Industrial Training in Polytechnics: Enhancing Diploma Student Learning

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Abstract:

Undergraduate student industrial training programs in the engineering industry are mutually beneficial relationships that helps nurture student growth, enhance industry-institute relationships, and help the education industry update its curriculum. The engineering discipline in particular requires the budding engineers to be well-prepared with real world. The industrial training program is now a mandatory requirement for Polytechnic students to undergo a six weeks industrial training course following their second-year exams of diploma programs. Before the training period, students have to prepare a short resume and then determine their companies of choice. During the internship, students kept a daily log documenting the activities and will be monitored by a visiting faculty from the institute. After completion of the training interns have to submit a technical report on their work done and deliver a seminar presentation summarizing their experience. This paper highlights the program description, defines the industrial training objectives and describes the implementation process and challenges

Keywords: MSBTE, EJ (Electronics & Telecommunication), CO (Computer Engineering), IF (Information Technology)

1. INTRODUCTION

Industrial training refers to students' placements at selected organizations for a predetermined duration ranging from several weeks to several months, depending on institutions and programs. The objective of the industrial training is to expose students to the competency, knowledge and skills needed to succeed at the workplace. In other words, industrial training is seen as a bridge from classroom to workplace. Consequently almost all tertiary institutions embed industrial training in their academic programs.[1]

One of the objectives of the industrial training program is to expose students to the practices in engineering specific to their chosen field of study and industry. Engineering industry often uses the most advanced technology in their operations, and by spending some time in such environment, students will gain some new experience and knowledge that would be unavailable at university.[2]

Through the internship period, students are expected to develop their personality, self-confidence, independence; as well as learn how to take decisions with little or no assistance. They are also expected to learn how to interact with other employees while carrying out their tasks with minimal supervision

through finding a link between modules of study and work process while being trained. Furthermore, students' it is anticipated will develop communication skills, discipline, time management, commitment to tasks and other leadership abilities that will enable them cooperate with others, engage in group discussions that will lead to the meeting of industrial targets. By learning to take liability and responsibility, they are expected to gain the support of their peers (Harter, 1999).[3]

Industrial Training, was thus introduced in polytechnics, to bridge the gap faced by the industry due to lack of exposure towards latest technology. A six weeks training was given to the students with enough hands-on and feedback was taken on a weekly basis. Students were allotted a mentor – from the industry and the institute as well. The overall exercise of scheduling an industrial training was a solution to the shortcomings faced by the student after completion of his course.

2. LITERATURE REVIEW

2.1 Overview

INTRODUCTION

Industrial placement or internships are beginning to be considered vital to be included in a higher education curriculum. More students and companies are aware of the benefits of practical experiences obtained during internships by making part of a course programme. It has been reported 1 that students increasingly demand internship programmes so they can acquire professional skills before looking for a job while at the same time, companies train students in their organization and use internships to reduce uncertainty in the hiring process after graduation. Thus, internships serve the needs of three parties: students, academic institutions and companies Over the last decades public debates on educational policy have drawn the attention to changes required in higher education to produce graduates better equipped for the modern working environment, stressing the need for acquiring transferable skills and employability during studies. As such, the development of links with companies is perceived as an essential part of this process at both undergraduate and at postgraduate levels. Students get some useful career insights from their improved understanding of the working environment. It has long been accepted in professional degree courses, such as medicine and engineering, that training in the work place must be an obligatory part of them.[4]

Interactions with employers indicated that most employers expect graduates to have a wide range of skills and other ca-pabilities that they need to engage in a wide range of activities. It is a fact, that the internship is crucial to assessing these abilities in students /graduates across nations and cultures (Abderrahman Hassi & Giovanna Storti, 2011). In training, diversity, inclusivity, equality and fairness in organizations are as important as the development of human resources. So, there is need for communities to adopt more proactive roles in addressing the issue of diversity through research and course curricular (David McGuire & Mammed Bagher, 2010).[5]

In a move to give industrial exposure, Maharashtra State Board of Technical Education (MSBTE) is mulling over mandatory internships for diploma students for two months, so that they get good exposure and experience of work culture in the industries.

3. INDUSTRIAL TRAINING

Industrial training course was introduced to all diploma programs with an objective to develop the traits of industry culture among the students before they enter into the world of industry. By exposing and

interacting with the real-life industrial setting, student will appreciate and understand the actual working of an industry & the best practices adopted by them.

3.1 Need of Industrail training:

Industrial training course has been designed to be implemented during the preceding year before the completion of the program. It aims to help the student develop excellent communication skills in engineering that covers daily interaction within the working environment and technical writing. There has been enough evidence that graduate engineers often lack the required standard of communication skills particularly when compared to the needs of industry internationally [6]. Therefore, this course aims to provide the necessary training in such skills for the future graduates of the faculty.

3.2 Description of the industrial training course:

This course is intended to develop the following competencies:

A. Soft skill i.e Communication, presentation etc.
B. Life skills i.e Time management, safety, Innovation, Entrepreneurship, Team building.
C. Hands on i.e Design, Implementation, Quality assurance aspects.
D. Industry specific tools e.g Value engineering, 6 sigma and Lean.

3.3 Implementation and challenges:

Through the many years of implementation of the industrial training program, many advantages and challenges have been faced by the students, faculty and industry. Students participating in the industrial training program can benefit from the pre-internship training on resume writing and general working conduct given by the departmental coordinators. During the seminar presentation students receive constructive feedback from their lecturers on useful communication skills techniques.

The faculty also gains tremendously by the industry feedback which allows improvements to the program to be made. This enables continuous quality improvement to be made, which is an essential element to outcome-based education. By providing the training experience to the students, industry effectively can 'test' the graduates before they are actually employed. This enables the industry to select the best future employees for their company.

The objectives of internship is defeated, if students are not involved in any meaningful work, (like "intern making the photocopy" syndrome), the employer not considering the intern a serious part of the work process and the institution not considering the internship a part of educational program because of its perceived lack of rigour and academic content (Thiel and Hartely, 1997).

One of the challenges faced by the faculty in implementing the program is the constraints of the university academic calendar. In particular, the duration of the industrial training period in the curriculum is only for six weeks. This is considered too short as industries often require a full 12-week period for their training program.

Another challenge is to ensure companies provide a useful and constructive training content. It has been found through previous industry visits that some companies do not conduct a proper training program, and as a result, students were assigned to do tasks not relevant to their engineering career. This can be overcome by conducting discussions and giving briefing to industries on the course expectations.

In terms of the students, some students do not take these training seriously and treat it only as a way to spend their semester break. There have been cases where students quit their training without any notifications to the employer and faculty just because they were unsatisfied with the working arrangements. This gives a negative impression to the institute, and therefore steps were taken by the

institute to prevent this from recurring. One of the steps is through constant communication between the mentors (Institute and Industry) and the students to monitor their satisfaction.[2]

3.4 Course Outcomes:

The industrial training is intended to acquire the competencies and aims to provide the students the following outcomes:

1. Communicate effectively (Verbal as well as written) the work carried out.
2. Prepare and present the report of the work carried out.
3. Exercise time management and safety in the work environment.
4. Working in team.
5. Demonstrate various quality assurance.
6. Exhibit the work carried out.

3.5. *Course structure and assessment:*

- The total credits allotted are '6' for the program
- Assessment at institute level and industry level will be done.
- The evaluation of Industrial training will be done on the basis of skills acquired by the student during this six-week period.

3.6. Assessment scheme implemented:

ASSESSMENT PATTERN	CONTENT	MARKS
Progressive assessment	Weekly report and performance	75
End Semester Exam	Report, Viva and Presentation	75

3.7. *ages in implementation – Role of the Institute*

Stage 1 (2-4 weeks) : During stage 1 (before completion of 3rd semester) , students are expected to prepare a short 2-3 pages of resume highlighting their personal information, educational achievements, interests, and relevant co-curricular activities. The students would also need to provide the names of two references of which, one would normally be the TPO/departmental industrial training coordinator and the other one is a lecturer from the department. These resumes will be checked and revised by the respective coordinators and collected as a database at the department level.

Stage 2(4-8 weeks) : During stage 2, (on commencement of 4th semester) the students choose the companies in which they would like to undergo training .This is done by selecting up to 10 companies from a company database prepared by the department. The respective applications will be sent off by the TPO with the revised short resume. Then, the students wait for the company reply and training offer. Once a student receives an offer, they will confirm their acceptance and will be recorded in the system.

If by any chance, the student receives no offers, they have to go through to the next cycle of application. They are sent to the next set of 10 companies available at the department level or any Industry reference. The success of each student's application is being closely monitored by the respective departments along with the TPO cell

Stage 3(8-10 weeks) : During stage 3, (before commencement of 4th semester progressive exams) the students are alloted mentors, consent letters from parents are obtained.

Stage 4(10-16 weeks): During stage 4, (before commencement of 4th semester end semester exams) Industry is issued a letter from the Principal's desk about the training along with the details of students and Institute mentors.

Stage 5(each week of training): During stage 5, i.e the six weeks training students are placed in the respective industries, and the training is initiated.

1. Week wise report is submitted by the student and progressive assessment of the student is monitored.
2. At the end of the 6 weeks training a final report is submitted to the department.
3. The students are then assessed by Industry experts wherein a presentation is also delivered by them.

4. CASE STUDY

4.1 Introduction to Vidyalnkar Polytechnic:

A case study of Vidyalankar polytechnic, Wadala, Mumbai, MSBTE affiliated (Maharashtra State Board of Technical Education) (having all programs NBA accredited to its accolades), is illustrated below. Vidyalankar Dyanpeet Trust was established in 1960 by Prof. Chandrashekhar S. Deshpande, a person blessed with extraordinary academic talent and immaculate engineering skills. Vidyalankar Polytechnic' mission is to provide an educational environment where students can reach their full potential in their chosen discipline and become responsible citizens without compromising in ethics and a scholarly environment where the talents of both, the faculty members and students are nurtured. The vision of the institute is to establish a leading centre of imparting Quality Education in the field of Science, Technology and Management with emphasis on ensuring that students learn the fundamental concepts in various disciplines.[5]

4.2 Strategic Implementaion:

The following methods were devised for successful implantation of Industrial training in Summer 2019 by the Institute.

a. A task force comprising of HOD's, TPO, Members from IIIC (Industry Institute Interaction Committee), and Entrepreneurship development committee was formed.
b. An industry database was created and the respective industries were contacted.
c. Extensive follow-up via e-mail, telephonic conversations and personal interactions resulted in an agreement from the Industry.
d. Statistics of the work done:

Industry wise analysis	
Industries contacted	Industries agreed
150	111

Table 1

Classification of Industries agreed			
MNC	Govt. Organizations	LSI	SSI/MSI
19	06	06	80

Table 2

Total no. of students		
EJ	CO	IF
108	206	165

Table 3

4.3 Achievements and accolodes:

a. ODCPE trial projects and configuration of access points at Reliance JIO was done by Electronics & Telecommunication (EJ) & Computer engineering (CO) students.

b. Creating Database using Microsoft SQL, Web designing using HTML/CSS was offered to CO students at American Logistics.

c. Web application for Mumbai Crime branch was developed by Information technology (IF) students.

d. EJ students have successfully handled Process controllers at Pidilite Industries.

e. Contract Management and Centralized Environment for Airports authority of India was created by IF students.

f. Stipend was offered by various companies as a token of appreciation for the work done.

g. Appreciation letter has been released by various industries after the completion of the training.

h. A lot of Industries have offered Final year project problem statement to the budding final year polytechnic students in their respective domains.

i. Many placements offer have been given as a result of the hard work done by the students.

CONCLUSION

The challenges of globalization require the budding engineers to be fully equipped with the necessary knowledge and skills before they enter the workforce. One of the ways that can be achieved is through the incorporation of an industrial training program during their study. In this paper the industrial training program has been described and the benefits gained by the students, faculty and industry have also been highlighted. The implementation of this MSBTE Industrial Training Course in the respective programs has ensured a win-win situation for the students, Industry and the Institute.

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