own businesses.

Example:

The Skill India initiative offers vocational training, but more targeted programs for migrant women could bridge the employment gap.

5. Culturally Responsive Pedagogy and Content

Future Direction:

Ensure educational content is culturally sensitive and responsive to the unique experiences of migrant women.

Recommendations:

Localized Content Creation: Develop region-specific content that reflects local cultures, languages, and social norms.

Involvement of Local Educators: Train local women to co-create content, ensuring it is relevant and relatable.

Inclusive Curriculum: Integrate gender-sensitive and culturally relevant topics into mainstream digital curricula.

Example:

The EkStep Foundation has piloted localized digital content in various states; scaling this approach nationally could enhance inclusivity.

6. Enhanced Collaboration through Public-Private Partnerships (PPPs)

Future Direction:

Strengthen partnerships between government, private sector, and civil society to ensure sustainable and scalable educational initiatives.

Recommendations:

Joint Funding Models: Develop co-funding models where the private sector and government share the cost of infrastructure and content development.

Corporate Social Responsibility (CSR) Engagement: Encourage companies to invest in educational technology initiatives as part of their CSR mandates.

Knowledge Exchange Platforms: Create platforms for knowledge exchange between private tech companies and educational institutions.

Example:

The Microsoft-UNESCO partnership for digital literacy in Africa could serve as a model for similar initiatives in India.

7. Policy and Regulatory Frameworks for Data Privacy and Security

Future Direction:

Ensure robust data protection policies to safeguard the privacy of migrant women participating in digital education.

Recommendations:

Data Privacy Laws: Enforce strict data privacy regulations to protect personal information collected by educational platforms.

Digital Literacy on Privacy: Include training modules on data privacy and online safety in digital literacy programs.

Example:

India's proposed Data Protection Bill needs specific clauses for protecting marginalized communities' data rights.

Conclusion

The future of inclusive education for migrant women in India lies in the thoughtful integration of technology with supportive policies. By focusing on infrastructure, personalization, offline accessibility, vocational training, and data privacy, future initiatives can create a robust, inclusive educational ecosystem. Collaboration among government bodies, private sector entities, and communities will be key to ensuring these efforts are scalable, sustainable, and impactful.

UNESCO (2020). "Private Sector Partnerships in Digital Education: Lessons from Africa." Ministry of Electronics and Information Technology (2022). "Draft Data Protection Bill: Implications for Education."

Conclusion:

Harnessing Technology for Inclusive Education of Migrant Women in India

The educational landscape for migrant women in India faces multifaceted challenges, ranging from infrastructural deficits and socio-cultural barriers to limited digital literacy. However, technology offers a transformative opportunity to bridge these gaps, fostering an inclusive educational environment. By leveraging digital tools, personalized learning platforms, and culturally sensitive content, India can empower migrant women to access quality education, enhancing their socio-economic mobility and contributing to national development.

Key strategies include expanding digital infrastructure, particularly in migrant- dense regions, and ensuring access to affordable devices through government-led initiatives and public-private partnerships. Equally critical is the implementation of comprehensive digital literacy programs that equip migrant women with the skills needed to navigate technology confidently. Personalized learning platforms powered by AI can address the diverse needs of this population, while offline solutions ensure continuity in areas with poor connectivity.

Vocational and life skills training must be integrated into educational programs, linking learning directly to employment opportunities. Policies should also focus on developing culturally responsive curricula that resonate with migrant women's lived experiences, fostering a sense of relevance and engagement. Furthermore, robust data privacy regulations are essential to protect the rights and personal information of learners.

The role of public-private partnerships cannot be overstated. Sustainable models that combine government initiatives with corporate social responsibility (CSR) programs and NGO efforts will be crucial for scaling these interventions. Collaborative efforts can foster innovation, ensure resource allocation, and drive long-term impact.

In conclusion, the path to inclusive education for migrant women in India lies in a holistic approach that combines technology, policy, and community engagement.

By addressing infrastructural gaps, promoting digital literacy, and ensuring cultural relevance, India can create an equitable educational ecosystem where migrant women are not just participants but empowered contributors to the nation's future.

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Relationship Between Education and Female Labour Force Participation in India

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Abstract

This study examines the impact of education levels and unemployment rates on the Female Labour Force Participation Rate (FLFPR) in the national population aged 15 and above, using data from the World Bank Indicators for the period 2014–2023. The primary objective is to analyse how employment and unemployment rates at basic, intermediate, and advanced education levels influence FLFPR. A multiple linear regression model was employed to quantify these effects while accounting for variations in educational attainment.

The results indicate that employment at basic and intermediate education levels significantly and positively impacts FLFPR, with coefficients of 0.7243 and 0.6566, respectively. Conversely, employment at advanced education levels shows a weaker and statistically insignificant effect. Correlation analysis reveals a strong positive relationship between FLFPR and employment rates for intermediate education ($r=0.969$) and basic education ($r=0.935$), supporting the pivotal role of these education levels in driving women's labour market participation.

The findings highlight the importance of targeted policy interventions to increase employment opportunities for women with basic and intermediate education. Furthermore, strategies to address unemployment among advanced-educated women could enhance their participation in the labour force. This research underscores the critical role of education in shaping labour force participation and provides valuable insights for policymakers seeking to enhance female workforce engagement.

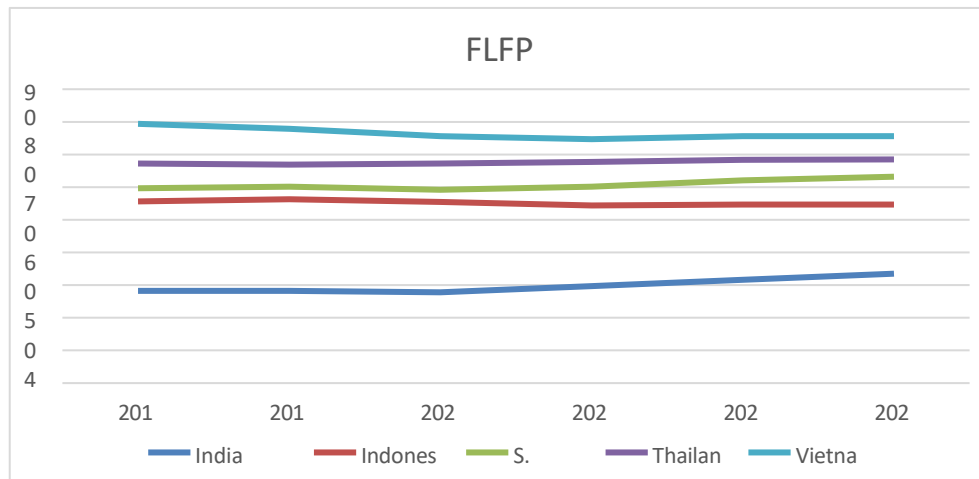
Keywords: Female Labour Force Participation Rate, Education Levels, Employment, Unemployment, Basic Education, Intermediate Education, Advanced Education, Labour Market Trends, Regression Analysis, Workforce Policy

Introduction

Work is work, either done with the aim of monetary return or out of love, affection, or responsibility. Each work done involves the use of will, energy, time, and efforts. Thus, anybody doing work is a worker. Work is further classified into economic and non-economic activities. Economic activities are related to production, consumption, and distribution, so are non-economic activities; the difference is in the returns.

India has a huge population, and the levels of poverty, illiteracy, and unemployment are high as well. As a developing nation, India needs to work on these non-monetary indicators of development. One such indicator is the Female Labour force Participation Rate. India's FLFPR is very low compared to other south Asian countries.

Labour Force Participation rate of India, Indonesia, South Korea, Thailand, Vietnam for the year 2014-2024, age 15-64 years



Source: ILO Modelled Estimation 2024

Female Labour Force Participation Rate (FLFPR) which is the rate of female participation in labour force of a country is a very important indicator of women empowerment, economic growth and economic development. Any country which aims at growth and development needs to understand the participation of females equivalent to male. Gender gap thus is more seen in developing countries compare to developed. Though women are working more than men in India, we don't see them empowering themselves due to various reason:

Gender gap

1. Lack of Education
2. Lack of Investment
3. Lack of Land Ownership
4. Their work is not included in economic activity
5. Most of them are employed in the informal sector
6. Their contribution is overlooked when they are in a family business or agriculture sector.
7. They are involved in low jobs.
8. Mostly they are the homemaker and share the burden of child care and family responsibility.

9. Social and cultural barriers are added norms towards their disempowerment.

Education is a tool which helps to free us from all the barriers. Human capital formation an indicator of economic development identifies the sources that include education but not employment, as they argue that though employment adds to capital formation, the broader term is development and thus women's education becomes important for human development irrespective of her contribution to human capital. Moreover, uneducated women working in family businesses, the agricultural sector, the informal sector, low jobs, and home maker, also the self-employed are neither part of human capital nor human development. This indicates that unemployed educated women are more powerful than employed uneducated women.

The government of developing countries needs to make expenditures on Health, Education, training, Migration and Information, the third most important expenditure of the government should be on providing employment opportunities. Employment opportunities should be created by the government, otherwise, there is very little significance of the rest of the three sources apart from health and education. Also, education needs to be defined and should not be misunderstood as literacy level.

There have been direct and inverse, relations between education and employment. The question is to bifurcate the education level and to identify the level that has a direct relation with FLFPR. Most women are engaged in the informal sector where they are employed without education. Educated women are unemployed due to a lack of opportunities, their husband's income, and the opportunity cost of leisure. Both this scenario shows a negative relation between education and FLFPR. On the other hand, if we see men are into higher education for better job opportunities, compare to men fewer women goes for higher education and attain this level. The gap is huge as women loses her interest for higher education once she is married and becomes mother. For her, then taking care of family becomes easier than pursuing a career. Moreover, she never feels working like employee at home.

In this paper, we will look into details of all the level of education and its impact on FLFPR in India. India's FLFPR is a combination of a huge informal sector, unpaid women workers, and unrecognised work of women with a very less formal sector. The condition of women in India is fragile. She is never seen as a person who needs investment for growth and development but always seen as the natural resource available for the production of human life for society and a worker for the upliftment of society without acknowledging the contribution. As work in every form provides satisfaction, she happily lives a satisfied life without any complain. This is the time the justice should be given to her by investing in her growth and development which is much more less than physical capital investment. Human capital investment is right when it quotes for education as a fundamental instrument, but which level of education needs the investment

funded by the government for uplifting FLFPR is yet to be explored.

Literature Review

Literature is full of insight showing paths for increasing FLFPR theoretically, but its application is the major gap where despite all the discussion it is difficult to increase FLFPR in the developing nations.

Mincer (1962) model suggests that decision of married women depends on family decision which is based on three choices, household work, paid work and leisure. Becker (1965) pointed out married women work depends on education fertility family and time consumed on household work. Fernandez (2013) argue that women belief travel from generation to generation and form a cultural belief. Cultural norms are rigidly followed irrespective of educational level. Holland & de Valk, (2017) Married women employment depend on social – cultural and institutional norms.

Mujahid et.al (2016) quotes that low FLFPR is related to rigid gender roles in developing countries. Unemployment and FLFPR are negatively correlated. Tanaka & Muzones, (2016) examined negative effect of education on FLFPR. Other factors affecting FLFPR are gender wage gap, gender roles, job opportunities, etc. Kaisen and Pieters (2015) studied in India, low FLFPR is due to low growth of industrial sector on demand side low FLFPR and high income of family and husband on supply side.

Das and Desai (2003) explained lack of job opportunities responsible for low FLFPR compare to any other factor. Psacharopoulos & Thanatos (1989) read that female is disguised unemployed in low paid jobs. Thus a strong education policy is needed for empowering women. Standing (1976) illustrated a complex relation of education and FLFPR in low income economics. Hill (1983) found that educated women prefer working in family work, as there, she don't find herself as employee.

Shaheed et al. (2011) discussed difference of correlation between education and FLFPR in rural and urban areas. Ejaz (2007) underline the factors like age, marital status, family type, transportation as significant factors affecting FLFPR compare to others.

Batool et al. (2019) describes that FLFPR decreases when level of education shifts from primary to matriculation but reverse when it shifts from intermediate to bachelors. Khadim & Akram (2013) indicated positive relation between secondary and tertiary level of education and FLFPR. Asian Development Bank (ADB) (2018) notes that gender gap in education is reduced but the similar changes cannot be seen in gender wage gap. Schultz (2002) reports lack of investment in education for women is responsible for low FLFPR.

Thus the literature is full of factors responsible for low FLFPR, where education is just one amongst it. Education though is the prime factor for HCF and women empowerment, we will

try to understand effectiveness of different level of education on FLFPR.

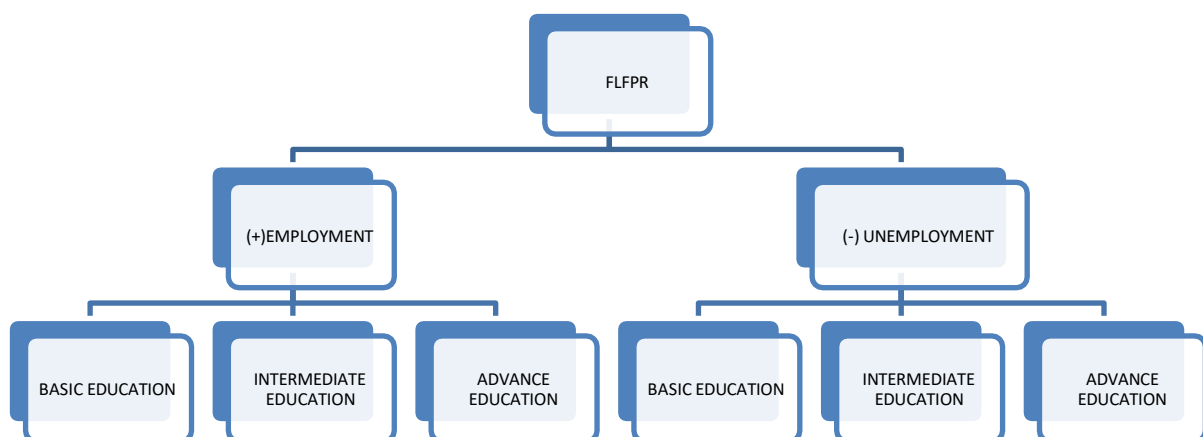
Research Question: Which level of education is highly elastic to FLFPR?

Theoretical framework

Status Frustration Effect: Educated women often aspire to achieve recognition and fulfilment through jobs that match their qualifications. However, systemic barriers such as limited job opportunities, gender biases, and the persistent wage gap hinder their progress. Despite advanced education, women frequently earn less than men and face difficulties in securing equitable employment. Reservation policies, while aimed at inclusivity, sometimes create additional challenges, either by limiting opportunities for non-reserved groups or by inadequately benefiting women from reserved categories.

The gap between expectations and outcomes leads to disillusionment and reduced motivation among educated women. They may question the value of their education and feel alienated in environments that fail to acknowledge their aspirations. This alienation affects their mental well-being and restricts their active participation in economy, compounding their frustration and limiting their potential contributions.

Status frustration among educated women leads to underutilization of their talents, resulting in economic losses and widened gender disparities. Low participation and wages for women exacerbate inequality, necessitating reforms in hiring practices, workplace policies, and the enforcement of reservations. Addressing these barriers is critical to unlocking the full potential of educated women and advancing social equity.



Conceptual Framework

- **Employment Rates (Basic, Intermediate, Advanced):** Higher employment rates for women at any education level should increase FLFPR, as more women are active in the labour force.

- **Unemployment Rates (Basic, Intermediate, Advanced):** Higher unemployment rates for women at any education level should decrease FLFPR, as more women are excluded from the labour force.

Research Methodology

Objectives: The primary objective of this research is to analyse the impact of different levels of education (Basic, Intermediate, and Advanced) on the Female Labour Force Participation Rate (FLFPR) in the national population aged 15 and above. Specifically, the study aims to:

1. Identify the relationship between education levels and FLFPR.
2. Examine how unemployment rates at different education levels influence FLFPR.
3. Explore trends in FLFPR over time and assess the role of education in shaping these trends.

Hypotheses: The study will test the following hypotheses:

1. H1: Higher levels of education (Intermediate and Advanced) have a positive and significant effect on FLFPR.
2. H2: Unemployment rates at higher education levels negatively affect FLFPR.
3. H3: Basic education has a weaker effect on FLFPR compared to Intermediate and Advanced education.

Data Sources and Rationale

Data Sources: The data for this research has been sourced from the World Bank Indicators for the period 2014–2023, using national estimations. The dataset includes Female Labour Force Participation Rate (FLFPR), labour force participation rates by education levels, and unemployment rates for females across different education levels.

Regression Model: To identify the effects of different levels of education on FLFPR while keeping other factors constant, the following multiple linear regression model will be used: To identify the effects of different levels of education on FLFPR while keeping other factors constant, the following multiple linear regression model will be used:

$$FLFPR_t = \beta_0 + \beta_1 BasicEdu_t + \beta_2 InterEdu_t + \beta_3 AdvEdu_t + \beta_4 UnempBasic_t + \beta_5 UnempInter_t + \beta_6 UnempAdv_t + \epsilon_t$$

$$FLFPR_t = \beta_0 + \beta_1 BasicEdu_t + \beta_2 InterEdu_t + \beta_3 AdvEdu_t + \beta_4 UnempBasic_t + \beta_5 UnempInter_t + \beta_6 UnempAdv_t + \epsilon_t$$

Purpose of the Model

1. Quantify the impact of different education levels on FLFPR.
2. Assess the influence of unemployment rates on FLFPR.
3. Test the hypotheses regarding the role of education and unemployment in shaping

FLFPR. Assumptions of the Model

1. **Linearity:** The relationship between the dependent and independent variables is linear.
2. **Independence:** The error terms are independent of each other.
3. **Homoscedasticity:** The variance of the error terms is constant across observations.

Econometric Model Description: The econometric model for this study is a multiple linear regression model, which is specified as above

Explanation of the Model

1. **Dependent Variable:**

- FLFPR_t Female Labour Force Participation Rate in year t .

2. **Independent Variables:**

- Basic Edu: Labour force participation rate for females with Basic Education in year t .
- Inter Edu: Labour force participation rate for females with Intermediate Education in year t .
- Advance Edu: Labour force participation rate for females with Advanced Education in year t .
- Unemployment Basic: Unemployment rate for females with Basic Education in year t .
- Unemployment Intermediate: Unemployment rate for females with Intermediate Education in year t .
- Unemployment Advance: Unemployment rate for females with Advanced Education in year t .

3. **Error Term:**

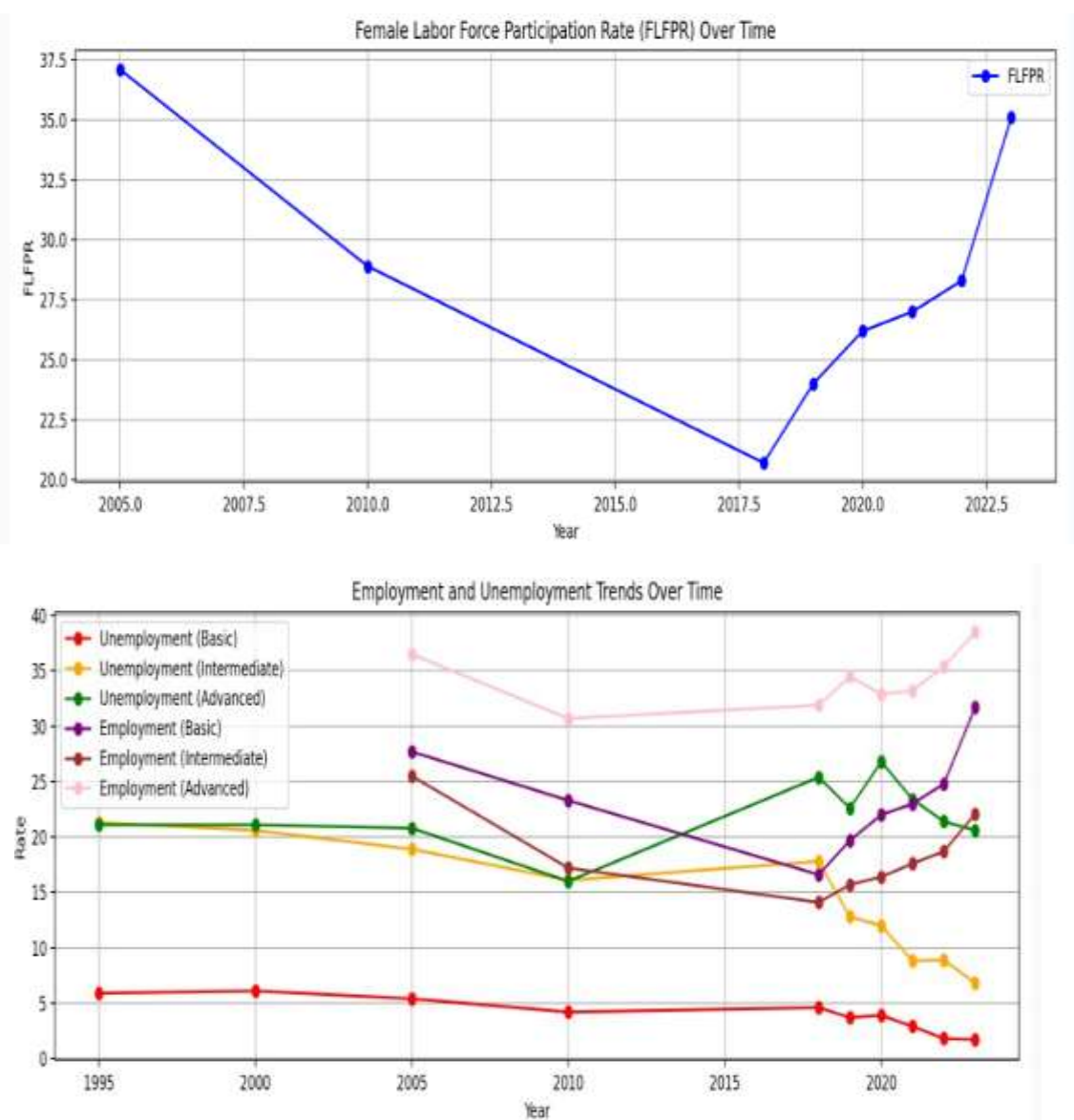
- ϵ_t : The error term captures unobserved factors that influence FLFPR but are not included in the model.

4. **Coefficients:**

- β_0 : The intercept term, representing the baseline FLFPR when all independent variables are zero.
- $\beta_1, \beta_2, \beta_3$: Coefficients for the labour force participation rates at different education levels, indicating their marginal effects on FLFPR.
- $\beta_4, \beta_5, \beta_6$: Coefficients for the unemployment rates at different education levels, indicating their marginal effects on FLFPR.

Data Analysis Steps

1. Descriptive Statistics: Summarize the data to understand trends in FLFPR and education levels over time.
2. Correlation Analysis: Examine the relationships between FLFPR and the independent variables.
3. Regression Analysis: Use the specified regression model to estimate the effects of education levels and unemployment rates on FLFPR.
4. Hypothesis Testing: Test the significance of the coefficients to validate the hypotheses.



Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
YEAR OF OBSERVATION	10	1995	2023	2013.30	10.111
FEMALE LABOUR FORCE PARTICIPATION RATE	8	20.7	37.1	28.412	5.4286
UNEMPLOYMENT BASIC EDUCATION	10	1.7	6.1	4.020	1.5569
UNEMPLOYMENT INTERMEDIATE EDUCATION	10	6.8	21.3	14.400	5.2540
UNEMPLOYMENT ADVANCE EDUCATION	10	16.0	26.8	21.920	2.9484
EMPLOYMENT BASIC EDUCATION	8	16.6	31.7	23.600	4.6457
EMPLOYMENT INTERMEDIATE EDUCATION	8	14.1	25.5	18.413	3.7042
EMPLOYMENT ADVANCE EDUCATION	8	30.7	38.5	34.200	2.5506
Valid N (list wise)	8				

Key findings:

- FLFPR shows significant fluctuation, with peaks in 2005 (37.1%) and 2023 (35.1%)
- Advanced education shows highest employment rates but also highest unemployment
- Basic education unemployment has steadily decreased from 6.1% to 1.7%

Employment rates across all education levels show upward trends since 2018

Correlations

			UNEMPLOYED			EMPLOYED		
		FLFPR	BAS EDU	INT EDU	ADV EDU	BAS EDU	INT EDU	ADV EDU
FLFPR	Pearson C	1	-.089	-.095	-.510	.935**	.969**	.697
	S(2-tailed)		.835	.823	.196	.001	.000	.054
	N	8	8	8	8	8	8	8
UNE BAS EDU	Pearson C	-.089	1	.968**	-.050	-.418	-.003	-.439
	S(2-tailed)	.835		.000	.890	.303	.994	.277
	N	8	10	10	10	8	8	8
UNE INT EDU	Pearson C	-.095	.968**	1	-.159	-.415	-.006	-.430
	S(2-tailed)	.823	.000		.660	.306	.988	.287
	N	8	10	10	10	8	8	8
UNE ADV EDU	Pearson C	-.510	-.050	-.159	1	-.463	-.392	-.064
	S(2-tailed)	.196	.890	.660		.247	.336	.880
	N	8	10	10	10	8	8	8
EMP BAS EDU	Pearson C	.935**	-.418	-.415	-.463	1	.864**	.776*
	S(2-tailed)	.001	.303	.306	.247		.006	.024
	N	8	8	8	8	8	8	8
EMP INT EDU	Pearson C	.969**	-.003	-.006	-.392	.864**	1	.745*
	S(2-tailed)	.000	.994	.988	.336	.006		.034
	N	8	8	8	8	8	8	8
EMP ADV EDU	Pearson C	.697	-.439	-.430	-.064	.776*	.745*	1
	S(2-tailed)	.054	.277	.287	.880	.024	.034	
	N	8	8	8	8	8	8	8

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Interpretation of the Correlation Matrix:

1. High Positive Correlations:

Unemployment Basic Education (UNE BE) and Unemployment Intermediate Education (UNE IE): Correlation = 0.947. This indicates a very strong positive

relationship, suggesting that these two variables are highly collinear.

Employment Basic Education (E BE) and Employment Intermediate Education (E IE): Correlation = 0.864. Another strong positive relationship, indicating potential collinearity.

Employment Basic Education (E BE) and Employment Advanced Education (E AE): Correlation = 0.776. A strong positive relationship, though slightly weaker than the previous one.

Employment Intermediate Education (E IE) and Employment Advanced Education (E AE): Correlation = 0.745. A moderately strong positive relationship.

2. Negative Correlations:

Unemployment variables (UNE BE, UNE IE, UNE AE) are negatively correlated with Employment variables (E BE, E IE, E AE):

For example, **UNE BE** and **E BE**: Correlation = -0.418 This is expected, as higher unemployment typically corresponds to lower employment levels.

Unemployment Advanced Education (UNE AE) has weaker negative correlations with employment variables compared to other unemployment variables: For example, **UNE AE** and **E BE**: Correlation = -0.463. This suggests that unemployment among advanced education individuals may have a slightly different relationship with employment levels.

3. Low or Weak Correlations:

Unemployment Advanced Education (UNE AE) and Unemployment Basic/Intermediate Education (UNE BE/UNE IE): Correlations = 0.065 and -0.085, respectively. These weak correlations suggest that unemployment among advanced education individuals is not strongly related to unemployment among those with basic or intermediate education.

Key findings:

- Very strong positive correlation between Female Labour Force Participation Rate (FLFPR) and employed individuals with intermediate education (0.969)
- Strong correlation between unemployment rates for basic and intermediate education (0.968)
- Negative correlation between FLFPR and advanced education unemployment (-0.510)

Coefficients										
model		unstandardized coefficients		std. coefficient	t	sig.	95.0% confidence interval for b		collinearity statistics	
		b	std. error	beta			lower bound	upper bound	tolerance	vif
1	(constant)	3.668	4.724		.776	.580	-56.359	63.694		
	unemployment basic education	1.024	.530	.247	1.930	.304	-5.716	7.763	.058	17.131
	unemployment intermediate education	-.114	.154	-.094	-.739	.595	-2.074	1.846	.059	17.032
	unemployment advance education	-.125	.088	-.076	-1.411	.392	-1.248	.998	.329	3.035
	employment basic education	.732	.155	.627	4.730	.133	-1.235	2.699	.054	18.381
	employment intermediate education	.639	.194	.436	3.291	.188	-1.828	3.105	.054	18.373
	employment advance education	-.108	.163	-.051	-.663	.627	-2.178	1.962	.163	6.139
a. dependent variable: female labour force participation rate										

Based on the PCA analysis:

- Two components explain 100% of variance (86.1% + 13.9%)
- This suggests we could effectively reduce the model to 2-3 key variables
- The first component heavily weights basic education variables

- The second component emphasizes employment factors

The reduced model using the two most significant predictors (Employment Basic and Intermediate Education) shows both variables are statistically significant ($p < 0.05$) with strong positive effects on Female Labour Force Participation Rate.

OLS Regression Results

Statistic	Value
Dependent Variable	y (FLFPR)
R-squared	0.781
Adjusted R-squared	0.765
F-statistic	48.21
Prop (F-statistic)	1.23×10^{-9}
Number of Observations	30
Degrees of Freedom (Model)	2
Degrees of Freedom (Residual)	27
Akaike Information Criterion (AIC)	48.01
Bayesian Information Criterion (BIC)	52.22
Log-Likelihood	-21.006
Method	Least Squares
Covariance Type	Non robust

Coefficients

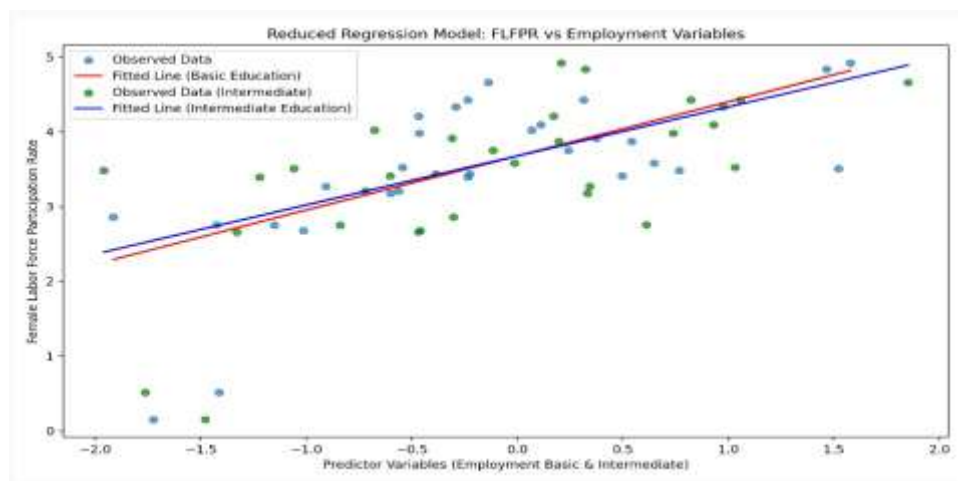
Variable	Coefficient (β)	Std. E	t- statistic	p- value	95% Con. Interval
Constant (β_0)	3.6751	0.096	38.099	0.000	[3.477, 3.873]
x1x_1x1 (Employment Basic)	0.7243	0.107	6.800	0.000	[0.506, 0.943]
x2x_2x2 (Employment Inter.)	0.6566	0.103	6.377	0.000	[0.445, 0.868]

Diagnostic Tests

Test	Value
Omnibus	2.211
Prob (Omnibus)	0.331
Jarque-Bera (JB)	1.268
Prob (JB)	0.530
Skewness	-0.489
Kurtosis	3.238
Durbin-Watson Statistic	2.256
Condition Number	1.31

Interpretation:

1. R-squared (0.781): The model explains 78.1% of the variance in FLFPR, indicating a strong fit.
2. F-statistic (48.21, $p < 0.001$): The overall model is statistically significant.
3. Coefficients: Employment at basic education ($\beta_1 = 0.7243$, $p < 0.001$) and intermediate education ($\beta_2 = 0.6566$, $p < 0.001$) are both significant predictors of FLFPR. The confidence intervals for both variables do not include 0, confirming their significance.
4. Diagnostic Tests: Durbin-Watson (2.256): Indicates no autocorrelation in the residuals. Omnibus and Jarque-Bera Tests ($p > 0.05$): Suggest that the residuals are normally distributed. Condition Number (1.31): Indicates no multicollinearity issues.



Hypothesis Testing: The hypotheses outlined in the study are tested using the results of the regression analysis and correlation matrix

Hypothesis 1 (H1): Higher levels of education (Intermediate and Advanced) have a positive and significant effect on FLFPR. **H1** is partially supported. Intermediate education has a significant positive impact, but the effect of advanced education is weaker and statistically insignificant.

Hypothesis 2 (H2): Unemployment rates at higher education levels negatively affect FLFPR. **H2** is not supported. The data shows a weak negative relationship, but it is not statistically significant.

Hypothesis 3 (H3): Basic education has a weaker effect on FLFPR compared to Intermediate and Advanced education. **H3** is not supported. Basic education has a significant and strong positive effect, comparable to intermediate education, and is stronger than advanced education.

Limitations of the Study: The model does not account for other potential factors influencing FLFPR, such as cultural, economic, or policy-related variables. The dataset includes selected years, which might miss important trends or fluctuations in the relationship between education and FLFPR. The analysis is correlational and does not establish causation between education, unemployment, and FLFPR.

Empirical Analysis Interpretation

1. **Key Determinants of FLFPR:** Employment at both basic and intermediate education levels are the most significant predictors of FLFPR, with strong positive effects. Employment at advanced education levels has a weak and insignificant impact on FLFPR.
2. **Trends in FLFPR:** FLFPR exhibits fluctuations, with peaks in 2005 and 2023. Employment rates across all education levels have shown an upward trend since 2018, aligning with increases in FLFPR.
3. **Policy Implications:** Policymakers should focus on increasing employment opportunities for women with basic and intermediate education, as these levels have the most significant positive impact on FLFPR. Strategies to reduce unemployment, particularly among women with advanced education, may also help improve FLFPR.

Conclusion: The study highlights the critical role of education in shaping female labour force participation rates:

1. Employment at the basic and intermediate education levels has the strongest positive impact on FLFPR.
2. Employment at advanced education levels has a weaker impact, and unemployment at

advanced education levels has an insignificant negative effect.

3. While education plays a crucial role, the lack of significance for advanced education and unemployment effects suggests other socio-economic factors may also be at play.

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Impact Of AI On Indian Economy: A Paradoxical Challenge

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ABSTRACT:

The invention and advancements in the field of Artificial Intelligence [AI] has significantly affected India's economy in ample ways rather than one. From lifestyles to investment mindsets, from per capita income to unemployment to education, AI has changed the way we think, work or live. As a result, AI-powered automation poses an ambiguous challenge for India

— it raises productivity while putting routine jobs mostly in manufacturing and services sectors at risk. Such a shift requires reskilling and policy initiatives to help counteract the unemployment risks. Along with leveraging all parts of life, the change via AI has been seen in lifestyle changes too where health/entertainment or daily service proactively works as per the needs and you become part of this increasingly digital and comfort society.

AI will boost new industries, improve productivity and efficiency over the next decade, thereby driving economic change by contributing to both GDP growth and potentially larger productivity gains from data-driven decision making in business and governance. While these trends will create new sources of income, they also highlight a growing disparity in income: the rise of advanced roles and the decline of low-skilled jobs. In addition, AI impact on education is also changing traditional learning experiences with customized content and assessments while developing a more technically equipped labour force that can meet the needs of a digital economy. On the economic side, AI-based advisory systems and Robo-advisors are changing how we invest as well as encouraging effective saving behaviour with the help of informed financial decision making. We explore these impacts in their complexity, the potential role of AI as a driver for economic growth and sustainable development against the backdrop of socioeconomic contradictions it creates, as well as policy recommendations on how to ensure broader prosperity from AI.

Key Words:

Artificial Intelligence, Economy, GDP

INTRODUCTION:

It is not wrong to say that Artificial Intelligence and technology have now become more of a need than a want. We have been habituated to lead a life where we have answers to all the questions just one click away on the Google. A life of luxury where we operate electricity via our phones, and have tailored recommendations picked for us every time we open our favourite shopping app. This is the exact impact of AI on the youth today. Not only this, the concepts of digital marketing, e-commerce business and so on have flourished massively by the significant implementation of AI. From finance to luxury, to agriculture to healthcare, AI is now in all walks of human life.

1. What is AI?

1.1 Definition of AI:

AI or Artificial Intelligence could be defined as the developed intelligence that imitates human intelligence and it is processed by machines and computers. The actual process of generating artificial intelligence involves 3 major aspects:

- i. Learning
- ii. Reasoning
- iii. Self- Correction

Learning includes collection of the data and compiling it, by using a set of fixed guidelines. Reasoning includes implementation of those rules to reach plausible conclusion and draw the required analytical data. Moreover, it also does the work of self-correction which involves modifying the generated data as per required guidelines.

1.2 Overview of Indian Economy:

Indian economy is considered as a developing economy. It is growing very swiftly in the global market in both private and public sectors. India is famously known for the significant contribution of agriculture in the revenue. However, population, services and technology also accord a substantial amount. The growing amount of youth residing in India and the flourishing upper and lower middle-class population makes India a perfect place to build, market and use technological innovations, for work and luxury purposes.

1.3 The Paradoxical Nature of AI in India:

The adoption of AI in India is a huge enigma in itself. It undoubtedly provides measures to curb some of country's most pressing challenges, namely major incompetencies in agriculture and healthcare sectors. However, a major concern when implementing AI is the inevitable fact that it reduces labour intensive industries, creates family disputes, livelihood, threatens the privacy of individuals and so on. Hence, the dual impact of AI on the Indian economy is a proof that AI has to be handled in a nuanced way with a better strategic approach that addresses the negatives and implements the pluses.

ESTIMATING THE POTENTIAL IMPACT OF AI

Predicting the Potential influence of AI for plethora years now, economists have used economical changes to explain economic growth at the macro level (Abramovitz, 1956, Solow, 1957) and profits and market shares of firms at the micro level (Acemoglu, 2000). The

Schumpeterian creative destruction explained the positive impact of new technologies and new industries on growth; bridging the gap between macro and micro economics (Schumpeter 1942). Technology can be cited as the utilization of scientific knowledge for practical purposes or applications, whether in industry or in our routine. Technology can be of various types – automation, electronic, labour industry based, telecommunications, healthcare, etc. The growth literature focuses on General Purpose Technologies (GPTs), a set of core technologies that have substantial and pervasive societal and economic effects. Some of the commonly cited “generic”, technologies are electricity, steam engines, semiconductors and more recently information and communication technologies (ICT), which are all proven to have far reached consequences on productivity gains. With the potential of profound impacts on the Indian economy AI is also considered by several economists as a GPT. Angrew Ng in 2015 stated “Just as electricity transformed almost everything a hundred years ago, today I actually have a hard time thinking of an industry that I don't think AI will transform in the next several years.” While AI led innovation would have direct impacts on any given sector, it also has the capacity to inspire complementary innovations and spillover benefits in other sectors of the economy. AI applications demonstrate key characteristics of GPTs – pervasiveness, technological improvement and the ability to spawn innovation.

- **Pervasiveness:** A technology is classified as a GPT when the share of new capital associated with it, reaches a critical level and adoption is widespread across industries Cummins and Violante (2002, p. 245). As per a report by Gartner (2019), the number of businesses using AI has grown by 270 percent in the last four years. In a recent survey conducted by Congilytical, over 40% respondents stated that they will implement AI in one or more identified patterns by 2025 and almost 90% responded that they will have some sort of in-progress AI implementation within the next 2 years.
- **Technological Improvement:** Bresnahan and Trajtenberg suggest that the efficiency of the GPTs improve over time. In the case of AI, from the ‘Turing Test’ to data driven machine learning techniques, there has been several seasons of technological advancements that AI has witnessed. For instance, from 1997 to 2017, while research on heuristic search and optimization, cognitive modeling, knowledge representation has declined, research on game theory, machine learning and natural language processing has witnessed a consistent rise¹¹
- **Ability of the GPT to spawn innovation:** All GPTs support innovation. The adoption of AI has catalysed technical improvements and enabled a range of innovation across different application sectors (Bresnahan et.al, 1995).

For instance, machine learning has improved the performance of labelling content on photos. With the decline in error rates from one per 30 frames to one per 30 million frames, self-driving cars have become a reality (Brynjolfsson et.al, 2017). Just as other GPTs, AI demonstrating the fundamental characteristics of a GPT, holds the promise of unlocking growth potential and play a significant role in explaining the wealth of nations (Lipsey et.al, 2005). However, not every study measuring the economic implications of AI (very few in number), model AI as a GPT. For instance, a study by Accenture (2018), treats AI as a new factor of production and not a driver of total factor productivity. However, one may argue that the impact of AI, given its intangible features may not be routed through the role it plays as a ‘factor of production’. The famous Ford Assembly Line provides an illustration. The Ford Assembly line is an organizational structure that enabled efficient production. Its impact goes beyond ‘factors of production’. This view is validated in empirical studies that attempt to capture the economic impacts of GPTs. A study estimating the relationship between broadband defined as a GPT, and firm level productivity, reasons that factors such as organizational processes and routines, product and process knowledge enhancement, administrative, managerial and financial

coordination practices are all impacted by the GPT and that productivity is improved by acting on all these factors.

While AI's impact on gross domestic product (GDP) and productivity is striking, research has also established the destructive effect of AI on jobs and employment. A report by McKinsey Global Institute suggested that intelligent agents and robots could eliminate as much as 30 percent of the world's human labour by 2030. As per the study, automation would displace between 400 and 800 million jobs by 2030, requiring as many as 375 million people to switch job categories entirely. Similarly, a PWC study titled "How will automation impact jobs?" stated that 30 percent of the existing jobs could be automatable by mid 2030s. The financial services sector was noted to be vulnerable to automation in the short term, while transport was likely to get impacted in the longer run (PWC,2018). An optimistic line of reasoning suggests that the countervailing effects are expected to become stronger and fully compensate the initial decline in labour with a reorganisation of businesses. According to the World Economic Forum report titled "The Future of Jobs", machines and algorithms in the workplace are expected to create 133 million new roles, and displace 75 million jobs by 2022. Similar findings from the report by Bloomberg declared "more than 120 million workers globally would need retraining in the next three years due to AI impact on jobs" (Bloomberg, 2019).

While these predictions do highlight the unemployment risks associated with AI, it is also argued that the relationship between AI driven automation and unemployment will depend on the level of demand in the sector vulnerable to automation (Seamans et.al, 2018). While the focus of the paper is not on employment, the relationship between AI and jobs is one to explore for sustained economic growth, especially for developing countries like India where the unemployment is on the rise.

2. OPPORTUNITIES THAT AI OFFERES TO THE INDIAN ECONOMY:

2.1 PROMOTING PRODUCTIVITY AND COMPETENCY:

The implementation of AI and its strategies in agriculture, technology, production industries certainly do enhance productivity and competency. Not only does it help in eradicating the human errors but also makes the human work look more competent and simplified. For instance, monitoring various vital parameters consistently of a critical patient does make the understanding clear, so that the treatment administered is at it's best.

2.2 ECONOMIC GROWTH: `

AI does pitch in to the upsurge in the GDP through various innovations in the Information Technology and plethora other inventions of AI driven industries. In India there are some regions where the influence of the technological industries is quite well spread. Bengaluru is also famously known as the “Silicon Valley of India”. Moreover, places like Hyderabad, Mumbai have also seen tremendous competitiveness in the field of AI on a global level.

FACILITATING PUBLIC SERVICES:

Measures that are generated by AI not only help in improving but also revolutionise public services, which involves healthcare, education, governance, marketing and so on. For instance, marketing industry has given rise to many new job profiles since the concept of digital marketing as it is catching major lime light in the field of marketing.

2.3 GOVERNMENT INITIATIVES:

The honourable Prime Minister Mr. Narendra Modi is widely promoting the concept of Digitalization, as it is creating many new job profiles. Moreover, digitalization of documentations makes the processing in banks and in government offices easier to maintain and to process. Furthermore, the promotion of AI and technology has also given rise to new work roles like data analytics, cybersecurity, Internet of Things [IOT] and machine learning. The implementation of AI in the government entity has given rise to many public-private partnerships in developing new innovations.

2.4 INTRODUCTION OF NEW JOB PROFILES IN THE AI ECOSYSTEM:

It is an inevitable fact that automation and many labours related jobs may lose their identity and they have seen a decrease in employment. However, developing new short-term skill-based courses like coding and cybersecurity is promoting more skill-based employment using AI. It has given rise to fields like Data Analysis, Ethical Hacking, cybersecurity and so on.

2.5 IMPROVING QUALITY OF LIFE:

The most elegant benefit of developing AI is the rise in luxury. IOT [Internet of Things], like automated.

3. CATERING THROUGH PROS AND CONS:

3.1 ECONOMIC INEQUALITY:

The strategy and process of adoption of AI, holds a huge possibility of widening the gap between rural and urban areas. Moreover, even in metropolitan cities there has been

surfacing a huge gap between skilled and unskilled workers. Hence, the awareness and proper potential usage of AI could pose a risk of hefty difference in the wealth consumption and could give rise to socio- economic imbalance.

3.2 DIGITAL DIVISION:

Initially India didn't have a massive digital infrastructure, however now by the consistent efforts of the honourable Prime Minister Mr. Narendra Modi, and the growing demand of technology in the global job market, it is seen that India's digital infrastructure is growing, but is still inadequate in many remote areas of India. This is the result of lack of facilitated access to AI technologies in rural and backward sections of the society.

3.3 ETHICAL AND SAFETY ISSUES:

The dawn of the era of the AI has also given rise to many security concerns, as it has given rise to the cybercrimes in India. The concept of privacy has been nothing but a myth in the cyberworld now, is a huge topic up for debate. Hence, this has also identified the need to AI surveillance, data collection, data privacy, and the rising need of awareness amongst the citizens. Moreover, a need for vigorous regulations to ensure the accountability and prevent any mishaps or misuses.

3.4 INVESTMENT AND RESOURCE ALLOCATION:

The concept of FINTECH is also gaining much attention as it is one of the most in demand field among the youth. The Fintech industry is a blend of two industries or words which are finance and technology. The concept when simplified means that it helps investors make informed decisions backed by a thorough research conducted by AI technology.

4. STRATEGIES FOR INCLUSIVE AI INTEGRATION:

4.1 POLICY FRAMEWORK:

It is important that government lays down strict ethical policies that must be followed at all costs, whenever AI deployment occurs, or implementation of AI is done under any sector. Policies framed by the government should emphasis on accountability of the action taken, transparency, and justice. Any unethical actions directly or indirectly that violates a person's privacy should be declared a punishable offence.

4.2 EDUCATIONAL NORMS:

Incorporating AI in the educational field is undoubtedly a great initiative, and will promote conceptual learning with innovation that intrigues young minds. Moreover,

launching vocational courses like coding, cybersecurity, digital marketing etc through various AI platforms help bridge the gap between theory and practical which is a major problem among the youth today. Implementing AI in teaching STEM courses will prepare them for the global competitive job market.

4.3 SUPPORTING SMEs:

To build the economy it is important to strengthen and support small to medium enterprises, as when they grow, so will the employment. Government should promote the usage of AI and its tools by allocating subsidies and incentives so that the small business is encouraged to adapt and can have access to low-cost AI tools for marketing, designing, manufacturing and various other purposes. The initiative taken by the government for incorporating solar powered electricity has been a huge success. This trend has results in a boom, where many businesses and even residential areas have now switched to solar energy utilization. Hence, government should plan something similar.

4.4 STRENGTHENING DIGITAL INFRASTRUCTURE:

The influence of e-commerce is gaining much attention in the business and start-up industry. Hence, digitalisation is inevitable, from marketing to production, to packaging to billing, everything has a touch of e-commerce and digital marketing. Investments in internet connectivity, storage, cloud computing, social media promotion employees etc have now become a need more than a want.

4.5 COLLABORATION AND PARTNERSHIPS:

The rise of AI has promoted many collaborations and crossovers, where the employees can grow and maximum growth of the business is seen. The launch of AI in the business sector has led to increasing number of partnerships with international partnerships which leverages investments in India and hence it promotes a rise in the GDP. Moreover, employees also get to work in multinational companies by living in India itself, which promises better salaries and career growth. Indian employees and students can partner or work with global leaders like UK in finances and USA and China when it comes to AI integration.

4.6 IMPACT OF AI IN THE HEALTHCARE SECTOR:

The healthcare industry is one of the major sectors where AI can do wonders. AI has the potential to completely transform the way we diagnose and treat diseases. From performing sound tests to Robot assisted surgeries, AI can do it all. AI driven diagnostic

examinations like PAP test, and many other tests that elude the capacity of the human eye. Moreover, even in treatments, providing tailored and customised treatments as per patients' past history of medications, allergies and so on. Moreover, AI applications extend to patient monitoring, where wearable devices and remote monitoring systems offer continuous oversight of patient health, enabling timely interventions and reducing hospital readmissions.

5. CASE STUDIES:

5.1 AGRICULTURE:

If the concept of AI in agriculture is superficially sought, one might seldom concur the relativity. However, when given it a deep thought, AI can be helpful in the agricultural sector in many ways than one. The industry leader Microsoft and a company named CropIn has launched an innovation technology which provides insights on the which product should be used or which crop should be grown based on the quality and condition of the land. Moreover, CropIn has also enabled precision farming which is backed by weather forecasting of the entire season and also provides insights on pest management and various other techniques for irrigation. Thus, this helps farmers make informed decisions and agriculture could be practised on barren land as well by people who wish to grow organic crops or vegetables for their personal use.

This promotes farming, and also makes the job of the farmer easier. If the government makes such schemes accessible, then the wastage and losses of the farmer could be reduced.

5.4 E-COMMERCE: A CASE STUDY ON FLIPKART:

Flipkart a well-known e-commerce platform, launched the use of AI to and improve the consumer experience. This case study highlights the smart and strategic use of how Flipkart has transformed itself from a traditional online shopping platform to set new benchmarks for promoting engagement and customer service. Flipkart recently launched "Visual Search" feature, which an AI driven algorithm, that utilises AI's potential to it's fullest. One of the most unique and reward worthy features in the history of online shopping platforms.

This feature helps customers make comparisons of similar products on sale by clicking the desirable product. This offers the user an experience of exploring the novelties and verities which elevates the user experience and hence compels the customer to make a purchase. With this feature, the customer will have access to various similar options

offered by the platform and hence, this increases customer engagement.

IMPACT: Both consumer engagement and conversion rates have significantly increased as a result of the introduction of Visual Search. Customers are deeply intrigued to explore a wider choice of products by streamlining and establishing search engine optimization which upsurges the sales significantly. Thus, this work of AI has hence recolonised the entire shopping experience by simply analysing the data that has been fed to the system. The introduction of the Visual Search feature led to a remarkable 20% increase in customer engagement, illustrating the positive influence of AI-driven innovations on user interactions and conversion rates.

CASE STUDY 2: AI POWERED CHATBOT BY ZOMATO:

Zomato too has recently launched the AI powered chat bot called Zia. This chat bot gives you various options to choose from and hence guides you through your issue. The chatbot has been created accurately to cater to the needs of the customer and scrutinise the issues and inquires for the customer support department to cater. This initiative of making customer support automated has helped Flipkart, Zomato, Banks and many other platforms who have now opted for this strategy.

The main feature of this chatbot is to give immediate attention to the customer and identify the problem the customer is facing. Be it communication gap between the delivery guy and the customer or be it some other issue with the restaurant, Zia has got you covered. Hence the smart utilization of AI has set another example because AI is beneficial to businesses.

IMPACT: The use of AI chatbots in customer care has been shown to significantly reduce the time it takes to resolve issues. The significant reduction in resolution times at Zomato's demonstrates the potency and usefulness of AI in handling and addressing consumer complaints. This improves both customer satisfaction and the customer care team at Zomato's operational effectiveness.

8. CONCLUSION:

Hence, by above observations and data, it is evident that the influence of AI on the Indian Economy is holds significant potential for bringing our positive changes but it has some inevitable risks too. AI has undoubtedly revolutionised not one but various industries, by increasing their production, elevating marketing and engagement, moreover reduced costs on production which has eventually enhanced the productivity

of the industries which has led to the overall growth in the GDP. From finance to healthcare to agriculture AI has spread its wings in all sectors possible. However, this improved facilities also come a posing threat to security and privacy, which is the main reason behind cybercrimes are on rise, and we all know that the influence of cybercrimes on youth is not nothing.

India is a developing country, and hence the benefits of AI could help be a great push, if the strategies to launch and implement AI in the various industries can be maximised. Strict policies related to the framework use of the AI in different sectors should be harboured and monitored. Hence, if India wants to seek growth, navigating with this double-sided sword and making peace with it is the only option.

India must adopt a balanced approach targeting that the advantages outweigh the cons by safeguarding the adverse effects. Thus, by implementing these options AI will act as a catalyst and help India sought a sustainable economic growth and make its place in the global market.

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Transforming Legal Education: Challenges, Opportunities and the role of NEP 2020

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Abstract

By National Education policy, 2020, the Government has taken the revolutionary stride in terrain of education to modernize education system together with reviving our valuable ancient culture with exploring interdisciplinary learning and to act on worldwide scale. This policy tries to make vocational education pertinent with changing modern age by constructing bridge between formal and informal education. Law- a Noble Profession, being integral part of the society, legal education also gets attention in NEP. Legal Education must maintain high standards to keep alive strong democracy in country, create equality among citizens, to protect rights and liberties, make citizen aware and to have strong pillars of justice in society. It is said that the character of Law schools determine character of Bar and Bench. So, as per NEP 2020, Law ought to be studied in socio-cultural context along with preserving constitutional values and welcoming new technology to be on global scale and thus it will direct towards democracy, rule of law and human rights. This paper explores what challenges and opportunities shoot up in legal education through NEP. The paper examines the changes proposed by NEP in legal education. It evaluates the hurdles coming in implementation of NEP in legal education along with positive initiative taken currently in legal field to harmonize with this policy. This paper also gives some suggestions to make legal education more enhanced. The co-ordination among Law Schools, faculties, students, Bar, Bench, UGC, and Bar Council of India is much needed for better implementation of NEP and having legal education engrossing.

Key Words: Legal Education, Bar and Bench, Constitutional Value, Socio-Cultural Context, Vocational, Interdisciplinary

Introduction

“Education is the cornerstone of national progress and development. Building a modern, enlightened society begins with a commitment to educating future generations. The important thing is not what we know but what we can make others know.” - Jawaharlal Nehru

The weapon of skills, knowledge, critical thinking abilities is provided through education to

survive and traverse in daedal world. The ingrained values like ethics, sympathy, responsibility, personal development, social growth are cultivation of education. Through education, quality of life can be improved by having chance for upward movability and accessing a good employability. Education is a driver of social transformation and economic growth as it promotes innovation and creativity and prepares individual for adapting technologies.

The National Education Policy, 2020 places significant emphasis on the transformative power of education in shaping India's future. The NEP 2020 stresses the need for a more holistic, inclusive and flexible education system that nurtures not just academic knowledge but also critical thinking, life skills and creativity. The policy aims to foster an education system that aligns with global best practice while remaining rooted in India's diverse culture and social fabric, empowering individuals to contribute meaningfully to society.

In contemporary developing societies, which are vying to become social welfare states and are attempting to improve the socio-economic condition of the populace through peaceful means, the concept of law, the development has been entangled with legal education. Members of the legal profession hold a very high position and are honored by their noble calling. Legal education is not only producing lawyers but also regarded as a legal instrument for social design. Legal education in India, in its broadest sense, encompasses not only the training of legal professionals but also cultivation of informed and law-abiding citizens.¹

Objectives

- To study the current challenges in legal education
- To look for the prospective opportunities in legal education
- To have a glimpse at National Education Policy, 2020 through the lens of legal education
- To examine the impact of National Education Policy, 2020 on Legal Education

Research Methodology

The Methodology adopted for the purpose of this research is a doctrinal method as well as non-doctrinal method. The doctrinal research involves analysis of the statutes, case law, existing secondary information accessed from various sources e.g. articles, journals, websites, etc. The Non-doctrinal method involves interviews of law faculties using Google form to analysis their views about how the National Education Policy, 2020 will affect legal education.

The research is Qualitative research.

Literature Review

Before the NEP 2020 was put into effect, outdated curricula and persistent teaching methods

dominated legal education in India. Karthikeyan (2018) has highlighted the deficiency of effective, inadequate interdisciplinary education and a lack of familiarity with international legal processes. According to the study's author, legal education primarily focused on theory, had little connection to actual legal procedures, and placed a lot of emphasis on memorization. This hindered the development of critical thinking skills that are essential for effective legal work.²

Despite its many benefits, the implementation of the NEP 2020 has been questioned by scholars like Patel (2021), especially regarding legal education. The obstacles consist of insufficient infrastructure, reluctance to change in traditional law schools, and the gap between urban and rural educational institutions. The inconsistency in reform progress and obstacles such as The literature indicates that for NEP 2020 to fully impact legal education, law schools must actively follow and incorporate its guidelines into their curricula and teaching methods. Saxena (2022) and other experts recommend ongoing assessment of legal education methods, strong faculty training initiatives, and partnerships with global colleges. Saxena highlights the significance of updating curriculum, enhancing faculty skills, and fostering stronger international partnerships to enhance the global competitiveness of law students.⁴

Legal Education and NEP 2020

Although legal education in India has changed significantly in recent years, there are still issues that prevent it from producing capable, socially conscious lawyers. The need to adapt legal education to modern demands is growing as a result of the quick changes in global legal frameworks, technology, and societal demands. In this sense, transforming legal education in India requires the implementation of the National Education Policy (NEP) 2020. The NEP emphasizes quality, accessibility, and technology integration in its vision of an all-encompassing, multidisciplinary approach to education.

The goal of NEP 2020 is to modernize the traditional legal education models in order to make them more adaptable, multidisciplinary, and in line with international standards. It promotes a curriculum that combines the study of law with other disciplines, such as economics, technology, and the social sciences, so that law students can gain a comprehensive understanding of intricate, modern problems. The NEP emphasizes the importance of research and innovation in legal studies, encouraging universities to engage in multidisciplinary research to address pressing national and global challenges. By implementing these changes, the NEP hopes to make legal education a more dynamic, inclusive, and progressive field that can adapt to the changing demands of India's society and legal system.

The following are certain recommendations of NEP 2020 which are studied with prospective challenges and opportunities:

Globalization of Legal Education

NEP says: Legal education should be competitive globally and adopt best practices.

The lawyers, acting as social engineers, will surely have a growth by global legal education. To compete with advancing world, laws such as bankruptcy laws, cyber laws, anti-terrorist laws, real estate laws, anti-corruption laws, copyright laws, intellectual property laws, environment laws, foreign exchange law, international taxation, data privacy laws, international laws are desired to adopt with modernization, unlike Indian legal system teaching laws only on traditional bases. For international security, peace and unity, many countries may work together for legal policies, economic policies, trade, commerce, culture and other social aspects through globalized legal education. If legal education only remains restricted to Indian laws, Indian Companies willing to flourishing at international level will have challenges without awareness of international laws.

With advantages of Globalization, the other side is that Indian traditional culture of law and justice might lose its significance. To make global law schools, a lot of capital should be involved. As a step towards Globalization, the Supreme Court in case of *A.K. Balaji v the Government of India*⁵ has allowed foreign lawyers to provide legal advice on foreign laws and international legal issues on temporary bases, without constituting practice. The criticism is that if a sufficient legal expert skill is available at domestic stage; foreign lawyers are not needed to compete with Indian lawyers.

“Globalization has posed multiple challenges to the future of legal education in India, but it has provided an opportunity to challenge the status quo, which is an essential condition for seeking any reform.” – Tarunima Pandey⁶

Emerging New technology

It is said in NEP that Legal education must be embraced with new technologies for wider access to and timely delivery of justice.

Various Legal technologies such as Artificial Intelligence, Augmented Reality, Data Analytics, Automation, Virtual Reality play important task such as online dispute resolution, legal research, e-filing, case management, contract management, document automation, easily access to justice and much more. The benefits of technology in law are improved case management, cost saving, enhanced legal research, easy access, predictive insights, increased transparency, large data storage place, fast process, increased efficiency, improved collaboration, data analytics. This will help in lessening administrative burdens and monotonous tasks. The collaboration tools and the cloud based software will help lawyers to share real time information and work on documents synchronously.⁷

By going beyond physical accessibility to virtual accessibility, Indian courts must use

technology to enhance the open court concept. Though legal studies through distance learning and online education isn't allowed by Bar Council of India, law students must be trained by webinar on different law subjects or other programmes for virtual accessing the courts. For transparency and open justice, the Supreme Court in case of Swapnil Tripathi vs Supreme Court of India allowed live streaming of apex courts proceedings. This will help law students to learn real life.

The use of Artificial Intelligence at education level will improve the skills of law students in practical task of drafting, legal research, judgment review, finding preceding cases for references. Before retirement, the Chief Justice of India D Y Chandrachud inaugurated the National Judicial Museum and Archive which is having AI lawyer. So in future law students must be ready to compete with AI and for that technology must be emerged in legal education.

Constitutional Values of Justice

To uphold our constitutional values, NEP further stated that legal education must be enlightened and influenced by the principles of social, economic, and political justice.

The constitution of India, a transcendent charter, punctiliously drafted, enriched with fundamental values which are the backbone of our democracy and sovereignty. Along with these values, fraternity, justice, equality, liberty play magnificent role in good governance, shaping our democratic institutions and compatible societal co-existence. However, with rapidly changing time, we are somehow losing constitutional magnitude and it might be perilous to integrity of our nation.

“Constitutional values like secularism, democracy and federalism are facing serious challenges in the country and hurdles are being created in realizing the true federal concept of complacent states, a strong centre and dynamic local self-governments.” –Pinarayi Vijayan⁸

The NEP is farsighted vision as it focuses on preserving our constitutional values through education. By getting the hang of our constitutional values, law students, a national builder, will clogged to constitution and hence prolong the democracy, sovereignty, fraternity and integrity of our nation.

Socio-Cultural Context

NEP focuses on reviving our prosperous ancient culture. So it desires legal education to reflect socio-cultural contexts emphasizing the history of legal thinking, principles of justice and jurisprudence practices.

The origin of many laws in India can be traced back from customary practices and religious scriptures. The ancient Indian legal system was exceptional due to its unique integration of law and governance along with a distinct structure of value, unlike contemporary law. In

Vedic period, the prominent goal of law was to safeguard 'Dharma' which means religious duty and fidelity. Shruti, Smriti and Acharas i.e. custom were main sources of law.⁹

The jurisprudence nurtures plausible thoughts in law students and build them for virtuous citizen. It helps in developing legal systems, doing legal research, making legal decision, understanding and interpreting laws. The important task of jurisprudence is to study traces back to origin of law and how it has bestowed in society development.

Law, being integral part of the society, touches different social issues also to resolve it. For example, Aadhar-privacy issue, LGBTQ rights, gender equality in various domain, marital rape. So if law schools teach law in social context, law students may try to fix social problems and maintain justice and equity in society.

Bilingual Education

The NEP stated that legal education in state institutions must consider offering bilingual education for future lawyers and judges in English and in the state language where the legal institution is established.

The proceedings of the Supreme Court and the High Courts are done mostly in English. But lower courts work in the state language. So, Bilingual Education will remove language barrier for lawyers willing to practice in lower courts as well as apex courts.

But backside of this point is if the student of one state takes admission in other state can't understand language of that state. For Example, student from Gujarat goes to Maharashtra for legal education where education is provided in state language i.e. Marathi, Gujarati student will surely face language barriers. We are also lack of ingenious faculties having command over both languages. A limited material in state language is another issue. Most of the Legal literatures including judgments of apex courts are in English. Translated Material soon becomes outdated with dynamic time.

Multidisciplinary approach

Law, not being isolated field, touches every domain and aspects of society so as NEP promotes multidisciplinary institutes to give law students with a more diverse understanding of law. Legal education should be diverted in areas like Science, Politics, Philosophy, Economic, Humanities. Law schools need to collaborate with other departments such as intellectual property's registration firm, Information Technology Institutes, various Industries for proficiency and specialization.

Promoting Research Activities

The National Research Fund is proposed to establish by NEP to expedite research activities in higher education. This will facilitate all Law schools to promote research in legal field. Legal

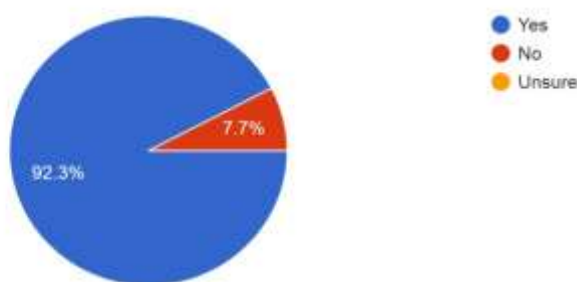
journals are discriminated and facing hurdles as it is looked with same parameters as science journals. But with NEP, legal research, contributing in policy transformation, is emphasized for improving teaching-learning process and law schools may become centers of excellence.

Analysis

Here is the analysis of views of law faculties on NEP 2020 and legal education:

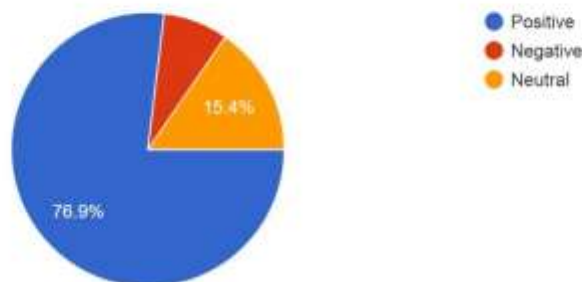
Do you believe that NEP 2020 is likely to bring significant changes to the current legal education system in India?

13 responses



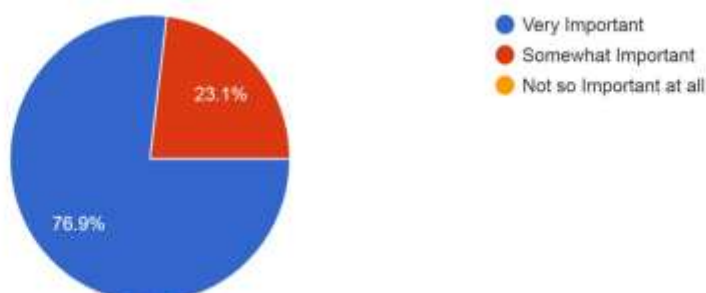
What is your overall perception of the NEP 2020 in relation to improving legal education in India?

13 responses



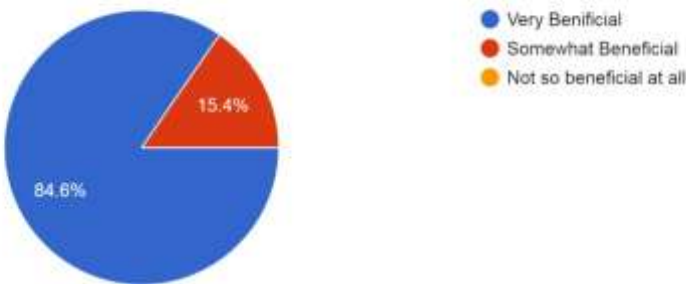
The NEP proposes a multidisciplinary approach to education. How important do you think it is for legal education to incorporate subjects like economics, technology, and social sciences?

13 responses



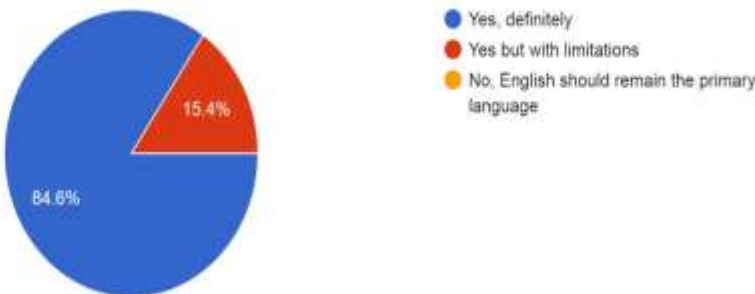
Do you think NEP 2020's emphasis on preserving India's constitutional values benefits legal education?

13 responses



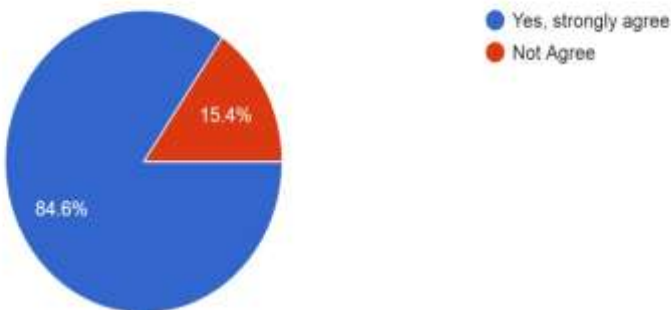
Would you prefer legal education to be offered in both English and local languages to ensure wider accessibility?

13 responses



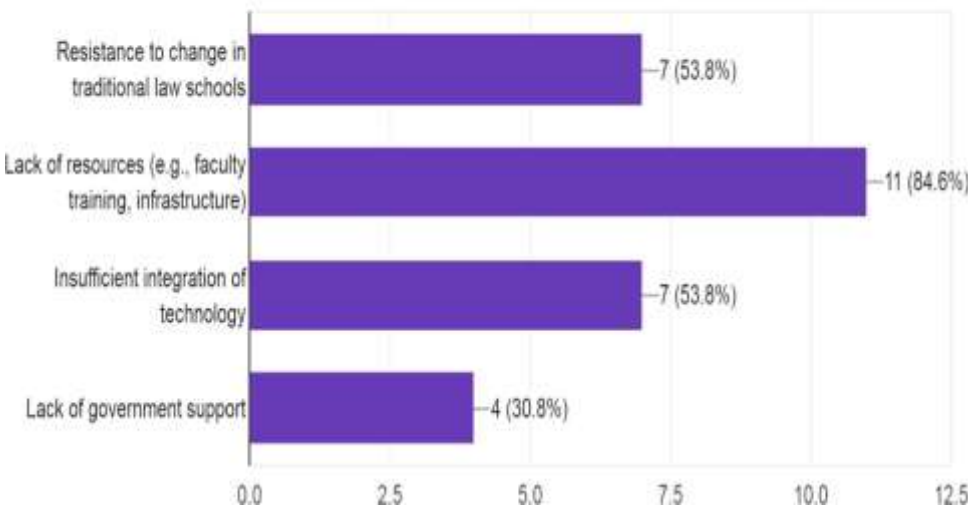
Do you believe that legal education in India should be more global in nature to align with international legal standards?

13 responses



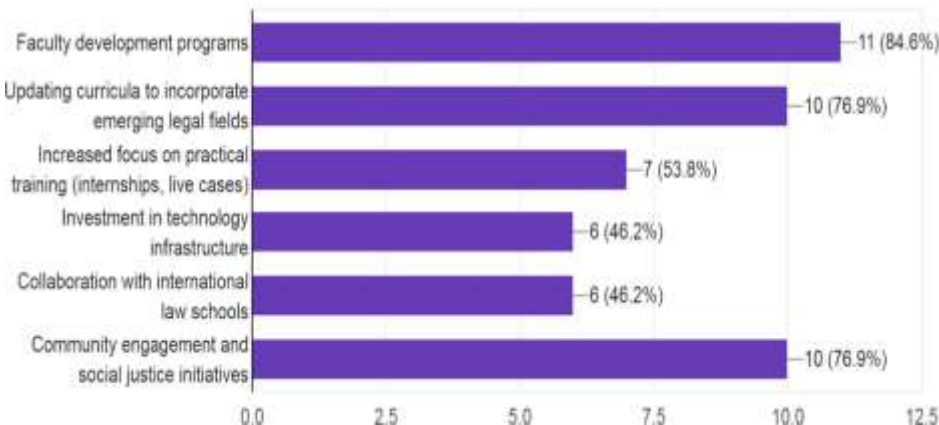
What do you perceive as the biggest challenge to implementing NEP 2020 in legal education?

13 responses



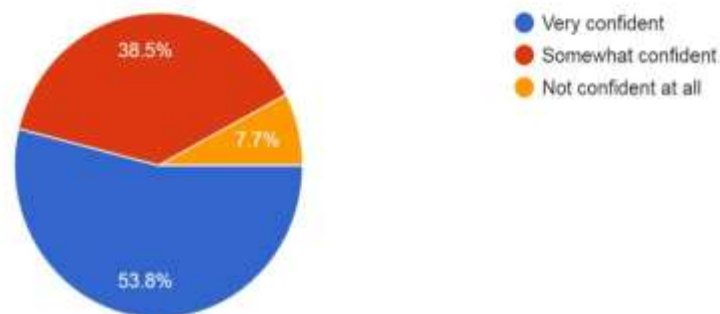
In your opinion, which of the following would help in better implementation of NEP 2020 in legal education?

13 responses



How confident are you in the ability of Indian legal education to adapt to the changes proposed by NEP 2020?

13 responses



Suggestions:

While the NEP 2020 offers a robust framework for reform, there are several areas within legal education that require focused attention to ensure its alignment with the policy's goals of accessibility, quality, and inclusivity. The following suggestions aim to address these gaps and offer practical solutions to enhance the effectiveness and relevance of legal education in India:

- Law schools should introduce courses with emerging areas such as bankruptcy laws, cyber laws, ant-terrorist laws, real estate laws, anti-corruption laws, copyright laws, intellectual property laws, environment laws, foreign exchange law, international taxation, data privacy laws etc.
- Legal Education should be integrated with other disciplines like Science, Politics, Philosophy, Economic, Humanities.
- Clinical Legal Education must be emphasized. Besides moot court competitions, up skilling in mediation, arbitration, legal aid, client counseling, drafting, pleading should be done.
- Community engagement programs must be promoted in law schools.
- Currently, full time law teachers are barred from legal practice, so it results in mere classroom teaching without practical approach. Law Teachers must be allowed to do practice so the students may learn theory with practical point of view.
- Bar Council of India should facilitate books, journals, online subscription.
- Law schools must focus on infrastructure having facilities of research center, computer labs, legal clinics. These facilities must be given equal importance as library.
- As foreign laws and Indian laws are different, it should be tried to make foreign

law degrees equivalent to and compliance with Indian legal education.

- Law books should be written or translated in local languages to empower students to learn law within their local limits and make legal education
- To increase accessibility to legal education, online teaching, online learning and digital infrastructure should be increased.
- Research and Innovation activities must be given attention. Law journals must be given importance like science journals. Research incentives should be given to law schools. Bar council of India needs to establish guidelines for research ethics in law and establish standards for legal research.
- One year mandatory internship in litigation, industry, judicial clerkship, media houses, NGOs in five years integrated course should be insisted.
- To make law course more employable, new eras like Artificial Intelligence, data protection, cyber security should not be overlooked.
- The co-ordination among Law Schools, faculties, students, Bar, Bench, UGC, and Bar Council of India is much needed for better implementation of NEP and having legal education engrossing.

Conclusion

The National Education Policy (NEP) 2020 offers a vital framework to propel the transformation of legal education in India, which is both a need and an opportunity. The NEP offers a significant chance to change the face of legal education in the nation because of its emphasis on interdisciplinary learning, access to high-quality education, and an emphasis on ethics and critical thinking. However, comprehensive reforms that address current gaps— such as out-of-date curricula, restricted access for marginalized communities, and the rising demand for legal professionals with a wider skill set—are necessary to fully maximize the potential of the NEP in the realm of legal education.

Legal education can be made more inclusive, pertinent, and flexible to meet the demands of a quickly evolving national and international environment by adopting the NEP's vision. This entails developing a culture of research, innovation, and interdisciplinary cooperation in addition to modernizing the curriculum and instructional strategies. The quality of legal education will be further raised by the incorporation of technology, expanded access via online channels, and enhanced faculty development.

In the end, the NEP 2020's reform of legal education is a critical step in building a society that is more just and equal. India can preserve its constitutional values, guarantee access to justice, and aid in the creation of a just and responsive legal system by educating upcoming legal

professionals. For these reforms to be successful, legislators, legal organizations, and educators must cooperate in order to guarantee that legal education changes to satisfy future needs.

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નવી શિક્ષણનીતિ-2020 દ્વારા કૌશલ્ય યુક્ત કામદારોની સંખ્યામાં

વૃદ્ધિ દ્વારા દેશનો ઝડપી આર્થિક વિકાસ

ડૉ. ઉત્તમકુમાર કે. જાદવ

આસિસ્ટન્ટ પ્રોફેસર

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પ્રસ્તાવના

ભારત સરકારના શિક્ષણ વિભાગ દ્વારા વર્ષ-2020માં નવી શિક્ષણ નીતિ અપનાવવામાં આવેલ છે. જેમાં પ્રથમ સોપાન સ્કૂલમાં 3 વર્ષ અને પ્રાથમિક શાળામાં ધોરણ 1 અને 2 એમ 2 વર્ષ એમ બંને મળીને વિદ્યાર્થીના 3 થી 8 વર્ષના વય જૂથને આવરી લીધેલ છે. બીજા સોપાનમાં ધોરણ 3 થી 5 એમ 3 વર્ષ થઈને 8 થી 10 વર્ષના વય જૂથને આવરી લીધેલ છે. ત્રીજા સોપાનમાં ધોરણ 6 થી 8 એમ 3 વર્ષ થઈને 11 થી 14 વર્ષના વય જૂથને આવરી લીધેલ છે. ચોથું સોપાન ધોરણ 9 થી 12 એમ 4 વર્ષ થઈને 15 થી 18 વર્ષના વય જૂથને આવરી લીધેલ છે. ત્યાર પછી ઉચ્ચ શિક્ષણમાં સ્નાતકની ડિગ્રી મેળવવા માટે 1 વર્ષ પૂર્ણ કરનારને વ્યવસાયિક પ્રમાણપત્ર, 2 વર્ષનો અભ્યાસ પૂર્ણ કરનારને ડિપ્લોમા, 3 વર્ષ પૂર્ણ કરનારને સ્નાતકની પદવી, ચાર વર્ષનો અભ્યાસ પૂર્ણ કરનારને “સંશોધન” સાથે સ્નાતકની પદવી મળશે. અનુસ્નાતક નો અભ્યાસક્રમ 1 વર્ષનો નક્કી કરવામાં આવેલ છે. તેમજ પીએચડી કરવા માટે અનુસ્નાતક અથવા ચાર વર્ષના સ્નાતકની સંશોધન સાથેની પદવી હોવી જરૂરી છે. આમ, આ મુજબ આંગણવાડીના પાયાના શિક્ષણથી લઈને ઉચ્ચ શિક્ષણ મેળવવાના સમયગાળાનો ઉલ્લેખ કરેલ છે.

નવી શિક્ષણનીતિ-2020માં ઉચ્ચ પ્રાથમિક શિક્ષણથી જ “વ્યવસાયિક શિક્ષણ” પર ભાર મૂકવામાં આવેલ જોવા મળે છે. તેમજ વિદ્યાર્થીઓ પોતાની રસ અને રુચિ પ્રમાણે

પોતાના મનપસંદ વિષયમાં અભ્યાસ કરી શકે તે માટેની સુવિધા આ નવી શિક્ષણનીતિમાં કરવામાં આવેલ જોવા મળે છે. નવી શિક્ષણનીતિ-2020ના આ પ્રકારના પરિવર્તનોને કારણે નીચે જણાવેલ મુદ્દાઓ પ્રમાણે હકારાત્મક અસરો થતી જોવા મળશે.

❖ હકારાત્મક અસરો

1. લોકોમાં શિક્ષણ (સાક્ષરતા)નું પ્રમાણ વધશે.
2. લોકોમાં કાર્યક્ષમતાનો વિકાસ થશે.
3. બેરોજગારીમાં ઘટાડો થશે.
4. રાષ્ટ્રીય આવકમાં વધારો.
5. દેશનું આર્થિક વિકાસ ઝડપી અને વધુ થશે

❖ હકારાત્મક અસરો

1. લોકોમાં શિક્ષણ (સાક્ષરતા)નું પ્રમાણ વધશે :-

નવી શિક્ષણનીતિ-2020માં સાર્વત્રિક શિક્ષણનો ઉદ્દેશ્ય હોવાથી તેમજ ડ્રોપ આઉટ રેસીયો ઘટે તેના પર વધુ ભાર હોવાથી અને અભ્યાસમાં વિષયોની પસંદગીનો અવકાશ હોવાથી લોકોમાં સાક્ષરતાનું પ્રમાણ વધશે. નવી શિક્ષણ નીતિમાં તકનીકી શિક્ષણ, આરોગ્યને લગતું શિક્ષણ, વિજ્ઞાન, કલા, સંસ્કૃતિ, વ્યવસાયિક શિક્ષણ વગેરે પર ભાર મૂકવામાં આવેલ હોવાથી ભવિષ્યમાં સાક્ષરતાના દરમાં વધારો થતો જોવા મળશે.

2. લોકોમાં કાર્યક્ષમતા નો વિકાસ :-

નવી શિક્ષણનીતિ-2020માં વ્યવસાયિક શિક્ષણ અને રસ અને રુચિ પ્રમાણેના વિષયોના અભ્યાસ પસંદગીને પરિણામે દેશમાં કાર્યક્ષમ લોકો અને કામદારોની સંખ્યામાં વધારો થશે. લોકોમાં તેમની આવડત પ્રમાણેની કાર્યક્ષમતામાં વધારો થશે. દા. ત.,

સુથારી કામ, ઈલેક્ટ્રીકનું કામ, પ્લમ્બરનું કાર્ય, પેઇન્ટિંગ, કલા-કારીગરી વગેરે જેવી કાર્યક્ષમતા ધરાવતા કારીગરો સરળતા થી મેળવી શકાશે.

3. બેરોજગારીમાં ઘટાડો થશે :-

કાર્યક્ષમ અને કંઈ વ્યવસાયિક આવડતવાળા કારીગરો બજારમાં ઉપલબ્ધ હોવાથી તેમને સરળતાથી રોજગારી મળી રહેશે. કાર્યક્ષમતાના અભાવમાં જે મજૂર વર્ગ બેરોજગાર રહી જતો હતો તેને પણ રોજગાર મળી રહેશે પરિણામે રોજગાર મેળવતા વર્ગમાં વધારો થશે અને બેરોજગારીમાં ઘટાડો થશે.

4. રાષ્ટ્રીય આવકમાં વધારો :-

નવી શિક્ષણનીતિ-2020ના લીધે દેશની રાષ્ટ્રીય આવકમાં વધારો થશે કારણ કે કાર્યક્ષમ વ્યવસાયીકોને કારણે તેમની આવડતને પરિણામે ઓછા સમયમાં ઓછી કિંમતે વસ્તુઓનું વધુ ઉત્પાદન થશે. પરિણામે ઉત્પાદન વધવાથી આવી ઉત્પાદિત વસ્તુઓની નિકાસો વધશે તેથી દેશમાં આવક વધશે. ઉપરાંત આ કારીગરોની આવકમાં પણ વધારો થશે પરિણામે દેશની રાષ્ટ્રીય આવકમાં વધારો થશે.

5. દેશનો આર્થિક વિકાસ ઝડપી :-

નવી શિક્ષણનીતિ-2020ને લીધે દેશમાં માનવ મૂડી કાર્યક્ષમ થશે પરિણામે દેશમાં ઉત્પાદનમાં વધારો થશે. વસ્તુઓનું ઉત્પાદન ગુણવત્તા યુક્ત થશે પરિણામે દેશની નિકાસોમાં વધારો થશે. નિકાસુ વધવાને લીધે દેશની નિકાસ આવકમાં વધારો થશે. ઉપરાંત દેશમાં જ સારી ગુણવત્તા યુક્ત સસ્તી કિંમતની વસ્તુઓ પર્યાપ્ત બનતા પહેલા જે આયાતી વસ્તુઓ વપરાતી હતી તેની જગ્યાએ દેશમાં જ બનેલી વસ્તુઓનો વપરાશ વધશે. પરિણામે દેશની આયાતમાં ઘટાડો થતાં દેશનું નાણું દેશમાં જ રહેશે. આમ થવાથી

દેશનો આર્થિક વિકાસ વધુ ઝડપથી વધતો જોવા મળશે.

આમ, નવી શિક્ષણનીતિ-2020ને પરિણામે ઉપર મુજબના હકારાત્મક પરિવર્તનો જોવા મળશે.

સમાપન :-

નવી શિક્ષણનીતિ-2020ને પરિણામે ભારત દેશના શિક્ષણ તેમજ અર્થતંત્ર પર ખૂબ જ લાંબા ગાળાની અને હકારાત્મક અસરો જોવા મળશે શિક્ષણની નીતિઓની અસર દેશના લોકો પર અને દેશના લોકોની અસર દેશના અર્થતંત્ર પર પડતી જોવા મળે છે કારણ કે દેશના લોકો એ દેશનું માનવધાન છે. આમ દેશનું માનવ ધન જેટલું વધુ કાર્યક્ષમ તેટલો જ દેશનું આર્થિક વિકાસ ઝડપી બને છે માટે નવી શિક્ષણનીતિ-2020ની દેશના આર્થિક વિકાસ પર હકારાત્મક અસર થતી જોવા મળશે.

સંદર્ભ :-

(સરકાર) રાષ્ટ્રીય શિક્ષણ નીતિ-2020, (પુસ્તક) શિક્ષણ મંત્રાલય ભારત સરકાર.

(NATIONAL EDUCATION POLICY 2020નું ગુજરાતી સંસ્કરણ).

નવું શૈક્ષણિક માળખું અને શિક્ષણની ગુણવત્તા

ભાવિકા વી. પટેલ¹, ડૉ. જિજ્ઞેશ પટેલ²

રિસર્ચ સ્કોલર¹, પ્રોફેસર²

શિક્ષણ વિદ્યાશાખા(IASE)^{1,2}

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સારાંશ

શિક્ષણ ક્ષેત્રે સમયાંતરે પરિવર્તનો થતાં રહે છે. આ પરિવર્તનો શિક્ષણની ગુણવત્તા સુધારવામાં મદદરૂપ બને છે. આવું જ એક મહત્ત્વનું પરિવર્તન રાષ્ટ્રીય શિક્ષણ નીતિ-2020 છે. આ શિક્ષણનીતિ અંતર્ગત વર્ષોથી અમલી શૈક્ષણિક માળખું 10+2 માં પરિવર્તન લાવીને નવું શૈક્ષણિક માળખું 5+3+3+4 કરવામાં આવ્યું. આ માળખામાં પ્રારંભિક શિક્ષણ પર વધુ ભાર મૂકવામાં આવ્યો છે. આ પ્રયાસથી ભારતમાં શિક્ષણ ક્ષેત્રે ઘણાં મહત્ત્વના સુધારાઓ લાવી શકાશે કારણ કે બાળકના સર્વાંગી વિકાસનો પાયો તેનું પ્રારંભિક શિક્ષણ છે. રાષ્ટ્રીય શિક્ષણ નીતિ-2020 અનુસાર શિક્ષણમાં કળા આધારિત શિક્ષણ, પ્રવૃત્તિ આધારિત શિક્ષણ, વ્યાવસાયિક શિક્ષણ, મૂલ્ય શિક્ષણ, માતૃભાષા શિક્ષણ પર ભાર મૂકવામાં આવશે. જેથી ભાર વિનાનાં ભણતરનું સ્વપ્ન સાકાર કરી શકાશે.

ચાવીરૂપ શબ્દો:

રાષ્ટ્રીય શિક્ષણ નીતિ-2020, શૈક્ષણિક માળખું, શિક્ષણની ગુણવત્તા

1. પ્રસ્તાવના

આજનો યુગ પરિવર્તનનો યુગ છે. સમયની સાથે પરિવર્તન વિકાસ તરફની યાત્રામાં ગતિ પ્રદાન કરે છે. રાષ્ટ્રીય શિક્ષણ નીતિ 2020થી શિક્ષણના માળખામાં આવેલ

પરિવર્તન શિક્ષણને નવીન દિશા પ્રદાન કરશે. ભારતમાં ઘણાં વર્ષોથી 10+2 શિક્ષણ માળખું અમલમાં હતું. પરંતુ રાષ્ટ્રીય શિક્ષણ નીતિ 2020 ના અમલ સાથે નવું શૈક્ષણિક માળખું 5+3+3+4 અમલમાં આવ્યું. આ માળખા અંતર્ગત શાળાકીય શિક્ષણમાં ઘણાં સુધારાઓ સૂચવવામાં આવ્યા છે. બાળકોની વયકક્ષા આધારિત અભ્યાસક્રમની રચના, અધ્યયન-અધ્યાપન પ્રણાલીમાં ફેરફાર, પ્રવૃત્તિ આધારિત શિક્ષણ, પસંદગીના વિષયોનું શિક્ષણ, મૂલ્યાંકન પ્રણાલીમાં પરિવર્તન વગેરે જેવા અનેક પ્રયાસો આ શિક્ષણ નીતિ દ્વારા કરવામાં આવ્યા છે. જે શિક્ષણની ગુણવત્તા સુધારવામાં ઉપયોગી સાબિત થશે. નવું શિક્ષણ માળખું ભાર વિનાના ભણતરને સાકાર કરી નવા ભારતના નિર્માણમાં મદદરૂપ બનશે.

2. નવું શૈક્ષણિક માળખું

રાષ્ટ્રીય શિક્ષણ નીતિ 1986માં સૂચવ્યા પ્રમાણે ભારતમાં 10+2 શૈક્ષણિક માળખું હાલ સુધી અમલી હતું. પરંતુ રાષ્ટ્રીય શિક્ષણ નીતિ 2020 અનુસાર ભારતીય શિક્ષણમાં નવું શૈક્ષણિક માળખું 5+3+3+4 અમલી બન્યું. આ માળખું 3 થી 18 વર્ષના વિદ્યાર્થીઓના સર્વાંગી વિકાસમાં શાળાકીય શિક્ષણની ભૂમિકા મજબૂત કરી શિક્ષણમાં નવા આયામો સ્થાપવામાં ઘણું જ ઉપયોગી બનશે. આ માળખામાં અભ્યાસક્રમ અને પદ્ધતિશાસ્ત્ર પર વધુ ભાર મૂકવામાં આવ્યો છે. શાળાકીય અભ્યાસક્રમ અને પદ્ધતિશાસ્ત્રમાં ફેરફાર દ્વારા શિક્ષણની ગુણવત્તા સુધારવા પર ભાર મૂકવાનું રાષ્ટ્રીય શિક્ષણ નીતિ 2020માં સૂચવવામાં આવ્યું છે.

ભારતીય શિક્ષક પ્રશિક્ષણ સંસ્થાન મુજબ,

10+2 શૈક્ષણિક માળખામાં 3 થી 6 વયજૂથનાં બાળકોનો સમાવેશ થતો નથી. કારણ કે, ધોરણ 1 માં પ્રવેશ લેતી વખતે વિદ્યાર્થીઓ 6 વર્ષનાં હોય છે. નવા 5+3+3+4

માળખામાં 3 વર્ષની ઉંમરથી જ પ્રારંભિક બાળ સંભાળ અને શિક્ષણનો સમાવેશ કરવામાં આવ્યો છે. જેનો ધ્યેય શરૂઆતથી જ બાળકના સર્વાંગી અધ્યયન, વિકાસ, સુખાકારીનો છે.

નવું શૈક્ષણિક માળખું 5+3+3+4 નીચેની આકૃતિમાં દર્શાવ્યું છે.

4 માધ્યમિક	● 14 થી 18 વર્ષ ● ધોરણ 9 થી 12
3 ઉચ્ચ પ્રાથમિક	● 11 થી 14 વર્ષ ● ધોરણ 6 થી 8
3 પ્રારંભિક	● 8 થી 11 વર્ષ ● ધોરણ 3 થી 5
5 (3+2) પૂર્વપ્રાથમિક	● 3 થી 6 વર્ષ + 6 થી 8 વર્ષ ● આંગણવાડી/બાળવાટિકા + ધોરણ 1 થી 2

1. પૂર્વપ્રાથમિક તબક્કો (Foundation Stage)

બાળકનાં શાળાકીય શિક્ષણનાં શરૂઆતનાં આ વર્ષો પર NEP-2020માં ઘણો ભાર મૂકવામાં આવ્યો છે. આ તબક્કામાં બાળકના શાળાકીય શિક્ષણનાં પ્રથમ પાંચ વર્ષનો સમાવેશ થાય છે, જેમાં 3+2 એવાં બે ભાગ પાડવામાં આવે છે. આ તબક્કામાં આંગણવાડી અને ધોરણ 1 થી 2નો સમાવેશ થયો છે. એટલે કે પ્રથમ 3 વર્ષ આંગણવાડી (3 થી 6 વર્ષ) અને ત્યારપછીના 2 વર્ષ ધોરણ 1 થી 2 (6 થી 8 વર્ષ)નો સમાવેશ કરવામાં આવ્યો છે. આ તબક્કામાં કોઈ લેખિત પરીક્ષા લેવામાં આવશે નહીં.

Online Studies 2020 અનુસાર, આંગણવાડીમાં થતાં સુધારાઓ આ મુજબ છે.

- આંગણવાડીમાં તાલીમબદ્ધ કર્મચારીઓની ભરતી
- હાલનાં કર્મચારીઓને તાલીમ

આ તાલીમ બે પ્રકારે આપવામાં આવશે.

1. ધોરણ-12 સુધીનો અભ્યાસ કર્યો છે તેમનાં માટે 6 મહિનાનો કોર્સ
 2. ધોરણ-12 કરતાં ઓછો અભ્યાસ કરેલ હોય તેમનાં માટે 1 વર્ષનો ડિપ્લોમા કોર્સ
- આ સમગ્ર વ્યવસ્થા ECCE અંતર્ગત કરવામાં આવશે.

ECCEનું પૂરું નામ Early Childhood Care and Education છે.

ભારતીય શિક્ષક પ્રશિક્ષણ સંસ્થાન મુજબ, Early Childhood Care and Education એટલે

પ્રારંભિક બાળ સંભાળ અને શિક્ષણમાં બહુસ્તરીય, બહુ આયામી, લવચિક, પ્રવૃત્તિ આધારિત, રમતગમત અને શોધ આધારિત શિક્ષણનો સમાવેશ કરવામાં આવ્યો છે. જેમ કે, મૂળાક્ષરો, ભાષા, સંખ્યા અને ગણતરી, રંગ અને આકાર, વિવિધ રમતો, ઉખાણા અને તાર્કિક વિચારણા તેમજ સમસ્યા ઉકેલની કળા, ચિત્રકામ, વિવિધ હસ્તકલાઓ, નાટક અને કઠપૂતળી, સંગીતકલા તથા અન્ય પ્રવૃત્તિઓનો સમાવેશ થાય છે. આ ઉપરાંત અન્ય પ્રવૃત્તિઓ જેવી કે સામાજિક કાર્ય, માનવ સંવેદનશીલતા, યોગ્ય વ્યવહાર, શિષ્ટાચાર, નીતિમત્તા, વ્યક્તિગત અને જાહેર સ્વચ્છતા, સમૂહકાર્ય કરવાની અને પરસ્પર સહકારની ભાવના વિકસાવવા પર ધ્યાન કેન્દ્રીત કરવામાં આવ્યું છે. પ્રારંભિક બાળ સંભાળ અને શિક્ષણનો સમગ્ર ઉદ્દેશ્ય શારીરિક અને મનોશારીરિક વિકાસ, બોધાત્મક વિકાસ, સામાજિક, સાંવેગિક અને નૈતિક વિકાસ, કલા કૌશલ્યો અને સાંસ્કૃતિક વિકાસ તથા પ્રત્યાયન માટે પ્રારંભિક ભાષા સાક્ષરતા અને સંખ્યાજ્ઞાનના વિકાસમાં મહત્તમ પરિણામો મેળવવાનું છે.

2. પ્રારંભિક તબક્કો (Preparatory Stage)

આ તબક્કામાં બાળકના શાળાકીય શિક્ષણનાં પ્રાથમિક શિક્ષણનો સમાવેશ થાય છે જેમાં ધોરણ 3 થી 5 એટલે કે (8 થી 11 વર્ષ)નો સમાવેશ કરવામાં આવ્યો છે. આ તબક્કાથી લેખિત પરીક્ષાની શરૂઆત થાય છે.

Online Studies 2020 અનુસાર, પ્રારંભિક તબક્કામાં થતાં સુધારાઓ આ મુજબ છે.

- ત્રીજા ધોરણ સુધીનું બાળક પાયાનું શિક્ષણ અને સંખ્યા જ્ઞાન મેળવે એ જ મુખ્ય લક્ષ્ય રહેશે.
- દરેક કક્ષાએ આ માટેના પ્રયત્નો અને સતત મોનિટરિંગ કરવામાં આવશે.
- ધોરણ-5 સુધીનો અભ્યાસક્રમ માતૃભાષા કે રાષ્ટ્રભાષામાં જ રહેશે. અંગ્રેજી વિષય મરજિયાત રહેશે.
- શરૂઆતનાં તબક્કામાં માતૃભાષા પર ખાસ ધ્યાન રાખવામાં આવશે.

3. ઉચ્ચ પ્રાથમિક તબક્કો (Middle Stage)

આ તબક્કામાં બાળકના શાળાકીય શિક્ષણનાં ઉચ્ચ પ્રાથમિક શિક્ષણનો સમાવેશ થાય છે જેમાં ધોરણ 6 થી 8 એટલે કે (11 થી 14 વર્ષ)નો સમાવેશ કરવામાં આવ્યો છે.

Online Studies 2020 અનુસાર, ઉચ્ચ પ્રાથમિક તબક્કામાં થતાં સુધારાઓ આ મુજબ છે.

- ધોરણ 6 થી 8માં વિદ્યાર્થીના રસનાં ક્ષેત્રમાં સમજ માટે તક પૂરી પાડવામાં આવશે. એટલે કે સ્થાનિક ક્ષેત્રનાં જુદા જુદા વ્યવસાયોની સમજ અને તાલીમ વિદ્યાર્થી મેળવી શકશે.
- પસંદિત ક્ષેત્રમાં 10 દિવસનો ઈન્ટર્નશીપ પ્રોગ્રામ
- વિદ્યાર્થીઓને તાર્કિક (કોડિંગ) વિષય શીખવવામાં આવશે. પ્રોજેક્ટ કરાવવામાં આવશે.

4. માધ્યમિક તબક્કો (Secondary Stage)

આ તબક્કામાં બાળકના શાળાકીય શિક્ષણનાં માધ્યમિક અને ઉચ્ચતર માધ્યમિક શિક્ષણનો સમાવેશ થાય છે જેમાં ધોરણ 9 થી 12 એટલે કે (14 થી 18 વર્ષ)નો સમાવેશ કરવામાં આવ્યો છે.

Online Studies 2020 અનુસાર, માધ્યમિક તબક્કામાં થતાં સુધારાઓ આ મુજબ છે.

- ધોરણ 9 થી 12ની પરીક્ષાઓ સેમેસ્ટર સિસ્ટમથી લેવામાં આવશે.
- વર્ષમાં 2 સેમેસ્ટરની પરીક્ષા આપવાની રહેશે.
- ધોરણ 10 અને ધોરણ 12ની બોર્ડની પરીક્ષાઓ રદ થશે.
- SC/ST/OBC/EWSનાં વિદ્યાર્થીઓ માટે કેન્દ્ર સરકાર દ્વારા નેશનલ સ્કોલરશીપ પોર્ટલ શરૂ કરવામાં આવશે.

Paperless Education 2020 મુજબ, માધ્યમિક તબક્કામાં થતાં સુધારાઓ આ મુજબ છે.

- ધોરણ 9 થી 12નો અભ્યાસક્રમ એકસમાન રહેશે. વિદ્યાર્થી પોતાનાં મનપસંદ વિષયોનો અભ્યાસ કરી શકશે.
- કોઈ પણ પ્રવાહનાં વિષયોનો અભ્યાસ એકસાથે કરી શકશે. કોઈ પણ પ્રવાહ પસંદ કરવાનો રહેશે નહિ.

જેમ કે, વિદ્યાર્થી ફિઝિક્સ, કેમેસ્ટ્રી સાથે મનોવિજ્ઞાન અને ભૂગોળનો પણ અભ્યાસ કરી શકશે.

- સાથે સાથે મ્યુઝિક, સ્પોર્ટ્સ જેવાં વિષયોમાં રુચિ હશે તો તે પણ પસંદ કરી શકશે અને આ વિષયોને વધારાના ગણવામાં આવશે નહિ.

- વર્ષમાં બે વાર પરીક્ષા લેવામાં આવશે. પરીક્ષા MCQ અને વિસ્તૃત ઉત્તર એમ બંને પ્રકારે લેવામાં આવશે.

આમ નવું શૈક્ષણિક માળખું 5+3+3+4 દ્વારા શિક્ષણમાં ઘણાં મહત્વના ફેરફારો જોવા મળશે અને આ ફેરફારો થકી શિક્ષણની ગુણવત્તા સુધારી શકાશે.

3. નવું શૈક્ષણિક માળખું 5+3+3+4 અને શિક્ષણની ગુણવત્તા

ભારતીય શિક્ષક પ્રશિક્ષણ સંસ્થાન મુજબ,

બાળકના મગજનો 85% વિકાસ 6 વર્ષની ઉંમર સુધીમાં જ થઈ જાય છે. બાળકના મગજનો યોગ્ય વિકાસ તથા શારીરિક વૃદ્ધિ માટે શરૂઆતના 6 વર્ષ મહત્વપૂર્ણ માનવામાં આવે છે.

- પૂર્વ પ્રાથમિક તબક્કા પર રાષ્ટ્રીય શિક્ષણ નીતિ-2020માં વધુ ભાર મૂકવામાં આવ્યો છે. આ તબક્કામાં સૂચવેલ સુધારાઓને આધારે આંગણવાડીમાં તાલીમબદ્ધ કર્મચારીઓની ભરતી થવાથી બાળકોને શરૂઆતથી જ ગુણવત્તાયુક્ત શિક્ષણ પ્રાપ્ત થશે. આથી જેમ પાચો મજબૂત હોય તો ઈમારત પણ મજબૂત બને તેવી જ રીતે શિક્ષણનો પાચો મજબૂત હશે તો સમય જતાં રાષ્ટ્રને ગુણવત્તાસભર યુવાધન પ્રાપ્ત થશે.
- આંગણવાડીમાં કાર્યરત કર્મચારીઓ માટે સમયાંતરે સેવાકાલીન તાલીમનું આયોજન કરવાથી બાળકોના સર્વાંગીણ વિકાસમાં આંગણવાડીની ભૂમિકા મજબૂત બનાવી શકાશે.
- પ્રવૃત્તિલક્ષી શિક્ષણને વેગ મળવાથી બાળકને વાસ્તવિક અનુભવો પૂરા પાડીને પાયાનું જ્ઞાન આપી શકાશે.
- બાળકોમાં મૂલ્યોનો વિકાસ થાય એ માટેના પ્રયત્નો પણ પ્રારંભિક તબક્કામાં જ કરવામાં આવશે. જે આજના સમયની જરૂરિયાત છે.

- માતૃભાષા શિક્ષણને પ્રાધાન્ય મળવાથી બાળકનો સર્વાંગી વિકાસ કરી શકશે. કારણ કે જે ભાષામાં બાળક વિચાર કરતો હોય એ જ ભાષામાં શિક્ષણ મેળવવાથી બાળકની મૌલિકતા, તર્કશક્તિ વિકસાવી શકાય છે.
- પ્રારંભિક તબક્કાના શિક્ષણમાં પાયાનું શિક્ષણ પર જ ભાર મૂકવામાં આવશે. જો પાયાનું શિક્ષણ બાળક સારી રીતે મેળવશે તો તે બાળકને આજીવન શિક્ષણમાં મદદરૂપ બનશે.
- શિક્ષણ ક્ષેત્રે થતાં દરેક પ્રયત્નોની દરેક કક્ષાએ દેખરેખ રાખવામાં આવશે. જેથી સમયાંતરે ગુણવત્તા સુધારવાની દિશામાં પ્રયત્નો હાથ ધરી શકાશે.
- ધોરણ 6 થી 8માં વ્યાવસાયિક શિક્ષણ મળવાના કારણે રાષ્ટ્રને જુદાં જુદાં વ્યવસાયિકો પ્રાપ્ત થશે.
- બાળક પોતાનાં રસના વિષયમાં કારકિર્દી બનાવી શકશે. આથી ભાર વિનાના ભણતરની સંકલ્પના સાકાર કરી શકાશે. કારણ કે પ્રવર્તમાન સમયમાં બાળક ફક્ત શાળાના દફતરનો જ ભાર નથી ઉઠાવતો પરંતુ શિક્ષણ વ્યવસ્થાના કારણે શિક્ષણનો પણ ભાર ઉઠાવે છે.
- બાળકના પસંદિત વિષય માટે ટૂંકા ગાળાની ઇન્ટર્નશીપનું આયોજન કરવામાં આવશે. જેથી વિદ્યાર્થીઓને સૈદ્ધાંતિક જ્ઞાનની સાથે પ્રાયોગિક સમજ પણ પ્રાપ્ત થશે.
- દરેક ધોરણ પ્રમાણે ગૃહકાર્યની મર્યાદા નક્કી થવાથી બાળક વધુ પડતાં ગૃહકાર્યના બોજથી બચી શકશે.
- પ્રવર્તમાન સમયમાં વાલી અને વિદ્યાર્થી માટે ચિંતાનું મુખ્ય કારણ બોર્ડની પરીક્ષા છે. નવા શૈક્ષણિક માળખા અનુસાર બોર્ડની પરીક્ષા રદ કરવામાં આવશે. જેથી વિદ્યાર્થીઓ બોર્ડની પરીક્ષાની ચિંતાથી મુક્ત થઈ શકશે.

- ધોરણ 9 થી 12 માં સમાન અભ્યાસક્રમને કારણે પ્રવાહ પસંદગી રહેશે નહીં. આથી વિદ્યાર્થીઓમાં જોવા મળતી લઘુતાગ્રંથિ દૂર થશે. ઉપરાંત વિદ્યાર્થી પોતાને મનપસંદ વિષયોનો અભ્યાસ કરી શકશે.
- શિક્ષણના આ નવાં શૈક્ષણિક માળખામાં કળા, રમત-ગમતને પણ પ્રાધાન્ય આપવામાં આવશે. આ વિષયોને વધારાના વિષયો તરીકે ન ગણતાં અન્ય શાળાકીય વિષયોની સાથે જ સમાવવામાં આવશે.

4. ઉપસંહાર

ભારતમાં ઘણાં વર્ષોથી શૈક્ષણિક માળખું 10+2 અમલમાં હતું. જેની ઘણી મર્યાદાઓ જોવા મળી હતી. એ મર્યાદાઓ દૂર કરવા માટે રાષ્ટ્રીય શિક્ષણ નીતિ-2020 માં નવું શૈક્ષણિક માળખું 5+3+3+2 અમલમાં મૂકવામાં આવ્યું. આ માળખાંના અમલીકરણને કારણે વિદ્યાર્થીઓનાં સર્વાંગી વિકાસની દિશામાં પ્રયત્નો કરી શકાશે. વિદ્યાર્થીઓનાં રસ-રુચિ જાણી તેમની કારકિર્દી ઘડતરમાં માર્ગદર્શન આપી સમાજને ગુણવત્તાસભર નાગરિકો પ્રદાન કરી શકાશે. આમ, શિક્ષણનું સુધારેલ માળખું રાષ્ટ્રને ઉન્નતિના પથ પર અગ્રેસર કરવામાં મદદરૂપ નીવડશે.

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10 બેગલેસ ડે પ્રોગ્રામ અંગે પ્રાથમિક શિક્ષકોના અભિપ્રાયોનો અભ્યાસ

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પ્રસ્તાવના

રાષ્ટ્રીય શિક્ષણ નીતિ 2020 ભારતની શિક્ષણ નીતિને સુધારવા માટે એક મહત્વનો પ્રયાસ છે. આ નીતિનો મુખ્ય ઉદ્દેશ દેશની શિક્ષણ વ્યવસ્થાને અનુકૂળ બનાવવી અને તેને મૂલ્યાંકનાત્મક પરિણામો માટે તૈયાર કરવી. આ નીતિમાં શિક્ષણ અને શિક્ષણ ક્ષેત્રના કેટલાક મુદ્દાઓની વિસ્તારમાં ચર્ચા કરવામાં આવી છે, જે વિદ્યાર્થીઓને અનુકૂળ અને સમર્થ બનાવવા માટે મદદ કરશે. આ નીતિનું લક્ષ્ય છે કે પ્રત્યેક વિદ્યાર્થી અને યુવાન સશક્ત અને સામર્થ્યપૂર્ણ બને અને દેશની શિક્ષણ વ્યવસ્થા અને શિક્ષણ મૂલ્યાંકનની ગુણવત્તા વધારવામાં મદદરૂપ થાય. અન્ય વિગતો માટે, તમે ભારતની શિક્ષણ નીતિ 2020 અને તેની પ્રમુખ પ્રવૃત્તિઓ વિશે ઓળખવા માટે આધારભૂત વેબસાઇટ્સ પર સંશોધન કરી શકો છો.

‘10 બેગ લેસ ડે’ એ રાષ્ટ્રીય શિક્ષણ નીતિના મહત્વના પ્રોગ્રામોમાંથી એક છે. આ દિવસો દરમિયાન શિક્ષકો, વિદ્યાર્થીઓ અને શિક્ષણ સંસ્થાઓ દ્વારા સાધારણ જીવનના વિવિધ કાર્યો અને ખાસ કરીને વ્યવસાયો માટે મુલાકાતો કરવામાં આવે છે, જે શિક્ષણ ક્ષેત્રમાં સુધારો લાવવા માટે આવશ્યક છે. આ દિવસો દરમિયાન શિક્ષણ પોલીસીઓ અને સંશોધનો પર ધ્યાન આપવામાં આવે છે અને સામાજિક સંપ્રદાયનો શિક્ષણ ક્ષેત્રમાં સમાવેશ કરવામાં આવે છે. 10 બેગ લેસ ડે અંતર્ગત માનવતા અને શિક્ષણ નીતિને સ્મરણીય અને સમર્પિત રીતે પ્રતિષ્ઠાપિત કરવામાં આવે છે.

સમસ્યાકથન

સમસ્યા કથન અતિ મહત્વની બાબત છે. સમસ્યા કથન એ કોઈ પણ પ્રકારના પૂર્વગ્રહથી મુક્ત તથા સંશોધન વિશે સ્પષ્ટ માહિતી આપે તેવું હોવું જોઈએ. પ્રસ્તુત સંશોધન માટે સંશોધકે નીચેના જેવી સમસ્યા પસંદ કરી છે.

‘10 બેગલેસ ડે પ્રોગ્રામ’ અંગે પ્રાથમિક શિક્ષકોના અભિપ્રાયોનો અભ્યાસ’

A Study of the Views of Primary Teachers on '10 bag less day'

સંશોધનના હેતુઓ

“હેતુઓ એવું બિંદુ છે જેની દિશામાં કાર્ય કરવામાં આવે છે અથવા હેતુ એવું વ્યવસ્થિત પરિવર્તન છે કે જે ક્રિયા દ્વારા પ્રાપ્ત કરી શકાય છે. ”

કોઈપણ સંશોધન પાછળ કેટલાક હેતુઓ રહેલા હોય છે. હેતુ વગરનું સંશોધન પાયા વગરના ઘર જેવું ગણાય. દરેક વ્યક્તિમાં ચિંતા અને સમાયોજનનું પ્રમાણ અલગ અલગ હોય છે. ચિંતા અને સમાયોજનને સમજવા માટે તેના કારણો અને તેને અસર કરતાં પરિબળો તપાસવામાં આવે છે. ‘10 બેગલેસ ડે પ્રોગ્રામ’ શું છે? તે કેવી રીતે કામ કરે છે? તેના સ્ત્રોતો કયા છે? વિદ્યાર્થીઓ તેનો કેટલો લાભ લે છે ? શિક્ષકો તેનાથી કેટલા માહિતગાર છે? આ બધા પ્રશ્નોના ઉત્તર મેળવવા માટે સંશોધકને પ્રસ્તુત અભ્યાસ કરવાનો હતો.

1. ‘10 બેગલેસ ડે પ્રોગ્રામ’ અંગે પ્રાથમિક શિક્ષકોના અભિપ્રાયો જાણવા.
2. ‘10 બેગલેસ ડે પ્રોગ્રામ’ અંગે પ્રાથમિક શિક્ષકોના અભિપ્રાયો જાણવા સ્વચિત અભિપ્રાયો બનાવવી.
3. પ્રાથમિક શિક્ષકોના ‘10 બેગલેસ ડે પ્રોગ્રામ’ અંગે જાતિયતાના સંદર્ભમાં અભિપ્રાયો જાણવા.
- 4 . પ્રાથમિક શિક્ષકોના ‘10 બેગલેસ ડે પ્રોગ્રામ’ અંગે શૈક્ષણિક લયકાતના સંદર્ભમાં અભિપ્રાયો જાણવા.

પદોની વ્યાવહારિક વ્યાખ્યાઓ

સંશોધન સમસ્યામાં સમાવિષ્ટ શબ્દોનું અર્થઘટન કરવાથી સ્વયંસ્પષ્ટ બને છે અને તેની મર્યાદાઓના ક્ષેત્રનો સ્પષ્ટ ખ્યાલ બંધાય છે.

‘10 બેગલેસ ડે પ્રોગ્રામ’

10 બેગ લેસ ડે એ રાષ્ટ્રીય શિક્ષણનીતિ-2020 નો મૂળ વિચાર છે તેને ધોરણ 6 થી 8 સુધીના શિક્ષણના અભ્યાસની હાલની યોજનામાં એડ ઓન તરીકે પ્રસ્તુત કરવાને બદલે શિક્ષણ પ્રક્રિયાનો એક અભિન્ન ભાગ બનાવવાનો છે. જે અંતર્ગત ધોરણ 6 થી 8 ના બાળકોને 10 બેગ લેસ દિવસની પ્રવૃત્તિઓ દ્વારા વિવિધ વ્યવસાયોનું જ્ઞાન, કૌશલ્ય પ્રાપ્ત કરવા માટે પ્રોત્સાહિત કરવામાં આવશે.

પ્રાથમિક શિક્ષકો

ધોરણ 1 થી 8માં અભ્યાસ કર્ય કરાવતા શાળાના શિક્ષકોનો સમૂહ.

અભિપ્રાયો

કોઈ બાબત વિશે રજૂ કરેલી પોતાની માન્યતા.

કોઈ બાબત પ્રત્યે વ્યક્તિની માન્યતા, વલણ કે ઝોક.

અભ્યાસ

કોઈ પણ ઘટના કે બાબત બનવા પાછળના કારણો અને પરિણામો કેવા મળવા પાત્ર છે તેના માટે કરવામાં આવતી પ્રક્રિયા.

સંશોધનના ચલો

ક્રમ	સ્વતંત્ર ચલ	કક્ષાઓ
1.	જાતિયતા	અ. પુરુષ બ. સ્ત્રી
2.	શૈક્ષણિક લાયકાત	અ. PTC બ. B.Ed.
3.	પરતંત્ર ચલ	10 બેગલેસ ડે અંગેના અભિપ્રાયો

આમ, પ્રસ્તુત સંશોધનમાં પ્રાથમિક શિક્ષકોના અભિપ્રાયોનું સંશોધન કરવાનું હોવાથી અહીં પરતંત્ર ચલ તરીકે 10 બેગલેસ ડે અંગેના અભિપ્રાયો લીધેલા છે.

સંશોધનના પ્રશ્નો

1. પ્રાથમિક શાળાના શિક્ષકોના અભિપ્રાયો કેવા હશે ?
2. પ્રાથમિક શાળાના શિક્ષકોના પુરુષ શિક્ષકોના અભિપ્રાયો કેવા હશે ?
3. પ્રાથમિક શાળાના સ્ત્રી શિક્ષકોના અભિપ્રાયો કેવા હશે ?
4. પ્રાથમિક શાળાના PTC કરેલા શિક્ષકોના અભિપ્રાયો કેવા હશે ?
5. પ્રાથમિક શાળાના B.Ed કરેલા શિક્ષકોના અભિપ્રાયો કેવા હશે ?

સંશોધનનું ક્ષેત્ર

સંશોધન માટે ઘણા ક્ષેત્રો વિકાસ પામ્યા છે. શિક્ષણમાં સંશોધન હાથ ધરવા માટે પસંદગીના ઘણા ક્ષેત્રો જોવામળે છે. પ્રયોજક સંશોધનકાર્ય હાથ ધરે તે પહેલા વિવિધ

સંશોધન ક્ષેત્રો વિશે વિચારે છે.

પ્રસ્તુત સંશોધન હેઠળ NEP-2020 અંતર્ગત પ્રાથમિક શાળામાં લાગુ કરવાનો થતો 10 બેગ લેસ ડે કાર્યક્રમ અંતર્ગત પ્રાથમિક શાળાના શિક્ષકોના અભિપ્રાયોનો અભ્યાસ કરવાનો હોય તથા તે પ્રાથમિક શિક્ષણ અને અધ્યાપન પ્રવૃત્તિના ક્ષેત્રને વધુ સ્પર્શે છે. આમ, પ્રસ્તુત અભ્યાસનું ક્ષેત્ર 'પ્રાથમિક શિક્ષણ' હતું. આ સંશોધનનું ક્ષેત્ર પ્રાથમિક શિક્ષણ લેવામાં આવ્યું છે.

સંશોધનનો પ્રકાર

સંશોધનના મુખ્ય ત્રણ પ્રકાર છે : મૂળગત સંશોધન, વ્યવહારિક સંશોધન અને ક્રિયાત્મક સંશોધન, જેમાંથી પ્રસ્તુત સંશોધનનો પ્રકાર વ્યવહારિક અને સાંખ્યિક છે. પ્રસ્તુત સંશોધન સંખ્યાત્મક પ્રકારનું છે.

સંશોધનનું મહત્વ

પ્રસ્તુત સંશોધનમાં પ્રાથમિક શિક્ષકોના 10 બેગ લેસ ડે કાર્યક્રમ અંગેના અભિપ્રાયો જાણવા સ્વરચિત અભિપ્રાયો વલિ તૈયાર કરવામાં આવી છે. આ સંશોધનથી 10 બેગ લેસ ડે કાર્યક્રમ અંગેના શિક્ષકોના અભિપ્રાયો જાણી શકાશે.

- શિક્ષણમાં 10 બેગ લેસ ડે કાર્યક્રમ અંગેના પ્રાથમિક શિક્ષકોના અભિપ્રાયો જાણી શકાશે.
- આ સંશોધનની મદદથી શિક્ષકો શિક્ષણમાં 10 બેગ લેસ ડે કાર્યક્રમ અંગે સભાન બનશે.
- વર્તમાન સમયમાં શિક્ષણમાં 10 બેગ લેસ ડે કાર્યક્રમ અંગે શિક્ષકોના અભિપ્રાયો જાણવાથી શિક્ષકોની 10 બેગ લેસ ડે કાર્યક્રમ અંગેની માનસિકતા જાણી શકાશે.
- 10 બેગ લેસ ડે કાર્યક્રમ અંગેની વાસ્તવિકતા જાણવામાં ઉપયોગી બનશે.

સંશોધનનો વ્યાપ

પ્રસ્તુત અભ્યાસ એ ભુજ તાલુકાના પ્રાથમિક શિક્ષકોના 10 બેગ લેસ ડે કાર્યક્રમ અંગેના વિચારો જાણવાનો હોવાથી ભુજ શહેરના પ્રાથમિક શિક્ષકોને અભ્યાસના વ્યાપ તરીકે પસંદ કરવામાં આવશે.

પ્રસ્તુત અભ્યાસમાં ભુજ તાલુકાના ગુજરાતી માધ્યમના સરકારી શાળાઓના પ્રાથમિક શાળામાં અધ્યાપન કાર્ય કરતા કુલ ૨૨૫ શિક્ષકોનો સમાવેશ યાદચ્છિક નમૂના પસંદગી દ્વારા કરવામાં આવ્યો હતો.

સંશોધનની મર્યાદાઓ

કોઈપણ સંશોધનમાં ગમે તેટલી કાળજી લીધી હોય તેમ છતાં કદાપી કોઈપણ સંશોધન સંપૂર્ણ શાસ્ત્રીય રીતે હાથ ધરી શકાય તેમ નથી. આથી પ્રસ્તુત સંશોધનની મર્યાદાઓ નીચે પ્રમાણે છે.

૧. પ્રસ્તુત સંશોધન વર્ષ 2023-24ના સરકારી પ્રાથમિક શાળાના શિક્ષકો પૂરતું છે.
૨. પ્રસ્તુત સંશોધનમાં સ્વ-રચિત અભિપ્રાયવલીનો ઉપયોગ કરવામાં આવ્યો છે.
૩. ભુજ શહેરની ગુજરાતી માધ્યમના શિક્ષકો પૂરતો મર્યાદિત છે.
૪. ભુજ શહેરના સરકારી પ્રાથમિક શાળામાં અધ્યાપન કાર્ય કરતા શિક્ષકો પૂરતો મર્યાદિત છે. માધ્યમિક અધ્યાપન કાર્ય કરતા શિક્ષકોનો સમાવેશ કરવામાં આવતો નથી.

વ્યાપવિશ્વ

દેસાઈ અને દેસાઈ (1997)ના મત મુજબ “જ્યાં સુધી વ્યાપવિશ્વની સાચી વ્યાખ્યા ન થાય ત્યાં સુધી લીધેલા નમૂનાને આધારે તારણો મેળવવાનું શકાય ન બને વ્યાપવિશ્વની સ્પષ્ટ વ્યાખ્યા ન હોય તો ક્યાં અને કેવા પ્રકારના પાત્રો તે ન સમજાય.”

નમૂના પસંદગી

ઉચાટ (2009) ના મત મુજબ “અભ્યાસના હેતુઓને અનુરૂપ સમગ્ર વિશે અનુમાન કરવા માટે તેનાં પ્રતિનિધિરૂપ નાના ભાગને પસંદ કરવાની પ્રક્રિયાને નમૂના પસંદગી કહેવાય છે.” પસંદ કરેલ શિક્ષકોનો નમૂનો જાતિ, લાયકાત, અનુભવના વર્ષો જેવા ચલને આધારે સ્તરીકૃત કરી યાદચિચ્છક રીતે લેવામાં આવ્યા હતા. નમૂનામાં કુલ 28 પ્રાથમિક શાળાના શિક્ષકોનો સમાવેશ કરવામાં આવ્યો હતો. જેમાંથી દરેક શાળામાં હાજર રહેલ શિક્ષકોને નમૂના તરીકે પસંદ કરવામાં આવ્યો.

સંશોધન પદ્ધતિ

ઉચાટ (2009)ના મત મુજબ “સંશોધન પદ્ધતિ સંશોધન પ્રક્રિયાનો એક આવશ્યક ભાગ છે. સંશોધન સમસ્યાનું ચોકસાઈ પૂર્વક સ્પષ્ટીકરણ થઈ ગયા બાદ સંશોધક અભ્યાસના હેતુઓને અનુરૂપ માહિતી મેળવવાના સંદર્ભમાં વિશિષ્ટ કાર્યો કરે છે. જેને સંશોધન પદ્ધતિ કહી શકાય.”

પ્રસ્તુત અભ્યાસમાં સંશોધકે વર્ણનાત્મક સંશોધન પદ્ધતિ પૈકી સર્વેક્ષણ પ્રકારની પદ્ધતિ પસંદ કરી હતી.

ઉપકરણ સંરચના

સંશોધન પ્રક્રિયા દરમિયાન અભ્યાસના હેતુઓ અનુસાર આવશ્યક માહિતી મેળવવાના સાધનને ઉપકરણ કહેવાય છે. સંશોધનમાં સંશોધન ઉપકરણનું પણ મહત્વ છે. વિવિધ પ્રકારના ઉપકરણો પૈકી સંશોધકે પોતાના અભ્યાસ માટે ઉચિત પ્રકારનું ઉપકરણ પસંદ કરવાનું હોય છે. અભ્યાસના હેતુઓ અનુરૂપ જો કોઈ પ્રમાણિત ઉપકરણ પ્રાપ્ત ન હોય તો સંશોધકે નવું પ્રમાણિત સાધન રચવું પડે છે.

પ્રસ્તુત સંશોધનનો મુખ્ય હેતુ '10 બેગલેસ દિવસથી' કાર્ય કરતા પ્રાથમિક શાળાના શિક્ષકો માટે અભિપ્રાયાવલીની સંરચના અને પ્રમાણીકરણ કરવાનું હતું તેથી સંશોધકે 10 બેગલેસ દિવસ આધારિત અભિપ્રાયાવલીની રચના કરી હતી.

માહિતીનું વિશ્લેષણ

સંશોધનના નમૂનામાં સમાવિષ્ટ પાત્રોના પ્રતિયારોના આધારે મળેલી માહિતીને નીચે પ્રમાણે સ્ત્રી, પુરુષો અને P.T.C., B.Ed, જેવા જૂથોમાં વહેંચણી કરી તેનું વિશ્લેષણ કરવામાં આવ્યું હતું. ચલોને ધ્યાનમાં રાખીને મળેલી માહિતીના પ્રાપ્તાંકોની ટકાવારી મેળવી પ્રશ્નોની ચકાસણી કરી માહિતીનું વિશ્લેષણ કરવામાં આવ્યું હતું.

તારણો

1. પ્રાથમિક શાળાના શિક્ષકોના અભિપ્રાયો કેવા હશે ?
 1. 10 બેગલેસ દિવસ અભિયાન અંતર્ગત પ્રાથમિક શાળાના શિક્ષકોના અભિપ્રાયો હકારાત્મક જોવા મળ્યા હતા.
 2. 100% પ્રાથમિક શાળાના શિક્ષકોના મતે 6 થી 8 ધોરણ માટે આ પ્રયોગ યોગ્ય છે. આથી કહી શકાય કે, આ કાર્યક્રમ અંતર્ગત પ્રાથમિક શાળાના શિક્ષકો સંપૂર્ણ પણે સહમત ધરાવે છે.
 3. 50% જેટલા પ્રાથમિક શાળાના શિક્ષકોના મતે આ કાર્યક્રમ માટે ઓનલાઈન મોડ પસંદ કરી શકાય છે.

4. 'રાષ્ટ્રીય શિક્ષણ નીતિ ઓછામાં ઓછાં 50% શિખનારાઓને વ્યાવસાયિક શિક્ષણ સાથે જોડવાનો પ્રસ્તાવ મૂકે છે ' 50% જેટલા પ્રાથમિક શાળાના શિક્ષકોના મતે આ વિધાન યોગ્ય છે .
5. 100% પ્રાથમિક શાળાના શિક્ષકોના મતે આ કાર્યક્રમ પુસ્તકિયા જ્ઞાન અને જ્ઞાનના ઉપયોગ વચ્ચેની સીમાઓને ઘટાડો કરે છે.
6. મહત્તમ પ્રાથમિક શાળાના શિક્ષકો એવું માને છે કે આ કાર્યક્રમ દ્વારા બાળકોમાં સર્જનાત્મકતા, ગુણવત્તા સભાનતા જેવા અનૌપચારિક કૌશલ્યોના વિકાસ થશે.
7. 95% જેટલા પ્રાથમિક શાળાના શિક્ષકોના મતે 10 બેગલસ દિવસ અંતર્ગત વિદ્યાર્થીઓને સુથાર કામ અને ઇલેક્ટ્રિક કામ શીખવાડવામાં આવે છે. તે યોગ્ય છે.
8. 75% જેટલા પ્રાથમિક શાળાના શિક્ષકોના મતે 10 બેગલસ દિવસ અંતર્ગત વિદ્યાર્થીઓને મેટલ કાર્ય શીખવાડવામાં આવે છે. તે યોગ્ય છે.
9. 100% પ્રાથમિક શાળાના શિક્ષકોના મતે 10 બેગલસ દિવસ અંતર્ગત વિદ્યાર્થીઓને બાગ કામ અને માટી કામ શીખવાડવામાં આવે છે. તે યોગ્ય છે.
10. મહત્તમ પ્રાથમિક શાળાના શિક્ષકો એવું માને છે કે આ કાર્યક્રમ અંતર્ગત કળા, ક્વિઝ, રમત ગમત અને વ્યવસાયિક હસ્તકલા નો સમાવેશ કરતી વિવિધ પ્રકારની સંવર્ધન પ્રવૃત્તિઓ કરાવવામાં આવે છે.
11. 100% પ્રાથમિક શાળાના શિક્ષકો એવું માને છે કે આ કાર્યક્રમમાં રાજ્ય અને સ્થાનિક સમુદાયો દ્વારા નક્કી કરાયેલ અને સ્થાનિક કૌશલ્યની પ્રવૃત્તિઓનો સમાવેશ કરવામાં આવેલ છે.
12. આ કાર્યક્રમ અંતર્ગત ઐતિહાસિક, સાંસ્કૃતિક અને પ્રવાસન મહત્વના સ્થળોની મુલાકાત કરાવવામાં આવે છે. 55% પ્રાથમિક શાળાના શિક્ષકો આ વિધાન સાથે સહમત છે અને 45% અસહમત છે.
13. આ કાર્યક્રમ અંતર્ગત સ્થાનિક કલાકારો અને કારીગરોની મુલાકાત દ્વારા બાળકોને શાળાની બહારની પ્રવૃત્તિઓ કરાવવામાં આવે છે 62% પ્રાથમિક શાળાના શિક્ષકો આ વિધાન સાથે સહમત છે અને 38% અસહમત છે.

14. આ કાર્યક્રમ અંતર્ગત કરાવવામાં આવતી પ્રવૃત્તિઓએ ભાષાના વિષયો, વિજ્ઞાન વિષય, સામાજિક વિજ્ઞાન, ગણિત વિષય, સાથે સંલગ્ન છે ક્રમશઃ 100% 56% 56% પ્રાથમિક શાળાના શિક્ષકો આ વિધાન સાથે સહમત છે અને 44% 40% અસહમત છે.
15. 58% પ્રાથમિક શાળાના શિક્ષકો એવું માને છે કે આ કાર્યક્રમ દ્વારા બાળકોને કાર્યની દુનિયામાં વિવિધ ઉત્પાદક કાર્યો માટે મૂળભૂત કૌશલ્યોની આવશ્યકતાઓ શોધવાની તકો પ્રદાન કરવામાં ઉપયોગી થશે અને 30% અસહમત છે.
16. મહત્તમ પ્રાથમિક શાળાના શિક્ષકો એવું માને છે કે આ કાર્યક્રમ બાળકોને પોતાની કારકિર્દીની પસંદગી કરવામાં મદદ કરશે.
17. આ કાર્યક્રમ અંતર્ગત મહત્તમ પુરુષ શિક્ષકો માને છે કે, 10-દિવસની બેગલેસ દિવસની પ્રવૃત્તિઓના મહત્વ વિશે માતાપિતાને શિક્ષિત કરવા., વિદ્યાર્થીઓને આ કાર્યક્રમના મહત્વ વિશે માર્ગદર્શન આપવું. 65% પ્રાથમિક શાળાના શિક્ષકો જ એવું માને છે કે આ કાર્યક્રમ અંતર્ગતની પ્રવૃત્તિ માટે ઓછામાં ઓછાં 10 દિવસ અથવા શાળાના 60 કલાકનો સમય ફાળવવો જોઈએ.
18. 68% પ્રાથમિક શાળાના શિક્ષકો જ એવું માને છે કે આ કાર્યક્રમ અંતર્ગત પર્ફોર્મિંગ અને વિઝ્યુઅલ આર્ટ માટે મલ્ટી આર્ટ સેન્ટરની મુલાકાત દ્વારા વિદ્યાર્થીઓ પર્ફોર્મિંગ અને વિઝ્યુઅલ આર્ટ વચ્ચેનો તફાવત જાણી શકશે.
19. 40% પ્રાથમિક શાળાના શિક્ષકો જ એવું માને છે કે આ કાર્યક્રમ અંતર્ગત સાઇબર સિક્યોરિટી પર નિષ્ણાતોની ચર્ચા દ્વારા વિદ્યાર્થી વાસ્તવિક દુનિયા અને ડિજિટલ વિશ્વમાં રહેતા લોકો વચ્ચે જોડાણ સાધી શકશે. 45 % શિક્ષકો કોઈ મત આપતા નથી.
20. મહત્તમ પ્રાથમિક શાળાના શિક્ષકો જ એવું માને છે કે આ કાર્યક્રમ અંતર્ગત પુસ્તક મેળાનું આયોજન દ્વારા વિદ્યાર્થીઓ વિવિધ થીમ પર વિવિધ પ્રકારના પુસ્તકોનું અન્વેષણ કરી શકશે.
21. 60% પ્રાથમિક શાળાના શિક્ષકો જ એવું માને છે કે 10 બેગ લેસ ડે અંતર્ગત આ કાર્યક્રમ માટે ફાળવામાં આવેલ 10 દિવસ/60 કલાકનો સમય યોગ્ય છે ?
22. 82% પ્રાથમિક શાળાના શિક્ષકો જ એવું માને છે કે આ કાર્યક્રમ અંતર્ગત શિક્ષકો વિદ્યાર્થીઓની શિક્ષણ પ્રત્યેની રુચિ અને વલણનું અવલોકન કરી શકશે.

23. 80% પ્રાથમિક શાળાના શિક્ષકો જ એવું માને છે કે ચેરિટી વિઝિટ દ્વારા આંતર વ્યક્તિત્વ કૌશલ્ય, માનવતા પ્રત્યે આદર સમુદાય પ્રત્યે જવાબદારી જેવા ગુણોનું વિકાસ થઈ શકે છે?
24. 75% પ્રાથમિક શાળાના શિક્ષકો જ એવું માને છે કે આઉટ ડોર એક્ટિવિટી દ્વારા અવલોકન, પ્રશ્ન પુછવા, ભાષા યોગ્યતા, અવધિ, ટીમમાં સાથે કામ કરવું વગેરે જેવા કૌશલ્યનો વિકાસ થશે 15% પ્રાથમિક શાળાના શિક્ષકો આ વિધાન થી અસમત છે.
25. મહત્તમ પ્રાથમિક શાળાના શિક્ષકો એવું માને છે કે પક્ષી અભ્યારણની મુલાકાત દ્વારા પક્ષીઓના સંરક્ષણ અને જાળવણી વિશેની સમજ વિદ્યાર્થીઓમાં કેળવી શકાશે ?
26. મહત્તમ પ્રાથમિક શાળાના શિક્ષકો એવું માને છે કે 10 બેગ લેસ ડે અંતર્ગત આર્ટિકિસિયલ ઇન્ટેલીજન્સ/ ડેટા સાયન્સ/ રોબોટિક્સનાં વિવિધ એપ્લિકેશનનું જ્ઞાન આપવું વર્તમાન સમયમાં જરૂરી છે.
27. 85 % પ્રાથમિક શાળાના શિક્ષકો એવું માને છે કે પતંગ બનાવવી અને ચગાવવી જેવી પ્રવૃત્તિઓ દ્વારા વિદ્યાર્થીઓ તેમની કલ્પનાને આકાર આપી શકશે.
2. પ્રાથમિક શાળાના પુરુષ શિક્ષકોના અભિપ્રાયો કેવા હશે ?
1. 10 બેગલસ દિવસ અભિયાન અંતર્ગત પ્રાથમિક શાળાના પુરુષ શિક્ષકોના અભિપ્રાયો હકારાત્મક જોવા મળ્યા હતા.
 2. 100% પ્રાથમિક શાળાના પ્રાથમિક શાળાના શિક્ષકોના પુરુષ શિક્ષકોના મતે 6 થી 8 ધોરણ માટે આ પ્રયોગ યોગ્ય છે. આથી કહી શકાય કે, આ કાર્યક્રમ અંતર્ગત પ્રાથમિક શાળાના પુરુષ શિક્ષકો સંપૂર્ણ પણે સહમત ધરાવે છે.
 3. ૫૦% જેટલા પ્રાથમિક શાળાના પુરુષ શિક્ષકોના મતે આ કાર્યક્રમ માટે ઓનલાઈન મોડ પસંદ કરી શકાય છે.
 4. 'રાષ્ટ્રીય શિક્ષણ નીતિ ઓછામાં ઓછાં 50% શિખનારાઓને વ્યાવસાયિક શિક્ષણ સાથે જોડવાનો પ્રસ્તાવ મૂકે છે '50% જેટલા પ્રાથમિક શાળાના પુરુષ શિક્ષકોના મતે આ વિધાન યોગ્ય છે.
 5. 100% પ્રાથમિક શાળાના પુરુષ શિક્ષકોના મતે આ કાર્યક્રમ પુસ્તકિયા જ્ઞાન અને જ્ઞાનના ઉપયોગ વચ્ચેની સીમાઓને ઘટાડો કરે છે.

6. મહત્તમ પ્રાથમિક શાળાના પુરુષ શિક્ષકો એવું માને છે કે આ કાર્યક્રમ દ્વારા બાળકોમાં સર્જનાત્મકતા, ગુણવત્તા સભાનતા જેવા અનૌપચારિક કૌશલ્યોના વિકાસ થશે.
7. 95% જેટલા પ્રાથમિક શાળાના પુરુષ શિક્ષકોના મતે 10 બેગલસ દિવસ અંતર્ગત વિદ્યાર્થીઓને સુથાર કામ અને ઇલેક્ટ્રિક કામ શીખવાડવામાં આવે છે. તે યોગ્ય છે.
8. 80% જેટલા પ્રાથમિક શાળાના પુરુષ શિક્ષકોના મતે 10 બેગલસ દિવસ અંતર્ગત વિદ્યાર્થીઓને મેટલ કાર્ય શીખવાડવામાં આવે છે. તે યોગ્ય છે.
9. 100% પ્રાથમિક શાળાના પુરુષ શિક્ષકોના મતે 10 બેગલસ દિવસ અંતર્ગત વિદ્યાર્થીઓને બાગ કામ અને માટી કામ શીખવાડવામાં આવે છે. તે યોગ્ય છે.
10. મહત્તમ પ્રાથમિક શાળાના પુરુષ શિક્ષકો એવું માને છે કે આ કાર્યક્રમ અંતર્ગત કળા, ક્વિઝ, રમત ગમત અને વ્યવસાયિક હસ્તકલા નો સમાવેશ કરતી વિવિધ પ્રકારની સંવર્ધન પ્રવૃત્તિઓ કરાવવામાં આવે છે.
11. 100% પ્રાથમિક શાળાના પુરુષ શિક્ષકો એવું માને છે કે આ કાર્યક્રમમાં રાજ્ય અને સ્થાનિક સમુદાયો દ્વારા નક્કી કરાયેલ અને સ્થાનિક કૌશલ્યની પ્રવૃત્તિઓનો સમાવેશ કરવામાં આવેલ છે.
12. આ કાર્યક્રમ અંતર્ગત ઐતિહાસિક, સાંસ્કૃતિક અને પ્રવાસન મહત્વના સ્થળોની મુલાકાત કરાવવામાં આવે છે. 65% પ્રાથમિક શાળાના પુરુષ શિક્ષકો આ વિધાન સાથે સહમત છે અને 35% અસહમત છે.
13. આ કાર્યક્રમ અંતર્ગત સ્થાનિક કલાકારો અને કારીગરોની મુલાકાત દ્વારા બાળકોને શાળાની બહારની પ્રવૃત્તિઓ કરાવવામાં આવે છે 62% પ્રાથમિક શાળાના પુરુષ શિક્ષકો આ વિધાન સાથે સહમત છે અને 38% અસહમત છે.
14. આ કાર્યક્રમ અંતર્ગત કરાવવામાં આવતી પ્રવૃત્તિઓએ ભાષાના વિષયો, વિજ્ઞાન વિષય, સામાજિક વિજ્ઞાન, ગણિત વિષય, સાથે સંલગ્ન છે ક્રમશઃ 100% 56% 56% પ્રાથમિક શાળાના પુરુષ શિક્ષકો આ વિધાન સાથે સહમત છે અને 44% 40% અસહમત છે.

15. 60% પ્રાથમિક શાળાના પુરુષ શિક્ષકો એવું માને છે કે આ કાર્યક્રમ દ્વારા બાળકોને કાર્યની દુનિયામાં વિવિધ ઉત્પાદક કાર્યો માટે મૂળભૂત કૌશલ્યોની આવશ્યકતાઓ શોધવાની તકો પ્રદાન કરવામાં ઉપયોગી થશે અને 40% અસહમત છે.
16. મહત્તમ પ્રાથમિક શાળાના પુરુષ શિક્ષકો એવું માને છે કે આ કાર્યક્રમ બાળકોને પોતાની કારકિર્દીની પસંદગી કરવામાં મદદ કરશે.
17. આ કાર્યક્રમ અંતર્ગત મહત્તમ પુરુષ શિક્ષકો માને છે કે, 10-દિવસની બેગલેસ દિવસની પ્રવૃત્તિઓના મહત્વ વિશે માતાપિતાને શિક્ષિત કરવા.,વિદ્યાર્થીઓને આ કાર્યક્રમના મહત્વ વિશે માર્ગદર્શન આપવું .
18. 75% પ્રાથમિક શાળાના પુરુષ શિક્ષકો જ એવું માને છે કે આ કાર્યક્રમ અંતર્ગતની પ્રવૃત્તિ માટે ઓછામાં ઓછાં 10 દિવસ અથવા શાળાના 60 કલાકનો સમય ફાળવવો જોઈએ.
19. 68% પ્રાથમિક શાળાના પુરુષ શિક્ષકો જ એવું માને છે કે આ કાર્યક્રમ અંતર્ગત પર્ફોર્મિંગ અને વિઝ્યુઅલ આર્ટ માટે મલ્ટી આર્ટ સેન્ટરની મુલાકાત દ્વારા વિદ્યાર્થીઓ પર્ફોર્મિંગ અને વિઝ્યુઅલ આર્ટ વચ્ચેનો તફાવત જાણી શકશે.
20. 90% પ્રાથમિક શાળાના પુરુષ શિક્ષકો જ એવું માને છે કે આ કાર્યક્રમ અંતર્ગત સાઇબર સિક્યોરિટી પર નિષ્ણાતોની ચર્ચા દ્વારા વિદ્યાર્થી વાસ્તવિક દુનિયા અને ડિજિટલ વિશ્વમાં રહેતા લોકો વચ્ચે જોડાણ સાધી શકશે. 10 % શિક્ષકો કોઈ મત આપતા નથી.
21. મહત્તમ પ્રાથમિક શાળાના પુરુષ શિક્ષકો એવું માને છે કે આ કાર્યક્રમ અંતર્ગત પુસ્તક મેળાનું આયોજન દ્વારા વિદ્યાર્થીઓ વિવિધ થીમ પર વિવિધ પ્રકારના પુસ્તકોનું અન્વેષણ કરી શકશે.
22. 47% પ્રાથમિક શાળાના પુરુષ શિક્ષકો જ એવું માને છે કે 10 બેગ લેસ ડે અંતર્ગત આ કાર્યક્રમ માટે ફાળવામાં આવેલ 10 દિવસ/60 કલાકનો સમય યોગ્ય છે?
23. 44% પ્રાથમિક શાળાના પુરુષ શિક્ષકો એવું માને છે કે આ કાર્યક્રમ અંતર્ગત શિક્ષકો વિદ્યાર્થીઓની શિક્ષણ પ્રત્યેની રુચિ અને વલણનું અવલોકન કરી શકશે.

24. 52% પ્રાથમિક શાળાના પુરુષ શિક્ષકો એવું માને છે કે ચેરિટી વિઝિટ દ્વારા આંતર વ્યક્તિત્વ કૌશલ્ય, માનવતા પ્રત્યે આદર સમુદાય પ્રત્યે જવાબદારી જેવા ગુણોનું વિકાસ થઈ શકે છે?
25. 68% પ્રાથમિક શાળાના પુરુષ શિક્ષકો જ એવું માને છે કે આઉટ ડોર એક્ટિવીટી દ્વારા અવલોકન, પ્રશ્ન પુછવા, ભાષા યોગ્યતા, અવધિ, ટીમમાં સાથે કામ કરવું વગેરે જેવા કૌશલ્યનો વિકાસ થશે 12% પ્રાથમિક શાળાના શિક્ષકો આ વિધાન થી અસમત છે.
26. મહત્તમ પ્રાથમિક શાળાના પુરુષ શિક્ષકો એવું માને છે કે પક્ષી અભ્યારણની મુલાકાત દ્વારા પક્ષીઓના સંરક્ષણ અને જાળવણી વિશેની સમજ વિદ્યાર્થીઓમાં કેળવી શકાશે ?
27. મહત્તમ પ્રાથમિક શાળાના પુરુષ શિક્ષકો એવું માને છે કે 10 બેગ લેસ ડે અંતર્ગત આર્ટિકિસિયલ ઇન્ટેલીજન્સ/ ડેટા સાયન્સ/ રોબોટિક્સનાં વિવિધ એપ્લિકેશનનું જ્ઞાન આપવું વર્તમાન સમયમાં જરૂરી છે.
28. 80 % પ્રાથમિક શાળાના પુરુષ શિક્ષકો એવું માને છે કે પતંગ બનાવવી અને ચગાવવી જેવી પ્રવૃત્તિઓ દ્વારા વિદ્યાર્થીઓ તેમની કલ્પનાને આકાર આપી શકશે.
3. પ્રાથમિક શાળાના સ્ત્રી શિક્ષકોના અભિપ્રાયો કેવા હશે ?
1. 10 બેગલસ દિવસ અભિયાન અંતર્ગત પ્રાથમિક શાળાના સ્ત્રી શિક્ષકોના અભિપ્રાયો હકારાત્મક જોવા મળ્યા હતા.
 2. 100% પ્રાથમિક શાળાના પ્રાથમિક શાળાના શિક્ષકોના સ્ત્રી શિક્ષકોના મતે 6 થી 8 ધોરણ માટે આ પ્રયોગ યોગ્ય છે. આથી કહી શકાય કે, આ કાર્યક્રમ અંતર્ગત પ્રાથમિક શાળાના સ્ત્રી શિક્ષકો સંપૂર્ણ પણે સહમત ધરાવે છે.
 3. 50% જેટલા પ્રાથમિક શાળાના સ્ત્રી શિક્ષકોના મતે આ કાર્યક્રમ માટે ઓનલાઈન મોડ પસંદ કરી શકાય છે.
 4. 'રાષ્ટ્રીય શિક્ષણ નીતિ ઓછામાં ઓછાં 50% શિખનારાઓને વ્યાવસાયિક શિક્ષણ સાથે જોડવાનો પ્રસ્તાવ મૂકે છે '50% જેટલા પ્રાથમિક શાળાના સ્ત્રી શિક્ષકોના મતે આ વિધાન યોગ્ય છે .
 5. 100% પ્રાથમિક શાળાના સ્ત્રી શિક્ષકોના મતે આ કાર્યક્રમ પુસ્તકિયા જ્ઞાન અને જ્ઞાનના ઉપયોગ વચ્ચેની સીમાઓને ઘટાડો કરે છે.

6. મહત્તમ પ્રાથમિક શાળાના સ્ત્રી શિક્ષકો એવું માને છે કે આ કાર્યક્રમ દ્વારા બાળકોમાં સર્જનાત્મકતા, ગુણવત્તા સભાનતા જેવા અનૌપચારિક કૌશલ્યોના વિકાસ થશે.
7. 75% જેટલા પ્રાથમિક શાળાના સ્ત્રી શિક્ષકોના મતે 10 બેગલસ દિવસ અંતર્ગત વિદ્યાર્થીઓને સુથાર કામ અને ઇલેક્ટ્રિક કામ શીખવાડવામાં આવે છે. તે યોગ્ય છે.
8. 68% જેટલા પ્રાથમિક શાળાના સ્ત્રી શિક્ષકોના મતે 10 બેગલસ દિવસ અંતર્ગત વિદ્યાર્થીઓને મેટલ કાર્ય શીખવાડવામાં આવે છે. તે યોગ્ય છે.
9. 100% પ્રાથમિક શાળાના સ્ત્રી શિક્ષકોના મતે 10 બેગલસ દિવસ અંતર્ગત વિદ્યાર્થીઓને બાગ કામ અને માટી કામ શીખવાડવામાં આવે છે. તે યોગ્ય છે.
10. મહત્તમ પ્રાથમિક શાળાના સ્ત્રી શિક્ષકો એવું માને છે કે આ કાર્યક્રમ અંતર્ગત કળા, ક્વિઝ, રમત ગમત અને વ્યવસાયિક હસ્તકલા નો સમાવેશ કરતી વિવિધ પ્રકારની સંવર્ધન પ્રવૃત્તિઓ કરાવવામાં આવે છે.
11. 100% પ્રાથમિક શાળાના સ્ત્રી શિક્ષકો એવું માને છે કે આ કાર્યક્રમમાં રાજ્ય અને સ્થાનિક સમુદાયો દ્વારા નક્કી કરાયેલ અને સ્થાનિક કૌશલ્યની પ્રવૃત્તિઓનો સમાવેશ કરવામાં આવેલ છે.
12. આ કાર્યક્રમ અંતર્ગત ઐતિહાસિક, સાંસ્કૃતિક અને પ્રવાસન મહત્વના સ્થળોની મુલાકાત કરાવવામાં આવે છે. 58% પ્રાથમિક શાળાના સ્ત્રી શિક્ષકો આ વિધાન સાથે સહમત છે અને 42% અસહમત છે.
13. આ કાર્યક્રમ અંતર્ગત સ્થાનિક કલાકારો અને કારીગરોની મુલાકાત દ્વારા બાળકોને શાળાની બહારની પ્રવૃત્તિઓ કરાવવામાં આવે છે 90% પ્રાથમિક શાળાના સ્ત્રી શિક્ષકો આ વિધાન સાથે સહમત છે અને 10% અસહમત છે.
14. આ કાર્યક્રમ અંતર્ગત કરાવવામાં આવતી પ્રવૃત્તિઓએ ભાષાના વિષયો, વિજ્ઞાન વિષય, સામાજિક વિજ્ઞાન, ગણિત વિષય, સાથે સંલગ્ન છે ક્રમશઃ 100% 56% 56% પ્રાથમિક શાળાના સ્ત્રી શિક્ષકો આ વિધાન સાથે સહમત છે અને 44% 40% અસહમત છે.

15. 58% પ્રાથમિક શાળાના સ્ત્રી શિક્ષકો એવું માને છે કે આ કાર્યક્રમ દ્વારા બાળકોને કાર્યની દુનિયામાં વિવિધ ઉત્પાદક કાર્યો માટે મૂળભૂત કૌશલ્યોની આવશ્યકતાઓ શોધવાની તકો પ્રદાન કરવામાં ઉપયોગી થશે અને 30% અસહમત છે.
16. મહત્તમ પ્રાથમિક શાળાના સ્ત્રી શિક્ષકો એવું માને છે કે આ કાર્યક્રમ બાળકોને પોતાની કારકિર્દીની પસંદગી કરવામાં મદદ કરશે.
17. આ કાર્યક્રમ અંતર્ગત મહત્તમ સ્ત્રી શિક્ષકો માને છે કે, 10-દિવસની બેગલેસ દિવસની પ્રવૃત્તિઓના મહત્વ વિશે માતાપિતાને શિક્ષિત કરવા, વિદ્યાર્થીઓને આ કાર્યક્રમના મહત્વ વિશે માર્ગદર્શન આપવું.
18. 60% પ્રાથમિક શાળાના સ્ત્રી શિક્ષકો જ એવું માને છે કે આ કાર્યક્રમ અંતર્ગતની પ્રવૃત્તિ માટે ઓછામાં ઓછાં 10 દિવસ અથવા શાળાના 60 કલાકનો સમય ફાળવવો જોઈએ.
19. 82% પ્રાથમિક શાળાના સ્ત્રી શિક્ષકો જ એવું માને છે કે આ કાર્યક્રમ અંતર્ગત પર્ફોર્મિંગ અને વિઝ્યુઅલ આર્ટ માટે મલ્ટી આર્ટ સેન્ટરની મુલાકાત દ્વારા વિદ્યાર્થીઓ પર્ફોર્મિંગ અને વિઝ્યુઅલ આર્ટ વચ્ચેનો તફાવત જાણી શકશે.
20. 80% પ્રાથમિક શાળાના સ્ત્રી શિક્ષકો જ એવું માને છે કે આ કાર્યક્રમ અંતર્ગત સાઇબર સિક્યોરિટી પર નિષ્ણાતોની ચર્ચા દ્વારા વિદ્યાર્થી વાસ્તવિક દુનિયા અને ડિજિટલ વિશ્વમાં રહેતા લોકો વચ્ચે જોડાણ સાધી શકશે. 20 % શિક્ષકો કોઈ મત આપતા નથી.
21. મહત્તમ પ્રાથમિક શાળાના સ્ત્રી શિક્ષકો એવું માને છે કે આ કાર્યક્રમ અંતર્ગત પુસ્તક મેળાનું આયોજન દ્વારા વિદ્યાર્થીઓ વિવિધ થીમ પર વિવિધ પ્રકારના પુસ્તકોનું અન્વેષણ કરી શકશે.
22. 60% પ્રાથમિક શાળાના સ્ત્રી શિક્ષકો જ એવું માને છે કે 10 બેગ લેસ ડે અંતર્ગત આ કાર્યક્રમ માટે ફાળવામાં આવેલ 10 દિવસ/60 કલાકનો સમય યોગ્ય છે ?
23. 75% પ્રાથમિક શાળાના સ્ત્રી શિક્ષકો એવું માને છે કે આ કાર્યક્રમ અંતર્ગત શિક્ષકો વિદ્યાર્થીઓની શિક્ષણ પ્રત્યેની રુચિ અને વલણનું અવલોકન કરી શકશે.
24. 68% પ્રાથમિક શાળાના સ્ત્રી શિક્ષકો એવું માને છે કે ચેરિટી વિઝિટ દ્વારા આંતર વ્યક્તિત્વ કૌશલ્ય, માનવતા પ્રત્યે આદર સમુદાય પ્રત્યે જવાબદારી જેવા ગુણોનું વિકાસ થઈ શકે છે?

25. 68% પ્રાથમિક શાળાના સ્ત્રી શિક્ષકો જ એવું માને છે કે આઉટ ડોર એક્ટિવિટી દ્વારા અવલોકન, પ્રશ્ન પુછવા, ભાષા યોગ્યતા, અવધિ, ટીમમાં સાથે કામ કરવું વગેરે જેવા કૌશલ્યનો વિકાસ થશે 20% પ્રાથમિક શાળાના શિક્ષકો આ વિધાન થી અસમત છે.
26. મહત્તમ પ્રાથમિક શાળાના સ્ત્રી શિક્ષકો એવું માને છે કે પક્ષી અભ્યાસની મુલાકાત દ્વારા પક્ષીઓના સંરક્ષણ અને જાળવણી વિશેની સમજ વિદ્યાર્થીઓમાં કેળવી શકાશે.
27. મહત્તમ પ્રાથમિક શાળાના સ્ત્રી શિક્ષકો એવું માને છે કે 10 બેગ લેસ ડે અંતર્ગત આર્ટિકિસિયલ ઇન્ટેલીજન્સ/ ડેટા સાયન્સ/ રોબોટિક્સનાં વિવિધ એપ્લિકેશનનું જ્ઞાન આપવું વર્તમાન સમયમાં જરૂરી છે.
28. 68 % પ્રાથમિક શાળાના સ્ત્રી શિક્ષકો એવું માને છે કે પતંગ બનાવવી અને ચગાવવી જેવી પ્રવૃત્તિઓ દ્વારા વિદ્યાર્થીઓ તેમની કલ્પનાને આકાર આપી શકશે.
4. પ્રાથમિક શાળાના P.T.C. કરેલા શિક્ષકોના અભિપ્રાયો કેવા હશે ?
 1. 10 બેગલસ દિવસ અભિયાન અંતર્ગત પ્રાથમિક શાળાના PTC શિક્ષકોના અભિપ્રાયો હકારાત્મક જોવા મળ્યા હતા.
 2. 100% પ્રાથમિક શાળાના પ્રાથમિક શાળાના શિક્ષકોના PTC શિક્ષકોના મતે 6 થી 8 ધોરણ માટે આ પ્રયોગ યોગ્ય છે. આથી કહી શકાય કે, આ કાર્યક્રમ અંતર્ગત પ્રાથમિક શાળાના PTC શિક્ષકો સંપૂર્ણ પણે સહમત ધરાવે છે.
 3. ૫૦% જેટલા પ્રાથમિક શાળાના PTC શિક્ષકોના મતે આ કાર્યક્રમ માટે ઓનલાઈન મોડ પસંદ કરી શકાય છે.
 4. 'રાષ્ટ્રીય શિક્ષણ નીતિ ઓછામાં ઓછાં 50% શિખનારાઓને વ્યાવસાયિક શિક્ષણ સાથે જોડવાનો પ્રસ્તાવ મૂકે છે '50% જેટલા પ્રાથમિક શાળાના PTC શિક્ષકોના મતે આ વિધાન યોગ્ય છે .
 5. 100% પ્રાથમિક શાળાના PTC શિક્ષકોના મતે આ કાર્યક્રમ પુસ્તકિયા જ્ઞાન અને જ્ઞાનના ઉપયોગ વચ્ચેની સીમાઓને ઘટાડો કરે છે.
 6. મહત્તમ પ્રાથમિક શાળાના PTC શિક્ષકો એવું માને છે કે આ કાર્યક્રમ દ્વારા બાળકોમાં સર્જનાત્મકતા, ગુણવત્તા સભાનતા જેવા અનૌપચારિક કૌશલ્યોના વિકાસ થશે.

7. 90% જેટલા પ્રાથમિક શાળાના PTC શિક્ષકોના મતે 10 બેગલસ દિવસ અંતર્ગત વિદ્યાર્થીઓને સુથાર કામ અને ઇલેક્ટ્રિક કામ શીખવાડવામાં આવે છે. તે યોગ્ય છે.
8. 82% જેટલા પ્રાથમિક શાળાના PTC શિક્ષકોના મતે 10 બેગલસ દિવસ અંતર્ગત વિદ્યાર્થીઓને મેટલ કાર્ય શીખવાડવામાં આવે છે. તે યોગ્ય છે.
9. 100% પ્રાથમિક શાળાના PTC શિક્ષકોના મતે 10 બેગલસ દિવસ અંતર્ગત વિદ્યાર્થીઓને બાગ કામ અને માટી કામ શીખવાડવામાં આવે છે. તે યોગ્ય છે.
10. મહત્તમ પ્રાથમિક શાળાના PTC શિક્ષકો એવું માને છે કે આ કાર્યક્રમ અંતર્ગત કળા, ક્વિઝ, રમત ગમત અને વ્યવસાયિક હસ્તકલા નો સમાવેશ કરતી વિવિધ પ્રકારની સંવર્ધન પ્રવૃત્તિઓ કરાવવામાં આવે છે.
11. 100% પ્રાથમિક શાળાના PTC શિક્ષકો એવું માને છે કે આ કાર્યક્રમમાં રાજ્ય અને સ્થાનિક સમુદાયો દ્વારા નક્કી કરાયેલ અને સ્થાનિક કૌશલ્યની પ્રવૃત્તિઓનો સમાવેશ કરવામાં આવેલ છે.
12. આ કાર્યક્રમ અંતર્ગત ઐતિહાસિક, સાંસ્કૃતિક અને પ્રવાસન મહત્વના સ્થળોની મુલાકાત કરાવવામાં આવે છે. 80% પ્રાથમિક શાળાના PTC શિક્ષકો આ વિધાન સાથે સહમત છે અને 20% અસહમત છે.
13. આ કાર્યક્રમ અંતર્ગત સ્થાનિક કલાકારો અને કારીગરોની મુલાકાત દ્વારા બાળકોને શાળાની બહારની પ્રવૃત્તિઓ કરાવવામાં આવે છે 75% પ્રાથમિક શાળાના PTC શિક્ષકો આ વિધાન સાથે સહમત છે અને 25% અસહમત છે.
14. આ કાર્યક્રમ અંતર્ગત કરાવવામાં આવતી પ્રવૃત્તિઓએ ભાષાના વિષયો, વિજ્ઞાન વિષય, સામાજિક વિજ્ઞાન, ગણિત વિષય, સાથે સંલગ્ન છે ક્રમશઃ 100% 56% 56% પ્રાથમિક શાળાના PTC શિક્ષકો આ વિધાન સાથે સહમત છે અને 44% 40% અસહમત છે.
15. 60% પ્રાથમિક શાળાના PTC શિક્ષકો એવું માને છે કે આ કાર્યક્રમ દ્વારા બાળકોને કાર્યની દુનિયામાં વિવિધ ઉત્પાદક કાર્યો માટે મૂળભૂત કૌશલ્યોની આવશ્યકતાઓ શોધવાની તકો પ્રદાન કરવામાં ઉપયોગી થશે અને 40% અસહમત છે.

16. મહત્તમ પ્રાથમિક શાળાના PTC શિક્ષકો એવું માને છે કે આ કાર્યક્રમ બાળકોને પોતાની કારકિર્દીની પસંદગી કરવામાં મદદ કરશે.
17. આ કાર્યક્રમ અંતર્ગત મહત્તમ PTC શિક્ષકો માને છે કે, 10-દિવસની બેગલેસ દિવસની પ્રવૃત્તિઓના મહત્વ વિશે માતાપિતાને શિક્ષિત કરવા.,વિદ્યાર્થીઓને આ કાર્યક્રમના મહત્વ વિશે માર્ગદર્શન આપવું.
18. 75% પ્રાથમિક શાળાના PTC શિક્ષકો જ એવું માને છે કે આ કાર્યક્રમ અંતર્ગતની પ્રવૃત્તિ માટે ઓછામાં ઓછાં 10 દિવસ અથવા શાળાના 60 કલાકનો સમય ફાળવવો જોઈએ.
19. 68% પ્રાથમિક શાળાના PTC શિક્ષકો જ એવું માને છે કે આ કાર્યક્રમ અંતર્ગત પફોર્મિંગ અને વિઝ્યુઅલ આર્ટ માટે મલ્ટી આર્ટ સેન્ટરની મુલાકાત દ્વારા વિદ્યાર્થીઓ પફોર્મિંગ અને વિઝ્યુઅલ આર્ટ વચ્ચેનો તફાવત જાણી શકશે.
20. 90% પ્રાથમિક શાળાના PTC શિક્ષકો જ એવું માને છે કે આ કાર્યક્રમ અંતર્ગત સાઇબર સિક્યોરિટી પર નિષ્ણાતોની ચર્ચા દ્વારા વિદ્યાર્થી વાસ્તવિક દુનિયા અને ડિજિટલ વિશ્વમાં રહેતા લોકો વચ્ચે જોડાણ સાધી શકશે. 10 % શિક્ષકો કોઈ મત આપતા નથી.
21. મહત્તમ પ્રાથમિક શાળાના PTC શિક્ષકો એવું માને છે કે આ કાર્યક્રમ અંતર્ગત પુસ્તક મેળાનું આયોજન દ્વારા વિદ્યાર્થીઓ વિવિધ થીમ પર વિવિધ પ્રકારના પુસ્તકોનું અન્વેષણ કરી શકશે.
22. 75% પ્રાથમિક શાળાના PTC શિક્ષકો જ એવું માને છે કે 10 બેગ લેસ ડે અંતર્ગત આ કાર્યક્રમ માટે ફાળવામાં આવેલ 10 દિવસ/60 કલાકનો સમય યોગ્ય છે ?
23. 44% પ્રાથમિક શાળાના PTC શિક્ષકો એવું માને છે કે આ કાર્યક્રમ અંતર્ગત શિક્ષકો વિદ્યાર્થીઓની શિક્ષણ પ્રત્યેની રુચિ અને વલણનું અવલોકન કરી શકશે.
24. 52% પ્રાથમિક શાળાના PTC શિક્ષકો એવું માને છે કે ચેરિટી વિઝિટ દ્વારા આંતર વ્યક્તિત્વ કૌશલ્ય, માનવતા પ્રત્યે આદર સમુદાય પ્રત્યે જવાબદારી જેવા ગુણોનું વિકાસ થઈ શકે છે?

25. 68% પ્રાથમિક શાળાના PTC શિક્ષકો જ એવું માને છે કે આઉટ ડોર એક્ટિવિટી દ્વારા અવલોકન, પ્રશ્ન પુછવા, ભાષા યોગ્યતા, અવધિ, ટીમમાં સાથે કામ કરવું વગેરે જેવા કૌશલ્યનો વિકાસ થશે 15% પ્રાથમિક શાળાના શિક્ષકો આ વિધાન થી અસમત છે.
26. મહત્તમ પ્રાથમિક શાળાના PTC શિક્ષકો એવું માને છે કે પક્ષી અભ્યારણની મુલાકાત દ્વારા પક્ષીઓના સંરક્ષણ અને જાળવણી વિશેની સમજ વિદ્યાર્થીઓમાં કેળવી શકાશે ?
27. મહત્તમ પ્રાથમિક શાળાના PTC શિક્ષકો એવું માને છે કે 10 બેગ લેસ ડે અંતર્ગત આર્ટિકિસિયલ ઇન્ટેલીજન્સ/ ડેટા સાયન્સ/ રોબોટિક્સનાં વિવિધ એપ્લિકેશનનું જ્ઞાન આપવું વર્તમાન સમયમાં જરૂરી છે.
28. 79 % પ્રાથમિક શાળાના PTC શિક્ષકો એવું માને છે કે પતંગ બનાવવી અને ચગાવવી જેવી પ્રવૃત્તિઓ દ્વારા વિદ્યાર્થીઓ તેમની કલ્પનાને આકાર આપી શકશે.
5. પ્રાથમિક શાળાના B.Ed કરેલા શિક્ષકોના અભિપ્રાયો કેવા હશે ?
1. 10 બેગલસ દિવસ અભિયાન અંતર્ગત પ્રાથમિક શાળાના B.Ed શિક્ષકોના અભિપ્રાયો હકારાત્મક જોવા મળ્યા હતા.
 2. 100% પ્રાથમિક શાળાના પ્રાથમિક શાળાના શિક્ષકોના B.Ed શિક્ષકોના મતે 6 થી 8 ધોરણ માટે આ પ્રયોગ યોગ્ય છે. આથી કહી શકાય કે, આ કાર્યક્રમ અંતર્ગત પ્રાથમિક શાળાના B.Ed શિક્ષકો સંપૂર્ણ પણે સહમત ધરાવે છે.
 3. 50% જેટલા પ્રાથમિક શાળાના B.Ed શિક્ષકોના મતે આ કાર્યક્રમ માટે ઓનલાઈન મોડ પસંદ કરી શકાય છે.
 4. 'રાષ્ટ્રીય શિક્ષણ નીતિ ઓછામાં ઓછાં 50% શિખનારાઓને વ્યાવસાયિક શિક્ષણ સાથે જોડવાનો પ્રસ્તાવ મૂકે છે '50% જેટલા પ્રાથમિક શાળાના B.Ed શિક્ષકોના મતે આ વિધાન યોગ્ય છે .
 5. 100% પ્રાથમિક શાળાના B.Ed શિક્ષકોના મતે આ કાર્યક્રમ પુસ્તકિયા જ્ઞાન અને જ્ઞાનના ઉપયોગ વચ્ચેની સીમાઓને ઘટાડો કરે છે.
 6. મહત્તમ પ્રાથમિક શાળાના B.Ed શિક્ષકો એવું માને છે કે આ કાર્યક્રમ દ્વારા બાળકોમાં સર્જનાત્મકતા, ગુણવત્તા સભાનતા જેવા અનૌપચારિક કૌશલ્યોના વિકાસ થશે.

7. 75% જેટલા પ્રાથમિક શાળાના B.Ed શિક્ષકોના મતે 10 બેગલસ દિવસ અંતર્ગત વિદ્યાર્થીઓને સુથાર કામ અને ઇલેક્ટ્રિક કામ શીખવાડવામાં આવે છે. તે યોગ્ય છે.
8. 68% જેટલા પ્રાથમિક શાળાના B.Ed શિક્ષકોના મતે 10 બેગલસ દિવસ અંતર્ગત વિદ્યાર્થીઓને મેટલ કાર્ય શીખવાડવામાં આવે છે. તે યોગ્ય છે.
9. 100% પ્રાથમિક શાળાના B.Ed શિક્ષકોના મતે 10 બેગલસ દિવસ અંતર્ગત વિદ્યાર્થીઓને બાગ કામ અને માટી કામ શીખવાડવામાં આવે છે. તે યોગ્ય છે.
10. મહત્તમ પ્રાથમિક શાળાના B.Ed શિક્ષકો એવું માને છે કે આ કાર્યક્રમ અંતર્ગત કળા, ક્વિઝ, રમત ગમત અને વ્યવસાયિક હસ્તકલા નો સમાવેશ કરતી વિવિધ પ્રકારની સંવર્ધન પ્રવૃત્તિઓ કરાવવામાં આવે છે.
11. 100% પ્રાથમિક શાળાના B.Ed શિક્ષકો એવું માને છે કે આ કાર્યક્રમમાં રાજ્ય અને સ્થાનિક સમુદાયો દ્વારા નક્કી કરાયેલ અને સ્થાનિક કૌશલ્યની પ્રવૃત્તિઓનો સમાવેશ કરવામાં આવેલ છે.
12. આ કાર્યક્રમ અંતર્ગત ઐતિહાસિક, સાંસ્કૃતિક અને પ્રવાસન મહત્વના સ્થળોની મુલાકાત કરાવવામાં આવે છે. 58% પ્રાથમિક શાળાના B.Ed શિક્ષકો આ વિધાન સાથે સહમત છે અને 42% અસહમત છે.
13. આ કાર્યક્રમ અંતર્ગત સ્થાનિક કલાકારો અને કારીગરોની મુલાકાત દ્વારા બાળકોને શાળાની બહારની પ્રવૃત્તિઓ કરાવવામાં આવે છે 90% પ્રાથમિક શાળાના B.Ed શિક્ષકો આ વિધાન સાથે સહમત છે અને 10% અસહમત છે.
14. આ કાર્યક્રમ અંતર્ગત કરાવવામાં આવતી પ્રવૃત્તિઓએ ભાષાના વિષયો, વિજ્ઞાન વિષય, સામાજિક વિજ્ઞાન, ગણિત વિષય, સાથે સંલગ્ન છે ક્રમશઃ 100% 56% 56% પ્રાથમિક શાળાના B.Ed શિક્ષકો આ વિધાન સાથે સહમત છે અને 44% 40% અસહમત છે.
15. 58% પ્રાથમિક શાળાના B.Ed શિક્ષકો એવું માને છે કે આ કાર્યક્રમ દ્વારા બાળકોને કાર્યની દુનિયામાં વિવિધ ઉત્પાદક કાર્યો માટે મૂળભૂત કૌશલ્યોની આવશ્યકતાઓ શોધવાની તકો પ્રદાન કરવામાં ઉપયોગી થશે અને 30% અસહમત છે.

16. મહત્તમ પ્રાથમિક શાળાના B.Ed શિક્ષકો એવું માને છે કે આ કાર્યક્રમ બાળકોને પોતાની કારકિર્દીની પસંદગી કરવામાં મદદ કરશે.
17. આ કાર્યક્રમ અંતર્ગત મહત્તમ B.Ed શિક્ષકો માને છે કે, 10-દિવસની બેગલેસ દિવસની પ્રવૃત્તિઓના મહત્વ વિશે માતાપિતાને શિક્ષિત કરવા.,વિદ્યાર્થીઓને આ કાર્યક્રમના મહત્વ વિશે માર્ગદર્શન આપવું.
18. 60% પ્રાથમિક શાળાના B.Ed શિક્ષકો જ એવું માને છે કે આ કાર્યક્રમ અંતર્ગતની પ્રવૃત્તિ માટે ઓછામાં ઓછાં 10 દિવસ અથવા શાળાના 60 કલાકનો સમય ફાળવવો જોઈએ.
19. 82% પ્રાથમિક શાળાના B.Ed શિક્ષકો જ એવું માને છે કે આ કાર્યક્રમ અંતર્ગત પફોર્મિંગ અને વિઝ્યુઅલ આર્ટ માટે મલ્ટી આર્ટ સેન્ટરની મુલાકાત દ્વારા વિદ્યાર્થીઓ પફોર્મિંગ અને વિઝ્યુઅલ આર્ટ વચ્ચેનો તફાવત જાણી શકશે.
20. 80% પ્રાથમિક શાળાના B.Ed શિક્ષકો જ એવું માને છે કે આ કાર્યક્રમ અંતર્ગત સાઇબર સિક્યોરિટી પર નિષ્ણાતોની ચર્ચા દ્વારા વિદ્યાર્થી વાસ્તવિક દુનિયા અને ડિજિટલ વિશ્વમાં રહેતા લોકો વચ્ચે જોડાણ સાધી શકશે. 20 % શિક્ષકો કોઈ મત આપતા નથી.
21. મહત્તમ પ્રાથમિક શાળાના B.Ed શિક્ષકો એવું માને છે કે આ કાર્યક્રમ અંતર્ગત પુસ્તક મેળાનું આયોજન દ્વારા વિદ્યાર્થીઓ વિવિધ થીમ પર વિવિધ પ્રકારના પુસ્તકોનું અન્વેષણ કરી શકશે.
22. 60% પ્રાથમિક શાળાના B.Ed શિક્ષકો જ એવું માને છે કે 10 બેગ લેસ ડે અંતર્ગત આ કાર્યક્રમ માટે ફાળવામાં આવેલ 10 દિવસ/60 કલાકનો સમય યોગ્ય છે?
23. 75% પ્રાથમિક શાળાના B.Ed શિક્ષકો એવું માને છે કે આ કાર્યક્રમ અંતર્ગત શિક્ષકો વિદ્યાર્થીઓની શિક્ષણ પ્રત્યેની રુચિ અને વલણનું અવલોકન કરી શકશે.
24. 68% પ્રાથમિક શાળાના B.Ed શિક્ષકો એવું માને છે કે ચેરિટી વિઝિટ દ્વારા આંતર વ્યક્તિત્વ કૌશલ્ય, માનવતા પ્રત્યે આદર સમુદાય પ્રત્યે જવાબદારી જેવા ગુણોનું વિકાસ થઈ શકે છે?

25. 68% પ્રાથમિક શાળાના B.Ed શિક્ષકો જ એવું માને છે કે આઉટ ડોર એક્ટિવિટી દ્વારા અવલોકન, પ્રશ્ન પુછવા, ભાષા યોગ્યતા, અવધિ, ટીમમાં સાથે કામ કરવું વગેરે જેવા કૌશલ્યનો વિકાસ થશે 20% પ્રાથમિક શાળાના શિક્ષકો આ વિધાન થી અસમત છે.
26. મહત્તમ પ્રાથમિક શાળાના B.Ed શિક્ષકો એવું માને છે કે પક્ષી અભ્યાસની મુલાકાત દ્વારા પક્ષીઓના સંરક્ષણ અને જાળવણી વિશેની સમજ વિદ્યાર્થીઓમાં કેળવી શકાશે.
27. મહત્તમ પ્રાથમિક શાળાના B.Ed શિક્ષકો એવું માને છે કે 10 બેગ લેસ ડે અંતર્ગત આર્ટિફિસિયલ ઇન્ટેલીજન્સ/ ડેટા સાયન્સ/ રોબોટિક્સનાં વિવિધ એપ્લિકેશનનું જ્ઞાન આપવું વર્તમાન સમયમાં જરૂરી છે.
28. 76 % પ્રાથમિક શાળાના B.Ed શિક્ષકો એવું માને છે કે પતંગ બનાવવી અને ચગાવવી જેવી પ્રવૃત્તિઓ દ્વારા વિદ્યાર્થીઓ તેમની કલ્પનાને આકાર આપી શકશે.

સંશોધનના ફલિતાર્થો

1. 10 બેગલસ દિવસ અભિયાન અંતર્ગત પ્રાથમિક શાળાના શિક્ષકોના અભિપ્રાયો હકારાત્મક જોવા મળ્યા હતા.
2. પ્રાથમિક શાળાના પુરુષ શિક્ષકો અને મહિલા શિક્ષકોના અભિપ્રાયોમાં ન્યુનતમ તફાવત જોવા મળ્યો હતો.
3. બેગલસ દિવસ અભિયાન અંતર્ગત પ્રાથમિક શાળાના વિદ્યાર્થીઓને સુથાર કામ, ઇલેક્ટ્રિક કામ, મેટલ કાર્ય , બાગ કામ અને માટી કામ શીખવાડવામાં આવે છે. જે તેમના વોકેશનલ ટ્રેઇનીંગ માટે યોગ્ય છે.
4. મહત્તમ પ્રાથમિક શાળાના 10 વર્ષથી વધુ અનુભવ ધરાવતા શિક્ષકો એવું માને છે કે આ કાર્યક્રમ અંતર્ગત કળા, ક્રિએટિવિટી, રમત ગમત અને વ્યવસાયિક હસ્તકલા નો સમાવેશ કરતી વિવિધ પ્રકારની સંવર્ધન પ્રવૃત્તિઓ કરાવવામાં આવે છે.
5. બેગલસ દિવસ અભિયાન અંતર્ગત પ્રાથમિક શાળાના વિદ્યાર્થીઓ પ્રવૃત્તિઓના મહત્વ વિશે માતાપિતાને શિક્ષિત કરવા.,વિદ્યાર્થીઓને આ કાર્યક્રમના મહત્વ વિશે માર્ગદર્શન આપવું, માર્ગદર્શિકામાં આપેલ પ્રવૃત્તિઓના આધારે પ્રવૃત્તિઓ પસંદ કરવી અથવા વધારાની પ્રવૃત્તિ ડિઝાઇન કરવી અથવા પ્રવૃત્તિઓ કરવા માટે પાઠની યોજના તૈયાર કરવી, સામગ્રી અને સંસાધનોની વ્યવસ્થા કરવી, નિષ્ણાત સંસ્થાઓ અને સમુદાય

સાથે જોડાણો વિકસાવવા, પ્રવૃત્તિઓનું આયોજન કરવું અને તેમને વાસ્તવિક જીવનની પરિસ્થિતિઓ સાથે જોડવું, સંબંધિત વિષય ક્ષેત્ર સાથે આધારભૂત વિભાવના, મહત્વ, સુસંગતતા સમજાવવી, પ્રવૃત્તિઓના અમલીકરણ દરમિયાન વિદ્યાર્થીઓને માર્ગદર્શન આપવું. પ્રોત્સાહિત કરવું અને સલાહ આપવી, દરેક પ્રવૃત્તિમાં વિદ્યાર્થીઓને સામેલ કરવા. અવલોકન કરવું અને મૂલ્યાંકન કરવું, વિદ્યાર્થીઓ અને વહીવટીતંત્રને સમયાંતર પ્રતિસાદ આપવો, નાણાં, પરિવહન સહિત જરૂરી સંસાધનો અને અન્ય ઔપચારિકતાની વ્યવસ્થા કરવી જેવી પ્રવૃત્તિ કરવી યોગ્ય છે.

ભાવિ સંશોધન અંગે ભલામણ

પ્રસ્તુત સંશોધનના અંતે સંશોધકે ભાવિ માટેનો નિર્દેશ આ પ્રમાણે આપી શકાય.

1. પ્રસ્તુત સંશોધન ભુજ શહેરના પ્રાથમિક શિક્ષકો માટે કરવામાં આવ્યું હતું. આ સિવાય કચ્છ જીલ્લાના અન્ય તાલુકાના પ્રાથમિક શિક્ષકો માટે હાથ ધરી શકાય..
2. સરકારના અન્ય પ્રોગ્રામ માટે આવું સંશોધન હાથ ધરી શકાય.
3. પીએચ.ડી. કક્ષાએ આ પ્રકારનું સંશોધન હાથ ધરી શકાય.
4. N.E.P અંતર્ગત અન્ય બાબતો ઉપર આ પ્રકારનું સંશોધન કરી શકાય.

ઉપસંહાર

સંશોધનના નમૂનામાં સમાવિષ્ટ પાત્રોના પ્રતિયારોના આધારે મળેલી માહિતીને નીચે પ્રમાણે સ્ત્રી પુરુષો P.T.C., B.Ed, 5 વર્ષથી વધુ અનુભવ અને 10 વર્ષથી વધુ અનુભવ જેવા વિવિધ જૂથોમાં વહેંચણી કરી તેનું વિશ્લેષણ કરવામાં આવ્યું હતું.

ચલોને ધ્યાનમાં રાખીને મળેલી માહિતીના પ્રાપ્તાંકોની ટકાવારી મેળવી પ્રશ્નોની ચકાસણી કરી માહિતીનું વિશ્લેષણ કરવામાં આવ્યું હતું.

પ્રસ્તુત સંશોધનમાં સંશોધકે મેળવેલી આંકડાકીય માહિતીનું યોગ્ય અર્થઘટન કરેલ છે. જેમાં અભ્યાસના હેતુઓ અને પ્રશ્નો અનુસાર માહિતીનું વર્ગીકરણ કર્યું છે. આ માહિતીને વર્ગીકરણ બાદ વિશ્લેષણ કરવા માટે ચલોને ધ્યાનમાં રાખીને મળેલી માહિતીના પ્રાપ્તાંકોની ટકાવારી મેળવી પ્રશ્નોની ચકાસણી કરી માહિતીનું વિશ્લેષણ કરવામાં આવ્યું હતું.

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પ્રસ્તાવના :

યોગ એ એક તંદુરસ્ત જીવનશૈલી છે, જેનો ઉદ્ભવ ભારતમાં થયો છે. સમગ્ર વિશ્વએ હવે તેને વૈજ્ઞાનિક કસરતના સ્વસ્થ સ્વરૂપમાં સ્વીકાર્યું છે. સામાન્ય વ્યક્તિઓ માટે યોગમાં યમ, નિયમ, આસન, પ્રાણાયામ, પ્રત્યાહાર, ક્રિયા અને ધ્યાનનો સમાવેશ થાય છે, જે વ્યક્તિને શારીરિક રીતે ફિટ, માનસિક રીતે સજાગ અને ભાવનાત્મક રીતે સંતુલિત રાખવામાં મદદરૂપ થાય છે. અત્યારનાં સ્પર્ધાનાં યુગમાં વ્યક્તિ શારીરિક રીતે તો તંદુરસ્ત હોય પણ માનસિક રીતે તંદુરસ્ત હોય તે ખૂબ મહત્વનું બની ગયું છે. માટે વર્તમાન સંશોધન પેપરનો હેતુ બી.એડના તાલીમાર્થીઓ તેમની શારીરિક તંદુરસ્તી, માનસિક વિકાસ અને ભાવનાત્મક સ્થિરતા વિકસાવે તે માટે યોગનો ઉપયોગ કરે તે છે.

ચાવીરૂપ શબ્દો :

યોગ, શારીરિક સ્વાસ્થ્ય, માનસિક વિકાસ

સંશોધન શીર્ષક :

બી.એડ.ના તાલીમાર્થીઓના માનસિક વિકાસ અને શારીરિક સ્વાસ્થ્ય પર યોગની અસર :

એક અભ્યાસ

ચાવીરૂપ શબ્દોની સમજૂતી:

યોગ : “યોગ” શબ્દ સંસ્કૃત મૂળ યુજ પરથી આવ્યો છે જેનો અર્થ થાય છે ‘ જોડાવું’ અથવા ‘એક થવું’ પતંજલિ અનુસાર યોગનો અર્થ છે શરીર ,મન અને આત્માના મિલન દ્વારા વૃત્તિઓ પર નિયંત્રણ મેળવવું. યોગ શારીરિક સ્તરે શક્તિ, સહનશક્તિ અને ઉચ્ચ ઉર્જાના વિકાસમાં મદદ કરે છે. તે માનસિક સ્તરે વધેલી એકાગ્રતા, શાંતિ અને સંતોષ સાથે પોતાને સશક્ત બનાવે છે જે આંતરિક અને બાહ્ય સંવાદિતા તરફ દોરી જાય છે.

શારીરિક સ્વાસ્થ્ય :શરીરનું સંપૂર્ણ નીરોગી હોવું એટલે શારીરિક સ્વાસ્થ્ય.

પ્રસ્તુત સંશોધનમાં શારીરિક સ્વાસ્થ્યમાં વિદ્યાર્થીઓના હૃદયનાં ધબકારા,વજન અને લોહીના નીચા અને ઊંચા દબાણના મળેલ એકમોને શારીરિક સ્વાસ્થ્ય ગણવામાં આવ્યું છે.

માનસિક વિકાસ: બુદ્ધિ, અભિયોગ્યતા,સ્મૃતિ,તર્ક,વિચાર,ભાષા,ખ્યાલો વગેરેનો ક્રમિક વિકાસ થઈ અમુક ઉંમરે પરિપક્વતાએ પહોંચવાની અને વૃદ્ધાવસ્થામાં તેમાં ક્રમશઃ ઘટાડો થવાની ક્રિયા એટલે માનસિક વિકાસ.

પ્રસ્તુત સંશોધનમાં માનસિક વિકાસમાટે વિવિધ ઘટકોમાં સ્મૃતિ, તર્ક, ખ્યાલ, સમસ્યા ઉકેલ, બુદ્ધિ અને ભાષાવિકાસના પ્રશ્નો ધરાવતી માનસિક વિકાસ કસોટી દ્વારા વિદ્યાર્થીઓએ પ્રાપ્ત કરેલ પ્રાપ્તિઓને માનસિક તરીકે ગણવામાં આવેલ છે.

સંશોધનના હેતુઓ:

પ્રસ્તુત સંશોધન માટે નીચે પ્રમાણેના હેતુઓ નક્કી કરવામાં આવ્યા હતા.

- (૧) બી.એડ.તાલીમાર્થીઓની માનસિક વિકાસનો અભ્યાસ કરવો.
- (૨) બી.એડ.તાલીમાર્થીઓની શારીરિક સ્વાસ્થ્યનો અભ્યાસ કરવો.
- (૩) બી.એડ.તાલીમાર્થીઓની માનસિક વિકાસ અને શારીરિક સ્વાસ્થ્ય પર યોગની અસર તપાસવી.

ઉત્કલ્પનાઓ:

- (૧) બી.એડ.તાલીમાર્થીઓના માનસિક વિકાસ અને શારીરિક સ્વાસ્થ્ય પર યોગની અસર હશે.
- (૨) બી.એડ.તાલીમાર્થીઓ પોતાના સંવેગો પ્રત્યેની જાગરુકતા પર યોગની અસર હશે.

સંશોધનનો પ્રકાર

પ્રસ્તુત અભ્યાસ વ્યવહારીક પ્રકારનું છે.

સંશોધનની મર્યાદા

- પ્રસ્તુત સંશોધન જિલ્લા શિક્ષણ અને તાલીમ ભવનના બી.એડ. સેમ -૧ અને સેમ-૩ નાં તાલીમાર્થીઓ પર કરવામાં આવ્યું હતું.
- આ સંશોધનમાં સ્ત્રી અને પુરુષ બંને તાલીમાર્થીઓ પર કરવામાં આવ્યું હતું.
- આ સંશોધનમાં નમૂના તરીકે ૧૦૦ તાલીમાર્થીઓનો સમાવેશ કરવામાં આવ્યો હતો.

સંશોધનનું ક્ષેત્ર

પ્રવર્તમાન સમયમાં અનેકવિધ ક્ષેત્રોમાં સંશોધનો થઈ રહ્યા છે. શિક્ષણમાં શૈક્ષણિક સંશોધનોનું ફલક પણ ધીમે ધીમે વિશાળ થતું જોવા મળે છે. જે અંતર્ગત પ્રસ્તુત સંશોધનને સ્પર્શતા ક્ષેત્રો નીચે પ્રમાણે હતા.

- યોગ શિક્ષણ
- ઉચ્ચ શિક્ષણ

સંશોધનનો વ્યાપ

પ્રસ્તુત સંશોધનના વ્યાપવિશ્વમાં ગુજરાત રાજ્યની બી.એડ.કોલેજમાં તાલીમ લઈ રહેલ તાલીમાર્થીઓનો સમાવેશ કરવામાં આવ્યો હતો.

સંશોધનનો નમૂનો

પ્રસ્તુત અભ્યાસ માટે નમૂનાની પસંદગી સહેતુક નમૂના પસંદગીની રીતે કરવામાં આવી હતી. નમૂના માટે જિલ્લા શિક્ષણ અને તાલીમ ભવન, પાટણના બી.એડ. સેમ-૧ અને સેમ-૩નાં કુલ ૧૦૦ વિદ્યાર્થીઓનો નમૂનામાં સમાવેશ કરવામાં આવ્યો હતો.

સંશોધનની પદ્ધતિ

પ્રસ્તુત સંશોધનમાં પ્રાયોગિક પદ્ધતિનો ઉપયોગ કરવામાં આવ્યો હતો.

ઉપકરણ :

માનસિક વિકાસ માટેની કસોટી તૈયાર કરવામાં આવી હતી, જેમાં ચિંતન, તર્ક, બુદ્ધિ, કલ્પના, સ્મૃતિ આધારિત વિધાનો/પ્રશ્નો રાખવામાં આવેલ હતાં. જ્યારે શારીરિક સ્વાસ્થ્ય માટે હૃદયનાં ધબકારા, એકાગ્રતા, બ્લડપ્રેશર, શ્વસનક્રિયા વગેરેની નોંધ દાક્તરી મદદથી લેવામાં આવી હતી.

માહિતીનું એકત્રીકરણ :

- સૌપ્રથમ પ્રિલિમ પરીક્ષાના ગુણના આધારે બે સમકક્ષ જૂથ પાડવામાં આવ્યા. (૧) પ્રાયોગિક (૨) નિયંત્રિત.
- જૂથ પાડ્યા બાદ બંને જૂથની માનસિક વિકાસ પૂર્વકસોટી તેમજ તેમના શારીરિક સ્વાસ્થ્યના કેટલાક ઘટકો આધારિત તપાસ કરવામાં આવી.
- ત્યારબાદ પ્રાયોગિક જૂથને ૧૫ દિવસની યોગ તાલીમ આપવામાં આવી જેમાં વિવિધ આસનો, સૂર્ય નમસ્કાર અને પ્રાણાયામનો સમાવેશ કરેલ હતો.
- ત્યારબાદ પોસ્ટટેસ્ટ લેવામાં આવ્યો. જેમાં માનસિક વિકાસ કસોટી તેમજ શારીરિક સ્વાસ્થ્યના કેટલાક ઘટકોની તપાસ કરવામાં આવી.

માહિતીનું પૃથક્કરણ :

ઉપરોક્ત માહિતીના એકત્રીકરણ બાદ પૂર્વ કસોટીના (પ્રાયોગિક જૂથ અને નિયંત્રિત જૂથ)નાં કાયા પ્રાપ્તાંકો તેમજ અંતિમ કસોટી (પ્રાયોગિક જૂથ અને નિયંત્રિત જૂથ)નાં પ્રાપ્તાંકોને બી.એડ.તાલીમાર્થી ભાઈઓ અને બહેનો, ગ્રામ્ય અને શહેરી ની તુલના કરવામાં આવી અને અંકશાસ્ત્રીય પદ્ધતિમાં પ્રતિશતનો ઉપયોગ કરવામાં આવ્યો. અને તેનાં આધારે તારણો કાઢવામાં આવ્યા.

સંશોધનના તારણો :

- (૧) યોગ તાલીમથી પ્રાયોગિક જૂથનાં ૯૫ ટકા તાલીમાર્થીઓના માનસિક વિકાસમાં નોંધપાત્ર વધારો જોવા મળ્યો.
- (૨) યોગ તાલીમથી પ્રાયોગિક જૂથનાં ૮૮ ટકા તાલીમાર્થીઓના શારીરિક સ્વાસ્થ્યમાં નોંધપાત્ર વધારો જોવા મળ્યો.
- (૩) યોગ તાલીમથી પ્રાયોગિક જૂથના ૭૫ ટકા તાલીમાર્થીઓની સ્મૃતિ, ધ્યાન, ચિંતન, કલ્પનાશક્તિ નિયંત્રિત જૂથનાં તાલીમાર્થીઓ કરતાં વધારે જોવા મળી.
- (૪) યોગ તાલીમથી પ્રાયોગિક જૂથના તાલીમાર્થી ભાઈઓ અને બહેનોમાં એક સમાન અસર જોવા મળી.
- (૪) યોગ તાલીમથી પ્રાયોગિક જૂથના ૭૨ ટકા તાલીમાર્થીઓના બ્લડપ્રેશર, હૃદયના ધબકારા, તણાવનિયંત્રણ નિયંત્રિત જૂથનાં તાલીમાર્થીઓ કરતાં સામાન્ય જોવા

મળ્યું.

- (૫) બી.એડ.તાલીમાર્થીઓમાંથી પ્રાયોગિક જૂથના ૯૫ ટકા તાલીમાર્થીઓને યોગ કરવાથી તણાવ નિયંત્રિત કરવામાં સહાય મળી છે.
- (૨) બી.એડ.તાલીમાર્થીઓમાંથી ૯૨ ટકા તાલીમાર્થીઓને યોગ કરવાથી સારી ઉંઘ આવે છે.
- (૩) બી.એડ.તાલીમાર્થીઓમાંથી ૮૫ ટકા તાલીમાર્થીઓને યોગ કરવાથી તેમની શારીરિક તંદુરસ્તીમાં સુધારો જોવા મળ્યો છે.
- (૪) બી.એડ.તાલીમાર્થીઓમાંથી ૭૨ ટકા તાલીમાર્થીઓને યોગ કરવાથી ચપળતા, એકાગ્રતામાં સુધારો જોવા મળ્યો છે.તેઓ મગજને શાંત રાખવામાં સફળ રહી શકે છે.
- (૫) બી.એડ.તાલીમાર્થીઓમાંથી ૬૭ ટકા તાલીમાર્થીઓને યોગ કરવાથી તેમના સંબંધોમાં સુધાર જોવા મળ્યો છે. બિનજરૂરી અહં દુર કરી બીજાઓ સાથે હળવા મળવામાં અને આંતરક્રિયામાં સુધારો જોવા મળ્યો છે.

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બાબા રામદેવ (૨૦૦૨) પતંજલિ યોગ

DT.T.N. (2018) YOGA FOR SECONDARY SCHOOLS

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