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A Case Study on Industry-Institute-Cooperation

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Abstract

Engineering institutes in India are growing at a very fast rate and offer industry-specific graduate and postgraduate programs. Many of them don't offer doctoral programs and don't undertake consultancy projects due to a shortage of high-performing faculty teams. However, the National Institute of Technical Teachers Training and Research (Southern Region), Chennai has grown since 1964 and offers short-term and long-term programs, curriculum development courses, preparing instructional packages, and offer consultancy projects to various international development agencies and Indian MSMEs and government companies. This case study gives two significant consultancy projects offered to the cement industry under the World Bank-assisted project and another to Auto Ancillary Component Manufacturing companies. This institute has well-developed faculty teams who can conduct training needs analyses, develop industry-specific outcome-based objectives, prepare training packages, conduct participative training programs, develop executives to establish training institutes and develop need-based training programs. This institute also offers training programs to engineering faculty members in planning and implementing various outcome-based executive development programs. Such courses will improve the performance of companies and improve GDP of the country. Due to this regional competitiveness will increase.

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Introduction

The Government of India established four Technical Teachers Training Institutes in and around 1964 in Bhopal, Chandigarh, Chennai, and Kolkata to assist the state governments in developing industry-relevant curricula, preparing

learning packages, developing item banks, and training the teachers through short-term and long-term courses. Also, these institutes established extension centers in various regions of the state to assist the state governments in evaluating the existing diploma programs, and plan the needed new diploma programs. These institutes consisted of various engineering departments (Civil, Electrical, Electronics, Mechanical, Computer Science, and Engineering, Education, Mathematics, Physics, Chemistry, Management, Educational Technology, Multimedia, Curriculum Development Center, and Center for Community Development). These institutes also assisted the state governments to develop detailed project reports (DPR) for capacity development, quality improvement, and efficiency improvement under the World Bank and scaffolded the faculty in the implementation of the projects. Further, they conducted various research projects to accelerate the implementation as per the schedule, tracer studies of alumni, and impact studies due the World Bank projects. These institutes also established many degrees, postgraduates, and interdisciplinary doctoral programs. Most of them are affiliated institutes of UNESCO's Asia Pacific Educational Innovation for Development (APEID), Bangkok, Thailand, and the Colombo Plan Staff College for Human Resource Development, Manila, Philippines. These institutes have been elevated to the National Institute of Technical Teachers Training and Research (NITTTR) and they offered faculty development programs for engineering colleges, and executive development programs for various industries. NITTTR Chennai developed various diverse global faculty development programs under the Ministry of External Affairs, Ministry of Finance, and Indian Council of Cooperation and Research (ICCR). This institute usually bid for various executive development projects under various International Development Agencies (IDAs) like DANIDA, GIZ, SIDA, UNDP, UNESCO, USAID, and the World Bank. This institute is having well-accomplished faculty members in conducting needs analysis, preparing curricula for executive development programs, preparing outcome-based training packages, training the trainers, establishing regional training centers, planning human resource development policy, preparing company-specific development programs in safe work practices, environmental protection, and maintenance of electronic equipment.

Literature survey

Most International Development Agencies invite well-performing institutions to submit technical and financial proposals to bid for the programs under the ongoing projects. High-performing faculty members with skills to solve complex programs have to be approved to negotiate and undertake the projects by their Board of Governors. They also develop needed training centers, train the trainers, and develop needed programs for industries. The faculty members also plan collaboration among the employees to solve their problems. Collaboration refers to a group of employees working together to attain a goal that all of them share, but they might not achieve if they work individually (Indeed, 2022). To achieve the goal, they require diverse knowledge, project-specific experience, problem-solving skills, coordination, and sharing ideas. Cooperation refers to an individual or group of employees or a team member achieving a goal (Indeed, 2022). According to Vector Solutions (2020), industrial training solutions are intended for continuous improvement. The following tasks are to be undertaken to complete the projects: 1. Conduct training needs analysis based on the terms of reference, 2. Identify the companies' goals, 3. Conduct task analysis, 4. Write performance objectives, 5. Conduct learner analysis, 6. Prepare training packages and self-learning modules, 7. Develop Training Programs, 8. Validate them, 9.

Provide a summary of the learning outcomes of the program, 10. Create interest in learning among the executives and employees, 11. Encourage active participation, 12 Assign practical works, 13 Observe the participants and guide one-to-one training, and 14. Suggest improvements.

Objectives

The intended objectives of this paper are:

1. Describe the training programs won by bidding, planned, developed, and offered to the executives of the cement industry under the World Bank-DANIDA-CMA-HRD PROJECT.
2. Describe the training programs jointly planned, developed, and conducted for the employees of Auto Ancillary Components Manufacturing companies in Chennai

SWOT Analysis

This SWOT analysis refers to NITTTR Chennai to check its strength, weaknesses, emerging opportunities, and growing threats in undertaking various consultancy projects under various multinational companies, government engineering departments, and International Development Agencies.

Strength

- Availability of needed interdisciplinary faculty members of NITTTR Chennai (Engineering, HRD, Education, Educational Technology, Multimedia, Curriculum Development, etc.)
- Continuous support from the Board of Governors
- Excellent track record of completing many challenging and complex training programs for diverse global faculty members, executives of various organizations
- Faculty members have sufficient expertise in conducting human resources development programs (training needs analysis, developing performance objectives, preparing curricula, developing learning packages, conducting participative instructions, assessing the progress, coaching, mentoring the trainees, etc.)
- Intrinsically motivated, experienced, and high-performing faculty team members in multidisciplinary areas
- Well-equipped CCTV studio, MMLP studio, and Print material production center
- Well-designed classrooms with computers and LCD projectors
- Well-equipped hostel facilities
- A unique institute that is capable of planning, designing, and implementing industrial executive development programs in the institute and as well as in client organizations not only in India but also in other countries
- Institute and faculty members have gained the highest reputations based on the services rendered to the states and overseas institutions, companies, and international development agencies

Weaknesses

- Too many conflicting works schedule at the same time
- Ever-increasing faculty turnover
- A few faculty members will be in outstation institutes while projects are executed
- Many posts are yet to be filled

Opportunities

- Challenging opportunities to effectively contribute to the growth of industries, human capital, and knowledge capital
- Can offer the most economical programs
- Can undertake complex problems in quality manufacturing, improving productivity, reducing the cost, and incorporating innovations
- Can build the portfolio of the newly recruited faculty members
- Can emerge as a global institute in solving problems in analysis, design, prototype development, testing, improvement, manufacturing, and maintenance.

Threats

- Competition from various local private institutions and corporates
- Low return on investments
- Made to work beyond the terms of reference
- Severe competition from the global universities which can win the projects

Cooperation with the cement manufacturing industry

Indian Cement industry faced many problems in expanding its capacity, reducing energy requirements, and eliminating accidents in and around mines and plants. They have to protect the environment in and around the plant. After the globalization of the Indian economy, the Ministry of Industries received a soft loan from the World Bank for modernizing cement manufacturing in India. Earlier, no cement company established any training center. Initially, the Indian Cement Manufacturing Association desired to establish four Regional Training Centers (RTCs) in all four regions under this project. This demanded training the part-time trainers. Later, they had to plan many projects to develop effective training packages and train employees at RTCs. The Ministry of Industries advertised for accomplished training organizations to undertake development programs as required for the cement industry under the World Bank-assisted project. NITTTR Chennai has successfully bid and got the following programs:

Table 1. Programs offered by the faculty members of NITTTR Chennai under the World Bank-DANIDA-CMA-HRD-Project

No.	Type of Program	Trainees	Duration
1	Training the Trainers (Chemical Engineers, Electrical Engineers, Instrument Engineers, Mechanical Engineers, Mining Engineers, etc.) of various cement companies	15 per batch identified by the cement companies	Two weeks per batch of 15 executives. Total of 10 batches of executives
2	Planning Human Resources Development Policy	South RTC	One week
3.	Conducting needs analysis of the employees and developing a comprehensive training package on safe work practices.	Selected Trainers from all four RTCs	Total time for the development of training packages, video programs, games, assignments, and quizzes; train the trainers of three RTCs: Three months.
4.	Conducting Needs analysis on environmental protection and management; developing learning packages, and training the trainers.	Selected Trainers from all four RTCs	Total time for developing training packages, video programs, case studies, assignments, and quiz; training the trainers: Three months

Method of Planning the Training Programs: The following steps have been used:

- Visit the designated cement plant and observe the working
- Collect needed training programs from the executives of various departments
- Conducting needs analysis
- Develop performance objectives, curricula, an instructional package consisting of self-instructional modules, and story-board for video production
- Validate them through the executives of the designated cement company
- Revise and improve the curricula and the learning packages
- Shoot the video shorts in the designated cement factories
- Edit and complete the video programs
- Conduct training programs who were identified by the company
- Deliver the curriculum, learning packages, and CD

Outcome: The employees of all cement factories have been trained through these packages by four regional centers. Environmental quality in and around cement plants has been maintained. The workers have been trained to follow safe work practices and accidents have been eliminated. Necessary job aids have been displayed in all workstations.

Follow-up activities: The postgraduate students of M. Tech. (HRD) were offered cement industry-specific dissertations which enhanced their attributes of them.

Cooperation with auto ancillary components manufacturers, Chennai

Many auto ancillary components manufacturing companies have been established by the British in Chennai during the Second World War to service, repair, and recondition the trucks, jeeps, and other vehicles of the British Army. After Independence in 1947, many automobile companies were established in Chennai, since, the availability of quality human

resources, and ancillary components. After the globalization of the Indian economy, many foreign Automobile Manufacturers like Suzuki, Toyota, Benz, Renault, Nissan, Ford, BMW, Hyundai, etc. have established their manufacturing companies in and around Chennai. When the Japanese companies demanded high-quality and low-cost auto ancillary components from local manufacturers like Lucas TVS, Sundaram Clayton, Brakes India, etc. these local companies which had British collaboration started planning their design and production based on the needs of these Japanese companies. The auto ancillary companies have chosen NITTTR Chennai as a reliable training institute for planning, designing and implementing suitable training programs to improve productivity, quality, cleanliness of the workplaces, and cost reduction. A team of faculty members visited the factory, and discussed the problems faced by the employees. Some of the significant feedbacks are late arrival of the semi-finished assembly, not being able to operate CNC machines, not being informed about quality to maintained, and not having multi skills to produce various ancillary products in the same shift.

Planning for Reducing the Cost, Improving Quality and the Productivity

The company has selected subcontractors to supply needed subcomponents needed for one week at a time and these suppliers were also offered needed training to improve the quality, and productivity, and reduce the cost.

Next, instead of a long queue system, supply was changed to a modular production unit for every auto ancillary component. This reduced the delay and workers started manufacturing immediately.

CNC machines were introduced and the workers were trained in multi skills. Productivity and quality were increased. A system approach for production was introduced and the employees were exposed to this method. The Kaizen method was also introduced. The employees were introduced to quality checking and clean maintenance of the workplace through the 5 S model of Japanese.

Every employee has been introduced to 'Quality Circle'. They voluntarily formed quality circles, had too many issues, and discussed possible ways of solving them. In this process, a leader emerged to moderate the inputs from the members of Quality Circle. In the end, the members have chosen the best solutions and presented them to the management. The whole process was recorded by a video camera. Later the members viewed the recording and analyzed the ideas generated, and finally chose the best solution. This process improved the collaboration among the team members. All the 2000 employees were trained over two years and the whole company followed the modular production method. The quality was ensured at every stage of production. By reducing the inventory of subcomponents, the cost was reduced.

Based on the success, other companies like Sundaram Clayton and Brakes India have also availed the company-specific training and development programs

Success factors

The following are success factors that were learned in this joint training program for auto ancillary component

manufacturing companies:

- Providing modern tools and training employees to operate them
- Introducing quality at every stage of production
- Eliminating rework
- Creating a dedicated module for every ancillary component production
- Stocking subcomponents required for one-week requirements
- Training the employees in Quality Circle to voluntarily solve the selected problem and submit the solution to the management
- Recognition of leadership
- Creating total commitment
- The whole program centered on the collaboration of the employees and management

Lessons learned

Significant lessons learned are:

- Introducing the employees to the art of quality production, and readiness to solve problems through quality circles
- Sharing the quality and maintaining high quality through mutual respect without looking for a replacement of the absent workers
- Valuing the mental abilities and high-performing motor skills
- Improved attitudes of employees
- Respect for collaboration at the workplace

Discussion

Every engineering faculty should undergo one month of industrial training, study workplace problems and conduct needed action research. They should be introduced to human resource development practices which consist of training needs analysis, developing curriculum based on the needed outcome-oriented performance, developing training packages, audiovisual materials like video programs, case studies, and games, conducting participative training programs, introducing quality circles, steps to improve the productivity, and reducing rework of the product, offering multi skills, and developing collaboration among the workers.

Conclusion

Industrial collaboration is one of the methods to bring companies and engineering institutes to jointly analyze the problems and develop needed training and development programs to achieve the business goals. The educational

leaders should facilitate industrial exposure, short-term training of newly selected faculty members. The postgraduate students should be exposed to industrial problems and scaffolded to undertake dissertation works from the industries. This gives a win-win solution. The faculty members should be trained to prepare technical and financial proposals for bidding consultancy projects. This will enable the graduates to gain needed attributes.

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