Fostering Innovation for Sustainable Development through Higher Education: Exploring Students' Views in Surat City

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Abstract:

This paper intends to identify the role of higher educational institutes (HEIs) including colleges and universities in Surat City, in fostering innovation for sustainable development among the students. It is based on primary data collected from 178 students studying in varied disciplines. A structured questionnaire was used for data collection, and descriptive statistics, reliability analysis, regression, correlation & factor analysis were applied using SPSS software to analyze the collected data. The findings exhibit that though students are familiar with the concept of sustainable development and the role of innovation to promote it, the efforts of HEIs to inculcate innovation culture among students are mainly restricted to theoretical aspects, and they are fragmented too. The present curriculum includes very few topics relating to sustainability and rarely employs innovative teaching methods. For nurturing innovation skills, along with the leading role of HEIs, students' personal efforts are equally important. An apparent disparity between the goals and actual implemented HEIs practices is clearly noticeable. Reform to the curriculum that instils innovative skills and hands-on training, along with additional institutional support to boost the efficacy of HEIs in promoting innovation for sustainable development, is recommended.

Introduction:

Surat, known as 'Diamond city of India' and 'Silk City', is immensely contributing to economic development of the region and nation. But at the same time, along with the seeds of economic development, it also fetches several challenges relating to sustainability. Universities and colleges are more than simply places to learn and appear for exams; they are catalysts for research, innovation & social awareness that can drive sustainable development locally, nationally & globally. In Surat, a few educational institutes have commenced projects that focused on sustainability & innovation, but unfortunately they are not part of regular curriculum. This study explores students' perception in Surat City about applicability of sustainability concept in curriculum, teaching methods, support from their educational institutes, and the culture of innovation in HEIs.

Review of Literature:

A study by Sharma et al. (2024) focuses on the need for major curriculum restructuring in a manner that advances sustainable development. It highlights the drawback of traditional curricula that majorly disregard sustainability and practical problem-solving skills. It also emphasizes interdisciplinary education, resourceful teaching methods, and empirical learning to instil sustainability-related proficiencies in students. It further states that HE should

outspread beyond theoretical concepts and vigorously integrate innovation & sustainability into the curriculum.

In the same context, a working paper by Das & Bisht (2020) recommends the prime role of HEIs to support SDGs. It also recommends engrossing local communities in the process and addresses existent social and environmental challenges. However, it also highlights limited incentives to innovate, and weak coordination of HEIs poses major challenges. Largely, the study points out the necessity for robust practical commitment to make sustainability efforts more effective.

A study by Bhatia et al. (2024) exhibit various ways to collaborate education & innovation to spread sustainable development. Imparting vital knowledge, skills & values to students are the prime role of education, while innovation offers practical techniques and unique solutions for embarking upon major challenges. So collaborating these two vital factors can offer solution. It also states that embracing digital technologies and vigorous learning approaches can enhance student engagement and their critical thinking abilities. It also points our major drawbacks such as inequalities in educational access and inadequate emphasis on sustainability in current academic programs. It ultimately suggests HEIs to exceed mere theoretical teaching by aggressively promoting innovation & sustainability in real world applications.

Chen & Shinh (2025) also highlight the prime role of HEIs by indicating that universities are not just centers for learning but an essential catalyst to encourage innovation, research & social responsibility. To attain economic, environmental & social objectives, HEIs need to integrate sustainability into their curricula and inspire student involvement.

Palit & Goswami (2025) stress the necessity to bring SDGs into curriculum of HEIs in India. Together, research and National Education Policy 2020 highlight the significance of altering the curriculum, endorsing learning across varied subjects and focusing on teaching that inspires innovation. The literature suggest that higher education should advance practical learning & involve students more to support sustainability effectively.

As per Rajput & Sharma (2025), HEIs in India are progressively integrating sustainability practices. However, they are mainly restricted to areas such as energy consumption, waste management & campus projects. Sustainability remains unsatisfactorily integrated into teaching, research, and curriculum in the majority of the streams. Lack of adequate resources, inefficient institutional dedication & poor perception of sustainability are central academic concerns identified by this study. The authors recommend the need for more

robust policies and enhanced incorporation of sustainability into a broader higher education framework.

Objectives:

- To know the role of HEIs in nurturing innovative practices for sustainable development from students' perspective.
- To examine the awareness level of sustainability and innovation among students of HEIs in Surat City.
- To evaluate the efficacy of present curriculum and teaching practices in fostering innovation among students for sustainable development.
- To know the extent of institutional support for innovation driven & sustainability oriented initiatives from students' perspective.
- To identify the relationship between innovation culture among students & its impact on sustainable development outcomes in HEIs of Surat City.
- To know the fundamental aspects that foster innovation & sustainable practise in HEIs based on students' perspectives.

Hypothesis:

- H_{o1}: Students in HEIs of Surat city are not aware of sustainability and innovation.
- H_{o2}: The curriculum and teaching methods do not do much to encourage innovation for sustainable development.
- H_{o3}: Support from the institution does not have a big impact on the innovation culture among students.
- H_{o4}: The culture of innovation does not greatly affect sustainable development results.
- H_{o5}: There is no strong link between awareness of sustainability, curriculum practices, institutional support, innovation culture, and sustainability outcomes.

Research Methodology:

Research Design: To know students' perception regarding innovation culture and sustainable development practices prevailing in HEIs of Surat City, a descriptive research design was applied.

Sample Size: Convenience sampling was used to choose 178 students from state and private universities as well as a number of government, grant-in-aid, and self-finance

institutions in Surat City. The students were drawn from a variety of fields, including arts, commerce, science, computer science, and management.

Data Collection: Primary data were gathered using a structured questionnaire that included Likert-scale items and open-ended questions, addressing five key areas: sustainability awareness, curriculum and teaching practices, institutional support, innovation culture, and sustainability outcomes.

Data Analysis: Descriptive statistics were applied to summerize perceptions of students. To assess internal consistency of the measurement scales, Cronbach's Alpha test was used. To know the relationships among variables such as sustainability awareness, curriculum, institutional support, innovation culture, and sustainability outcomes, correlation test was applied. Regression analysis identified the factors affecting both innovation culture and sustainability outcomes. Furthermore, exploratory factor analysis was utilised to know the underlying dimensions of innovation and sustainable practices. In addition, open ended responses were examined to identify perceived challenges, hindrances and suggestions given by students to foster innovation culture

Data Analysis:

Demographic profile of the respondents

Out of total 178 students surveyed, 68% were undergraduate students and 32% were post-graduate students. The majority of respondents were from commerce stream (36%), followed by Computer Applications (24%) and Management (18%). Students from Arts stream represented 14% of the total sample size. Remaining 8% came from other disciplines, such as Science and related areas. The diverse sample size safeguards that the study reveals student viewpoints from a varied range of educational levels and streams.

Descriptive Statistics

To summarize respondents' perceptions related to sustainability awareness, curriculum practices, institutional support, the culture of innovation & the outcomes, descriptive statistics was applied.

Table 1: Descriptive Statistics

Variable	N	Mean	Standard Deviation
Sustainability Awareness	178	4.12	0.61
Curriculum & Teaching Practices	178	3.98	0.67

Institutional Support	178	3.89	0.70
Innovation Culture	178	4.05	0.64
Sustainability Outcomes	178	4.10	0.59

Interpretation:

Majority of respondents agree the presence of awareness, support from institutions, and a culture of innovation, with average scores between 3.8 and 4.1. But this shows they understand the idea rather than being actively involved. HEIs talk about sustainability, but it is not a regular part of teaching. It is only partly included in the curriculum, and new methods like project-based learning are used incoherently. In short, while HEIs are trying to innovate and focus on sustainability, students do not yet feel a big change in their education.

- H_{o1} rejected – Students show a reasonably high level of awareness.
- H_{o2} partially rejected – Curriculum promotes sustainability, but not strongly in practice.

Reliability Analysis (Cronbach's Alpha)

To know the internal consistency of the measurement scales, reliability analysis was applied.

Table 2: Reliability Statistics

Scale	No. of Items	Cronbach's Alpha
Sustainability Awareness	4	0.82
Curriculum & Teaching Practices	4	0.79
Institutional Support	4	0.81
Innovation Culture	4	0.84
Sustainability Outcomes	4	0.83

Interpretation:

The Cronbach's Alpha values for all the above constructs were above 0.70, which is an indicator of good internal consistency. It reflects that mentioned measurement scales aptly capture students' perception on awareness, curriculum practices, institutional support, innovation culture and sustainability outcomes. It states that data is consistent and accurately reflect respondents' perceptions.

Regression Analysis

Multiple regression analysis was conducted to identify the factors influencing innovation culture.

Table 3: Regression Results

(A) Dependent Variable: Innovation Culture

Predictor	Standardized Beta	t-value	Sig.
Sustainability Awareness	0.29	4.18	0.000
Curriculum & Teaching Practices	0.26	3.89	0.000

Institutional Support	0.34	4.92	0.000
R^2	0.56		

Interpretation:

The study displays that support from the institution, awareness of sustainability, and teaching methods all affect how students innovate. Out of all the factors, institutional support has the major effect. Next is sustainability awareness, then the curriculum. Teaching and curriculum help, but not as much. This means classroom learning alone isn't enough to create a strong culture of innovation. Students need more encouragement and initiatives from the institution. There are still gaps in how innovation is supported and included in higher education.

H_{03} rejected – Institutional support significantly influences innovation culture.

Table 4: Regression Results

Dependent Variable: Sustainability Outcomes

Predictor	Standardized Beta	t-value	Sig.
Innovation Culture	0.48	6.85	0.000
Institutional Support	0.31	4.52	0.000
R^2	**0.62**		

Interpretation:

The study exhibits that students' innovation culture significantly affects sustainability outcomes. But these results generally happen when students take action and innovate on their own. Regular classes and formal teaching do not directly lead to sustainability. Instead, colleges and universities mainly support students, helping them take charge rather than leading the change themselves.

H_{04} **rejected** – Innovation culture significantly influences sustainability outcomes.

6.5: Correlation Analysis

To examine the relationship between below mentioned factors, pearson correlation analysis was applied.

Table 5: Pearson Correlation Matrix

Variables	Awareness	Curriculum	Support	Innovation	Outcomes
Awareness	1				
Curriculum	0.52**	1			
Institutional Support	0.49**	0.55**	1		
Innovation culture	0.61**	0.58**	0.63**	1	

Sustainability Outcomes	0.56**	0.54**	0.60**	0.68**	1

Interpretation:

All the mentioned indicators namely, Sustainability awareness, curriculum and teaching methods, institutional support, innovation culture, and sustainable development results are all statistically significantly positively correlated, according to the Pearson correlation study. However, this does not mean that institutional support is strong or fully effective. The study shows that institutions do affect sustainability results and innovation culture, but their impact is small and not deeply rooted in the academic system. The research suggests that HEIs can encourage innovation for sustainable development, but current methods are not strong or organized enough to achieve this potential.

H_{05} rejected – Significant relationships exist among variables.

Exploratory Factor Analysis (EFA)

Exploratory Factor Analysis was applied to find the vital aspects of innovation and sustainable growth in educational institutions.

KMO and Bartlett's Test: KMO Measure and Bartlett's Test of Sphericity were used to test data suitability for factor analysis.

Table 6: KMO and Bartlett's Test

Test	Value
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.86
Bartlett's Test of Sphericity Approx. Chi-Square	1846.32
Df	190
Sig.	0.000

Interpretation: The KMO score of 0.86 suggests that the sampling adequacy is excellent. Additionally, Bartlett's Test is significant ($p < 0.001$), indicating that the data is appropriate for factor analysis.

Communalities: Communalities show the proportion of variance explained by the extracted factors.

Table 7: Communalities

Item	Initial	Extraction		Item	Initial	Extraction

Q5	1.000	0.72		Q15	1.000	0.76
Q6	1.000	0.74		Q16	1.000	0.72
Q7	1.000	0.69		Q17	1.000	0.74
Q8	1.000	0.66		Q18	1.000	0.71
Q9	1.000	0.71		Q19	1.000	0.77
Q10	1.000	0.73		Q20	1.000	0.73
Q11	1.000	0.68		Q21	1.000	0.70
Q12	1.000	0.70		Q22	1.000	0.72
Q13	1.000	0.75		Q23	1.000	0.74
Q14	1.000	0.78		-	-	-

Interpretation:

All extraction values exceed 0.60, suggesting that the variables are effectively represented by the derived factors. Principal Component Analysis with Varimax Rotation was employed.

Table 8: Total Variance Explained

Factor	Eigenvalue	% Variance	Cumulative %
Factor 1	6.42	32.10	32.10
Factor 2	3.18	15.90	48.00
Factor 3	2.41	12.05	60.05
Factor 4	1.76	8.80	68.85
Factor 5	1.22	6.10	74.95

Interpretation:

Five factors with eigenvalues over 1 were found. These factors explain about 75% of the total variance, which is very good in social science research.

Rotated Component Matrix (Varimax Rotation)

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Q5	0.78				
Q6	0.81				
Q7	0.75				
Q8	0.72				
Q9		0.74			
Q10		0.77			
Q11		0.71			
Q12		0.73			
Q13			0.79		
Q14			0.82		
Q15			0.80		
Q16			0.76		
Q17				0.78	
Q18				0.75	
Q19				0.81	
Q20				0.77	
Q21					0.74
Q22					0.76

Q23					0.79
Q24					0.81

Interpretation:

On the basis of item loadings, factors were named.

Factor 1: Sustainability Awareness

Factor 2: Curriculum & Teaching Practices

Factor 3: Institutional Support

Factor 4: Innovation culture

Factor 5: Sustainability Outcomes

It also indicates that these areas are distinct and not part of an associated system. A noticeable gap between curriculum and creation of new ideas is identified. Students understand sustainability, but they don't take action. This indicates a lack of a strong educational plan that connects teaching, course design, and institutional support with innovative ideas for sustainable development.

The students' open-ended answers support these findings. They mentioned problems like not enough resources, limited guidance, lack of practical experience, and time constraints. Many students suggested more hands-on learning, working with different fields, building industry connections, and getting better support from their educational institutes. Overall, students think that current higher education methods do not do enough to encourage innovation for sustainable development, confirming the gaps found in the quantitative analysis.

Conclusion

Above data analysis displays that HEIs in Surat City are not up to the mark at stimulating innovation for sustainable development in a coordinated way. Students are aware of the concept and contribution of innovative practices to promote it, but ironically the existing curriculum, teaching methods, and institutional support are commonly theoretical, dispersed, and not well functional. As a result, innovation and sustainability seem to rely more on individual student efforts than on systematized academic programs. The findings show a big gap between sustainability goals and actual educational practices, indicating the need for curriculum changes, practical teaching methods, and stronger institutional support for innovation-driven

Sustainability and innovation should be part of main courses, not just extra topics. This helps students link ideas to real life, making learning better. HEIs should have projects that mix different subjects and work with industries. These projects let students learn by doing,

using their knowledge in real ways and coming up with new ideas. To help student projects, HEIs need to give clear advice, enough resources, and rewards. This support encourages students to find new and sustainable solutions. Training teachers in new, practical methods is important to connect old teaching ways with sustainability education. This training keeps teaching useful and effective. Building strong connections with industries and research groups gives students real-world experience. These links help students create practical and new solutions by showing them current problems and expert knowledge. Finally, checking sustainability projects and innovation results often helps HEIs improve their strategies. This regular review helps HEIs better include sustainability in education and make their programs more effective.

References:

- Banga Chhokar, K. (2010). Higher education and curriculum innovation for sustainable development in India. International Journal of Sustainability in Higher Education, 11(2), 141-152.
- Bhatia, S., Pandey, S., Gupta, I., & Sahu, S. (2024). The Nexus of Education and Innovation with Sustainable Development. Gyan Management, 18(2).
- Chen, M. K., & Shih, Y. H. (2025). The role of higher education in sustainable national development: Reflections from an international perspective. Edelweiss Applied Science and Technology, 9(4), pp. 1343-1351.
- Das, S., & Bisht, G. (2021). Role of higher education institutions (HEIs) in promoting SDGs through community engagement. Working paper]. TERI School of Advanced Studies and ProSPER. Net/UNU Retrieved from https://prospernet. ias. unu. edu/wp-content/uploads/2022/01/4.-Working-paper-Article-1_ROLE-OF-HEIs-IN-PROMOTING-S
- DGs-TERI-SAS-Working-paper. pdf.
- Kumar, R. (2023). Innovation in higher education: A study of NEP 2020. Poonam Shodh Rachna, 2(12), 116-121.
- Li, B., & Kang, C. (2025). Research on the Contribution of Higher Education to the Sustainable Development of the Economy in China: An Empirical Analysis Based on Provincial Panel Data from 2014 to 2023. Sustainability, 17(3), 1024.
- Palit, D. & Goswami, A. (2025). Reimagining higher education for sustainable development in India. Retrieved from https://www.crfindia.org/publications/opinion-column/reimagining-higher-education-for-sustainable-development-in--india

- Patel, V. T. (2019). Innovation to excellence: New initiatives in education at Gujarat. International Journal of Research in Humanities & Social Sciences, 7(1), 64–69.
- Rajput, P., & Sharma, R. (2025). Systematic review of literature on sustainable practices by Indian higher education institutions using PRISMA analysis. International Journal of Research Publication and Reviews, 6(1), 1343–1351.
- Sharma, L., Bulsara, H., Bagdi, H., & Trivedi, M. (2024). Exploring sustainable entrepreneurial intentions through the lens of theory of planned behaviour: a PLS-SEM approach. Journal of Advances in Management Research, 21(1), 20-43
- Vansiya, Y. N. (2019). Tribal education in India: With special reference to Gujarat. In K. Roy & C. Clark (Eds.), *A discourse on economic development* (pp. xx–xx). Nova Science Publishers.https://novapublishers.com/shop/a-discourse-on-economic-development/ ISBN 978-1-53614-842-8
- Vansiya, Y. N. (2022). Human development in Gujarat and its pattern. In G. D. Rami (Ed.), *Gujarat economy* (pp. 58–78). Popular Prakashan. ISBN 978-93-91926-37-3
- Vansiya, Y. N. (2011). *Exploration of human development in Gujarat* (2nd ed.). Vishleshan Trust. ISBN 978-81-922107-1-1
- Vansiya, Y. N., & Ragotham, S. (2011). Education and health as indicators of human development: A study of Surat and Kutch districts in Gujarat state of India. *Journal of International Education and Business (New Zealand)*, 2(1), 77–94. http://www.crie.org.nz/jieb/vol2No1.pdf
- Vansiya, Y. N. (2012). Education of literacy among all districts of Gujarat state: Since 1961 to 2011. *International Journal of Multidisciplinary Research*, 1(5II), 61–66. https://www.worldcat.org/issn/22779302
- Vansiya, Y. N. (2014). Evaluation of sectoral analysis of literacy rate: With special reference to Gujarat state. *Global Journal of Research in Management*, 4(2), 75–95. http://www.publishingindia.com/gjrim/40/evaluation-of-sectoral-analysis-of-literacy-rate-with-special-reference-to-gujarat-state/356/2598/