Utilization of Training and Development Programs at L&T Precision Engineering and Systems, Hazira

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Abstract:

The most significant turning point in the country's regulatory structure in India is the enactment Training and Development (T&D) programs play a vital role in enhancing employee capabilities, improving work efficiency, and enabling organizations to remain competitive in a global business environment. This study aims to examine the extent of utilization of T&D programs and their impact on employees' awareness, knowledge, skills, and overall performance. A descriptive research design was adopted using a quantitative approach to evaluate employee participation in training programs and their perceived effectiveness. Primary data were collected through structured questionnaires administered to employees across various departments, while secondary data were gathered from company policies, business records, and relevant literature. The study analysed departmental distribution of training participation, objectives of training nomination, total training hours, awareness levels before and after training, and observable changes in workplace behaviour. Data were interpreted using percentages, charts, and graphical representations. The findings reveal that T&D programs at PES IC are well-structured and aligned with organizational objectives, contributing positively to employee knowledge and skill enhancement. However, variations in training utilization across departments indicate the need for more balanced and inclusive training implementation strategies.

Introduction:

Larsen & Toubro (L&T) is a name of global repute among the conglomerates in technology, engineering, construction, manufacturing, and heavy industries sectors. The value of the company, which is widely spread across the globe, is around 18 billion US dollars. It has been synonymous with the provision of complex, high, precision engineering solutions, which are undoubtedly a major factor for national and international advancements. Training and Development (T&D) activities are the main vehicle for PES IC to constantly upgrade the capabilities of its employees. These activities help workers keep their technical knowledge up to date, get familiar with new technologies, and meet the requirements of the changing international standards. By leveraging T&D programs effectively, learning doesn't merely remain theoretical but gets reflected in better work performance, accurate task execution, and sustaining the competitiveness of the organization.

The operations at PES IC are of such a demanding nature that they require absolute precision, consistency, and reliability in every engineering process. Continuous learning

becomes a must if we want to keep up with rapid technological advances, increased digitalization, and very strict global compliance requirements.

The main purpose of the Training and Development programs at PES IC is to provide the employees with both the technical and behavioural skills necessary for the accurate and confident accomplishment of complex tasks. Such programs grant the employees an opportunity to acquaint themselves with the latest tools, digital platforms, analytical techniques, as well as to acquire a greater understanding of other functional areas, which altogether helps them to efficiently tackle the problems of operations.

Moreover, training is a great aid in helping the staff move from being purely the technical experts to taking on more strategic and decision, making roles. By increasing one's level of awareness, problem and solving capability, communication, and leadership skills, T&D programs become a major contributory factor to both the employee's development and the organization's capacity for continued survival.

In short, the effective use of Training and Development programs at PES IC should not be considered just an HR function but rather as a strategic investment that enhances operational excellence, facilitates innovation, and thereby guarantees the organization's long, term success in high, risk, high, precision industries.

Organizational Context: L&T PES IC

Larsen & Toubro began as a small dairy equipment manufacturing company and grew into India's leading engineering company with a strong contribution towards India's Industrial Development after Independence. L&T has continued to be one of the top engineering companies globally and hi technology, with Forbes ranking L&T as the 58th Most Innovative Company globally and a leader in green engineering technologies.

The Precision Engineering & Systems IC as part of L&T's Eco-ventures, is a significant contributor to India’s Defence Indigenisation since the mid-1980s. Prior to the opening of the private sector for Defence production, L&T had collaborated with Defence Research and Development Organisation (DRDO) on very complex weapon systems and platforms for naval applications. Given the strong future partnerships between L&T and DRDO; it is evident L&T has continued to grow from being a manufacturer of components to being a supplier of fully integrated platforms and autonomous systems.

PES IC is supported by three main pillars (Digitalisation / Globalisation / Customisation) through the use of new-age digital technologies providing precision and

accuracy through engineering processes, while maintaining a global perspective to implement worldwide best practices specific to the needs of the Indian Armed Forces.

Key milestones of this division include:

- The Hazira Manufacturing Complex (HZMC): A 750-acre facility that is among the best vertically integrated manufacturing sites in the world.
- Armored Systems Complex: Established at Hazira to produce the K9 Vajra-T Howitzers, delivering 100 artillery systems ahead of schedule.
- Strategic Naval Contributions: Involvement in the development of Arihant-class nuclear-powered submarines and offshore patrol vessels for the Indian Coast Guard.
- Aerospace Excellence: Providing high-precision structures and control systems for ISRO's launch vehicles and satellites.

Several different internal departments — Factory HR, Finance, Supply Chain Management, and Fabrication — are all closely linked through an interdependent web of connections. Furthermore, this interdependence requires that each department utilize cross-functional training to maintain alignment across departments. For instance, to meet very demanding delivery timelines, the Fabrication Shop has to collaborate with both Welding Engineering and Quality Management.

Literature Review:

(Ganesh, January 2015); investigated the effectiveness of training and development programs at a private university in India through structured interviews with 30 academic leaders. Their findings showed that training is viewed as a strategic investment, with both technical and behavioural training enhancing employee confidence, adaptability, and workplace culture. The study emphasized the importance of continuous, role-specific training aligned with institutional goals. It concluded that well-designed training programs significantly contribute to staff performance and recommended broader studies to validate the findings.

(V. Lakshmi, 2022); conducted a quantitative study involving 307 healthcare employees to examine how training and development influences psychological empowerment and job performance. Using correlation, regression, and Hayes mediation analysis, they found that training significantly enhances psychological empowerment, which in turn boosts employee performance and work attitude.

(Ghalawat, 2020); conducted an empirical study on 100 employees at DCM Textiles, Hisar, to assess the effectiveness of training and development programs. The study used structured

questionnaires followed by factor and discriminant analysis to evaluate dimensions like performance, productivity, and training environment. Results indicated that training had a significant positive impact on employee performance and productivity, especially when linked with favorable work environments and effective appraisal systems. The internal consistency reliability (Cronbach's alpha) ranged from 0.476 to 0.757 across variables, showing acceptable validity for a mid-sized organizational study.

(Lakra, 2024); investigated the effectiveness of training programs at TRL-Krosaki Refractories Ltd., Belpahar, Odisha, by surveying 200 employees using Likert scale–based questionnaires. The study found that training content, periodic evaluations, departmental coverage, and administrative support played key roles in enhancing employee learning and output. Employees reported that regular and relevant training sessions contributed to better problem-solving, communication, and job satisfaction. The researchers concluded that tailored training, aligned with organizational needs, significantly boosts employee morale and productivity.

(Gupta, 2022); focused on the IT sector and studied 110 professionals to determine the impact of training and development on innovation, adaptability, and performance. The study used descriptive statistics and SPSS-based regression analysis. Findings showed a strong positive correlation between quality of training and enhanced employee performance, creativity, and social productivity. The study emphasized that continuous training in fast-evolving industries like IT is not only essential for individual growth but also for retaining a competitive organizational edge.

(Wadhwa, 2023); explored the effectiveness of training on employee performance in the Indian banking sector. A sample of 550 public and private bank employees was analyzed using regression techniques. The study concluded that training accounted for 67.6% of the variation in job performance (Adjusted $R^2 = 0.676$), suggesting that a well-executed training strategy has a direct and measurable effect on work efficiency. It recommended that banks institutionalize structured, role-specific training programs to optimize their human resource potential.

(Navya, 2023) Examined the relationship between training and organizational effectiveness in a private sector bank, focusing specifically on HDFC Bank. The study involved 50 employees and used standardized questionnaires analyzed via SPSS. Findings revealed that employees perceived training programs as impactful, especially in enhancing clarity of job

roles, customer handling, and compliance. The study concluded that structured training programs have a direct influence on achieving business objectives and operational consistency in the banking sector.

(Nguyen, 2022); explored how training programs influence employee performance and satisfaction in Vietnam's hospitality industry. The study used quantitative methods to assess training design, delivery style, and evaluation mechanisms. It found that interactive training formats and alignment with job roles significantly improved employee engagement and service quality. The authors emphasized the importance of continuous assessment and employee feedback for training program effectiveness.

(Umar, 2020); In Indonesia, Umar, Kurniawan, and Halim (2020) studied public sector employees and demonstrated that soft-skills training substantially improved creativity and team performance. Structural equation modeling (SEM) confirmed that training enhanced soft-skill competence, which mediated improvements in group performance outcomes. These results underscore the importance of contextually relevant soft-skill programs in boosting organizational capacity.

(Kim, 2022); introduced and validated the CIP-R framework—Contextualized, Interactive**,** Personalized, and Reflective—for hybrid training in Korea. The study used empirical testing with HRD professionals and showed that the CIP-R framework enhances knowledge retention, engagement, and application in blended learning environments. It emphasizes learner-centered strategies and reflection to improve training outcomes, making it especially effective in remote or hybrid settings.

Objective of the Research:

The main aim of the current research is to study how far the employees of L&T Precision Engineering & Systems Independent Company (PES IC), Hazira use the Training and Development programs. The survey is also to evaluate the extent to which the training plans are turned into practices at the work location and thus help in output increment of the employees.

In more details, the paper intends to find out by which departments employees involved in the Training and Development programs are coming and thus find out the level of representation that these functional areas have. Evaluating if the objectives for choosing an

employee to a training program have been fulfilled or not as seen by the trainee and his/her supervisor was also one of the key goals.

Besides that, the study plans to quantify employees' pre, and post, training awareness, knowledge, and understanding levels and hence determine the efficiency of the training programs. It also plans to study the influence of training at work by observing changes in employee behaviour, skill usage, work capacity, and problem, solving skills. The study primarily focuses on analysing how Training and Development can be used strategically to increase the skills of employees, boost the effectiveness of the organization, and promote continuous learning in a highly demanding engineering environment like PES IC, Hazira.

Research Methodology:

- **Research Design:** The research adopted a quantitative methodology with a descriptive approach. To achieve this, an extensive utilization of systematic methods was done to figure out the use of Training and Development programs and also to assess the impact of these programs on employee awareness, skill improvement, and performance. Descriptive design made it possible for the researcher to gather numerical data and impartially assess patterns, trends, and relationships concerning training effectiveness in the company
- **Participants:** The sample comprised 50 employees of L&T PES IC, Hazira, chosen from its major functional departments such as Assembly & Integration, Fabrication Shop, Project Management Group (PMG), Factory HR & Industrial Relations, and D&DC Land Platforms. By involving employees from both operational and support departments, a balanced representation was created which helped to obtain a comprehensive view of the training utilization in different organizational functions.
- **Instruments:** Primary data by means of field survey questioners which were mainly intended to evaluate employees' level of awareness before and after their training programs. Besides, the questionnaire encompassed the aspects of the job application of the skills acquired, change of behaviour and overall effectiveness of training. Furthermore, the trainees' self, assessment and their direct supervisors' evaluation have been taken into account to give more credibility to the results.
- **Variables:** The independent variables of the study were training design and training delivery methods. The dependent variables, on the other hand, were the extent of training utilization and employee performance improvement. The study investigated

the connection between these variables thus figuring out how Training and Development programs actually promote employee and organizational performance.

Data Analysis and Interpretation:

The study analyzed the distribution of respondents and their growth across several metrics:

Metric	Findings & Interpretation
Departmental Participation	The Project Management Group (PMG) represented 36% of participants, followed by D&DC Land Platforms (20%) and Factory HR/AIT (16% each).
Pre-Training Awareness	48% of participants initially reported "poor" awareness levels, highlighting a significant knowledge gap prior to intervention.
Post-Training Awareness	66% rated their awareness as "Good" and 34% as "Excellent," with zero respondents remaining in the "Poor" or "Fair" categories.
Nomination Success	100% of respondents agreed that the purpose for their training nomination was successfully achieved.

Major Findings & Results: On-the-Job Impact:

Research outcomes let us know the exact level of the Training & Development programs being effective and used by the employees of L&T PES IC. The study thus demonstrated a significant rise in employee awareness from pre, training to post, training for each of the employees randomly taken into the sample, and also the way they apply their identified duties in their work processes.

According to statistics, there is a Shift in Awareness about what employees know and how aware they are of their knowledge level about a particular subject prior to their training; was considered a bad or poor: 48% of employees stated that they were unaware or did not understand the subject matter at all; whereas 24% considered themselves to be knowledgeable or somewhat knowledgeable after Training Intervention: there was no employee who indicated poor or fair self, awareness after Training Intervention; 66% had developed a good level of awareness due to Training Intervention and 34% had developed an excellent level of awareness; hence, all trained employees were capable of raising their own levels of awareness which, therefore, statistically demonstrated their progression towards higher competency level as a result of the effectiveness of Training intervention.

On, the, job impact is yet another indicator of how an employee applies their training gift to change their knowledge base, going from Theory to Application of Digital and Analytical Tools. First, they learned, basically, what Digital & Analytic Tools are, and, then,

they could make Interactive Dashboards, Advanced Visualizations using, for instance, Power BI, MS Excel, and AI Tools to a great extent of trustworthiness, thus the transition from the application of the theory to really good Data Driven Reporting as well as faster decision, making processes on the production floor.

Introducing Digital Tools has really boosted the Fabrication and Assembly Departments in their ability to track Project Timelines more accurately. Managerial and Behavioural Support Changes after a study's results revealing an increase in 'leader capability' as well as an extraordinary escalation in 'manager capacity' are the aspects where managers and leaders most distinctly felt improvement. Staff members indicated that they also observe that their own credibility as well as their effectiveness in communicating with others have been enhanced. Employees have now better skills in conducting performance discussions, aligning key stakeholders during high, stake moments of the project, and acting as internal consultants to their departments. These shifts from performing the technical parts of a role to performing the strategic aspects of the role are vital in creating long, term, sustainable leadership development, within PES IC at L&T.

Efficiency and Effectiveness, altogether 100% of the participants reported that the objectives which guided their selection for training were achieved. Further, each respondent pointed out that all the participants gave the same additional input, thereby indicating that in order to fully benefit from the competencies acquired through this study, employees should regularly apply the competencies learned in their work. This answer shows a very good match between the employees' comprehension of the necessity of keeping up with their training and development as a way of continuously improving the quality of their output, and the continuous cycle of growing and developing their careers. The findings of this research very strongly corroborate the effectiveness, productivity, and growth of the Training & Development programme as a strategic investment at L&T PES IC.

Recommendations:

1. Enhanced Pre-Training Diagnostic Evaluations

A study revealed that the majority of employees had limited knowledge before undergoing training. Hence, it is very much essential to carry out pre, training diagnosis like skill gap analysis, feedback from superiors, mini, diagnostic tests, etc. In fact, this will be a good move for L&T as it will help them to pick the right employees for the right talent programs. Besides, the trainer will also be able to adjust his/her presentation to meet the actual needs of the employees.

2. Connecting Training Utilization and Performance Management System (PMS)

Employee training efforts can be optimized only if they are assured that the application of their learning to work will have a positive impact on their yearly appraisal. How training at L&T can be quantified and/or incorporated into their PMS may be decided by looking at the implementation of the new skills by the employee with aspects like the resulting increase in work efficiency, compliance with safety regulations, and the enhancement of problem, solving abilities after training.

3. Integration of Digital and E-Learning Platforms

Digital learning solutions such as e, learning modules, short instructional videos, and online platforms may be combined with the traditional ways of learning. Digital learning solutions for the L&T firm imply giving employees the flexibility of learning at their own pace thus, work can go on without interruption and at the same time refreshing of skills and new employee induction is facilitated.

4. Cross Functional Training Exposure

Cross, functional training helps people to know how different departments and processes rely on one another. For L&T PES IC, it is a must because coordination among engineering, fabrication, quality, and project management departments is needed in each project, thus such training should be conducted to build better cooperation and communication among them. Cross, functional training increases employees' awareness of the overall functioning of the organization.

5. Introduction of Training ROI Measurement

Identifying training is costly, time, consuming, and exhausting. Therefore, the calculation of Return on Investment (ROI) of the training is a must. At L&T, for calculating training ROI, the measures can be in terms of increase in different KPIs such as increase in productivities, decrease in reworks, uplift in safety compliance, and overall increase in efficiency.

Conclusion:

A comprehensive evaluation of PES IC's (Precision Engineering and Systems Independent Company) Training and Development efforts at Larsen & Toubro, Hazira has come up with the following results: a very strong argument for the intervention of the targeted Human Resource has been made through the use of Training & Development.

Due to the nature of the industry where there is no place for mistakes and the demand for technological precision is extremely high, it is safe to say that the proper application of Training & Development has been a major factor in the attainment of operating excellence and

the internalization of sustainability. One hundred percent of the participants in a Training & Development program moved their self, awareness levels from "poor" and "fair" before the training to "good" and "excellent" after the training. That is of course, training is not one academic enterprise only but a kind of performance transformation tool. The key insight from the study was a significant uptick in the participant's capacity to comprehend and apply complex skills. Before the intervention of Training & Development, nearly half of the survey respondents (48%) admitted that they were quite unaware and that their "poor" recognition level was low. This bulk of this initial stage marks the extreme set, up where PES IC operates, which, is a continuous learning and development necessity, to keep up with fast, changing technology and the level of quality standards in the world. After Training & Development interventions, long, term effects measure performance improvement in general by 74%. The data was not gathered immediately after the training, but on average, the participants were evaluated as demonstrating a very significant improvement overall.

The positive impact of targeted Training & Development interventions on the internalization of complex competencies and, hence, on facilitating the organizations performance transformation through the changed behaviour of employees has been demonstrated by these results. Some of the research studies conducted have revealed that besides the competency in these techniques, there has been a major increase in the readiness to become managers/leaders.

The professional behaviour of the individual is very different now as he/she was mainly trained in honesty, communicating and setting expectations for stakeholders. Also, for PES IC as an internal consultant to the Armed Forces of India and most of the Space Agencies, these are very important areas. Employees have become accustomed to candid and open conversations regarding their performance, and they have grown significantly in managing projects independently without the need for micromanagement. Managers, on the other hand, are offering valuable technical expertise that build trust and promote collaboration among employees at all levels of the organization. The participants' capability to perform both a mentoring role and a consulting one demonstrates the success of the Training and Development Program in building a robust leadership pipeline for succession placement in the Engineering and Space related industries. The study further shows that training has empowered the employees to play a more active role in the attainment of the organization's wider goals by developing better problem, solving skills and coming up with new ideas. Moreover, by using a systematic method they have been able to analyse the core problems and develop a continuous improvement in complex manufacturing processes. Their ability to set and achieve goals and

creatively think through a structured process were some of the evidences of the participants' capabilities. This innovative way of improving the process helps PES IC to stay competitively positioned in the global precision, engineering market and to be able to meet the changing needs of the Defence and Aerospace Sector now and in the future.

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