

EFFECTS OF TECHNOLOGICAL DEVELOPMENTS ON INDUSTRIAL TRAINING

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Abstract

Engineering education is characterised by several aspects which make it different from other educational disciplines. One of these is based on the fact that training and placement has to be an integrated component of the engineering education. In this paper, we highlight the increased importance of training in this fast developing technological world. An appropriate training makes a candidate suitable for placement in industries and other organizations. Most of the training and placement cells of the engineering colleges of the country are lacking in fulfilling their needs for one reason or another and in turn affecting the overall performance of their institutions. The tradition in our industrial development in last forty five years of freedom has remained unchanged. Total, when technological developments have caused opening of several new issues, the relations between industries and educational institutions require a fresh look. There is a need to have different and better understanding between these two. Of course, problems exist, but sooner the better, we will have to establish a system which can last for long. The system should be able to bear the pressure of fast technological growth and cater to the needs of future growth. In our views, the educational institutions can take initiatives in this regard. If steps are taken with a broader view in the mind, there should not be any doubt about the hopeful and better results. In this paper, we are also describing the activities which can be taken up by educational institutions as well as industrial organizations.

INTRODUCTION

Engineering institutions invariably have some mechanism which takes care of training and placement. The purpose of this mechanism is to make arrangements for industrial training to the students of engineering education, so that an awareness about the working of industries, research organisations etc. can be provided. It also helps in providing job opportunities to the students who are passing out or who have just completed their education. In fact, the requirement of training and placement in engineering

education is the one, which may not be present in other education systems. It has to be an integral component of engineering education due to many reasons. The main reason for this is that the engineering education is more of applied nature. It demands practicals along with the theoretical concepts and hence the requirement of industrial training. Another factor is that the engineering graduates and postgraduates are in heavy demand in the growing organizations. These organizations are continuously looking for good and promising candidates and therefore many

organizations contact academic institutions for placement. Needless to say that training and placement will continue to remain important aspects in engineering education.

The second half of the current century has been a period of industrial revolution. Many fundamental ideas have emerged. Also, the applications of abstract research, which took place earlier, came into the existence during this period. The technological growth which took place in this century has been remarkable. The truths which remained unexposed during so many centuries were searched in this period. After the independence, India also participated in this industrial development and graph of growth has been quite encouraging. The fast development in the country was supported by government policies and our international relations. This industrial revolution has constantly demanded educated personnels from engineering field. The product of our engineering institutions was found quite suitable to fulfil the requirements. The role of training and placement cells in various organisations was considered upto the mark. It is only in this last decade, it has been felt at industrial level as well as at education institutions level that something is lacking in our education system. Industries do not seem to be happy with the products of academic institutions. In turn, academic institutions also started feeling that their products are not getting the require importance from industries, although demand still exists. Many reasons were given for this situation, we will be discussing about them in the sections to follow. However, there was one very strong general consensus that the industrial training component only can make this situation better. People started thinking about the need of reforming the activities of training and placement divisions.

It will have to extend its scope of working, keep new dimensions in mind, increase interaction with outside world as

well as with the various sections of the institution and so on. Of course, it has also been realised that with the fast changing technology, the industries will also have to change their view of looking at the passouts, they will have to contribute in many ways to improve the situation.

THE PROBLEM

The last decade of technological development has witnessed the fastest growth of all times. Particularly, the automation has spread in almost every component of Industry and this growth is continuing. Every day new components are being added to the existing systems. Unfortunately, this fast research, which is mainly concentrated in developed countries, is causing a wide gap between the developed countries and developing countries. Further, in developed countries, industries are so alert that any new research is implemented in the form of products almost immediately. These products do reach to market not only in their own countries but thanks to fast transportation and their marketing will, it also reaches the developing world including India. Since these products are definitely better than the older systems, these are purchased by industries and used. In process, the first problem which comes up is that being the latest technology, the trained manpower is not easily available to work on it. If somehow it is used then second problem which comes up is in operation. In case of some breakdown or in case of requirement of preventive maintenance, people knowing the technology are not easily available. Obviously, the industries will be looking for the persons from educational institutions. Industries are ready to contact institutes even before the students have actually completed their studies. These industries are expecting that a fresh graduate, who has undergone the training with latest technology of interest, will be able to work on their machines or equipments. In many

cases it proves to be true but not always. The reasons for this is also very clear. The technology, which we are talking about is very recent, may be old by few months or one year. Now, what is the method by which this technology reaches to academic institutions? Obviously, by the way of technical papers and reports, if at all these have been published. These publications itself take a long time before they reach the developing countries. Even if we assume that every teacher/researcher is so alert that he or she keeps himself or herself in touch with technological developments in his or her field, it has to be incorporated in the curriculum. Making changes in curriculum has its own methodology, it has to pass through various academic bodies of university, before being adopted for teaching. The inertia of this whole system easily takes a significant time. As far as text books on those developments are concerned, will be available only after one or two more years. It means that in general and in the most of the cases., the technological developments are reaching faster to the industries, particularly in last one decade there have been many instances of this, type.

When a university student who has just completed the education is employed by an industry, the candidate will certainly be not trained on the equipments which are procured latest. It creates the dissatisfaction of the industries about the candidate, or in general about the education system. Few years back, when transportation and establishment of latest equipments from developed countries to developing countries were not so fast, the problem of technological gap was not felt severely. But today when government policies, means of fast transportation, the feeling of competition in manufacturers, quality of products and consumer's demand are favouring the import of latest technology, the problem has come on surface.

TRAINING AND PLACEMENT CELLS

Almost every engineering institution has got a cell for training and placement the students. The conventional way of working of this unit is divided into two different parts, one is the training and another is the placement. In the training part, generally students of final year or prefinal year, are sent for industrial training during vacation period for one month or so. These industries are normally same every year who entertain such training programmes. Most of them are government or semi government type organisations. Very few industries at private sector level are entering training such training programmes in the current trends. Every year a large number of organisations are requested by the educational institutions for such training programmes during vacations. Many of these organisations do not consider the programmes as useful. Some organisations feel that it will not be possible for them to devote time for such training, some companies do not want outsiders due to the fear of loss of their trade secrets, and hence refuse to admit any such training programmes. Since such training are not the part of normal activities of the organisations in most of the cases, the students are left to get trained in their own ways. Since the students are new to an industrial environment, the learning part gets limited. The period available for training is also relatively less to learn many things about the organisations. Not all students of the institutions get the opportunity of training. Many of students are not able to take the advantage of such training programmes. Unawareness about the importance of such training, unavailability of organisations for training, refusal of organisations where a candidate wants to go for training, financial limitation of many students, some other assignment during the vacation etc. are the few among many possible reasons for not obtaining the training.

Table.1 Shows statistical figure of trained students under this scheme in different types of organisations.

Table -1

Sr. No.	Institutions	% of students; average of various disciplines
1.	I.I.Ts and Regional Engg. Colleges	60 %
2.	State level Engg. Colleges & Grant in aid institutions	35%
3.	Private Colleges	18%

Table.2 Shows the statistical information about the students getting training in the state level engineering institutions branch wise.

Table . 2

Sr. No.	Branch	% of the total students
1.	Civil	20%
2.	Mechanical	35%
3.	Electrical	25 %
4.	Electronics, Telecomm & Instrumentation	60%
5.	Computer	40%
6.	Industrial Production	45%
7.	Chemical	50%

The second part of duties of training and placement cell is the placement of students for the jobs. In this, normally educational institutes send the details of their courses in the form of brochures to various private, semigovernment and government organisations requesting them to visit the institute . Some of these

industries which are in need of urgent manpower do visit for campus interviews and complete their admission tests by the ways of written tests, personal interviews, group discussions etc.Suitable candidates are selected for the appointments. Table. 3 shows the average number of campus interviews by organisations every year.

Table.3.

Sr. No.	Institutions	No. of Students Selected
1.	I.I.T.s	Above 100
2.	Regional Engg. Colleges	50
3.	State level Engg. Colleges	20
4.	Private Engg. Colleges	5

One particular result of these campus interviews worth mentioning is that a few brilliant students are selected by many organisations i.e. they grab more than one opportunity where as an average or weak

student gets none. Table.4 shows the statistical information about average number of students selected per year through campus interviews.

Table.4

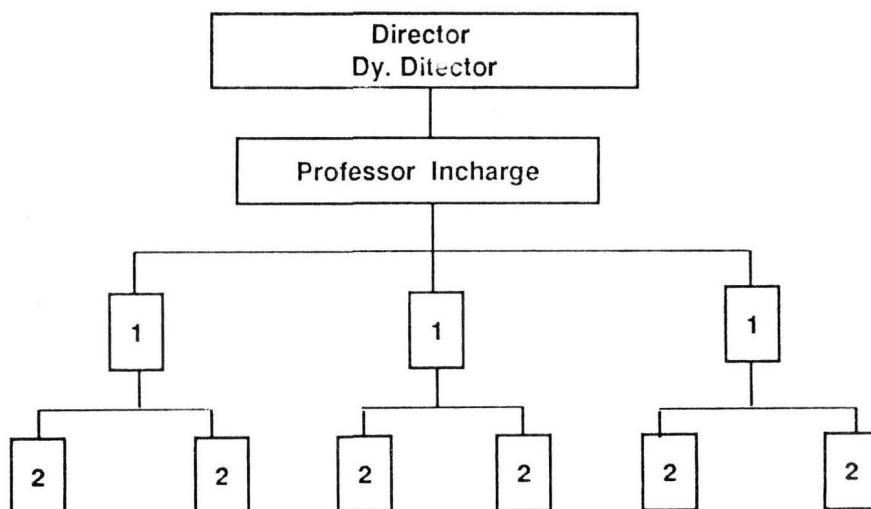
Sr.No.	Institutions	No. of Students Selected
1.	I.I.Ts	150
2.	Regional Engg. Colleges	75
3.	State level Engg. Colleges	30
4.	Private Colleges	5

IMPACT OF TECHNOLOGICAL DEVELOPMENTS

As mentioned above, the training and placement divisions of academic institutions can play effective role in engineering

education, so that their products are more saleable, and passouts are in position to satisfy the expectations of modern industries. Following are the suggested activities in this regard.

Fig. 1



(1) Structured Organisation of the cell

In the conventional training and placement cells, it is a one or two persons are responsible for all related matters. This has to be enhanced with involvement of more crews in the cell. Fig. 1 suggest a conceptual hierarchical structure of a body which should coordinate the activities of training and placement.

In Fig. 1, '1' indicates the various heads of departments and '2' indicates one or two faculty members of the respective departments. The idea of a larger body is that transfer of information from department to the cell and vice-versa can be done in effective manner. Involvement of one or two faculty members from each department will ensure the constant follow up of the matters concerned with training and placements.

(ii) Continous feedback to the departments :

The cell should be in contact with leading organisations of the region and with potential organisations of the country. A systematic methodology should be adopted by the cell to obtain the requirements and feedback on fresh employed persons of the organisations. The method of obtaining such information should be so effective and simplified that organisations should not take it as a difficult and/or time consuming activity. A proforma can be prepared every time and information can be collected in the form of short answers. The task of preparing proforma can be done by the department concerned, so that, to the point queries can be incorporated.

Visit of faculty members to the organisations can also be one effective method for collecting the information. The information collected should have primarily (a) the feedback about fresh employed persons, what are the areas in which they are not exposed, which topics require rigorous training etc. (b) the fields in which

near future requirements are likely to come up and (c) details of the latest equipments procured. The information collected in this way from various organisations will have to be compiled and then it should be disseminated to appropriate departments at the earliest possible.

The information can be used by departments to keep the courses and subject contents revised. New topics can be added, if required. If it is realised by a department, that a particular type of equipment is very useful in some industry or industries and also if it be estimated that the particular technology will last for longer, the steps can be taken by the institutes to obtain in the experimental setup on the same. Although limitations of educational institutions are well know in terms of financial resources, but in last five years period there has been a good amount of grants provided by the government to technological institutions, particularly in high technology areas. The advantage of government policies can be taken and project proposals based on latest technology can be submitted to government.

(iii) Exchange of expertise :

Exchange of expertise from educational institutions to industries and industries to educational institutions is very effective method to bridge the gap between industries and educational institutions. Faculty members can go to industries for some period and learn about the requirements in details. Person from industries can come to educational institutions and can share their experiences and highlight their requirements.

(iv) Training :

The practical training programmes currently running in the institutions should be implemented more effectively. The

importance of vocational training programmes should be made clear to each and every students. It should be made sure that all students take advantage of this program. Special attention may be given to the students belonging to financially weak categories.

One main aspect which we want to stress regarding the training programs is that the educational institutions should also specify the nature of training desired. Conventionally these training programmes consists of information on over all working of the organisation, detail about each and every section, its subsections, equipments etc. In this age of specialisations, in place of imparting a very general type of training, it should be made specific. It may be a rigorous training on particular type of high tech equipment for detailed training in a subsection. It will not only cover the technological aspects of training but will also provide more opportunities to more number of candidates in same organisation due to the distributing and locative training.

Training and placement cell, itself should arrange a few lectures for prefinal and final year students, covering various organisational ideas, different training programmes available, suitability of a specific program to particular branch and so on.

(v) Placement:

Placement component of the cell can be strengthen by making some efforts. Campus interviews can be treated as a mirror of the performance of the institutions. Today one measure of the performance of institutions is how many campus interviews are held. Number of campus interviews depends, of course, on the general reputation of the institution.

In many cases it is found that students may be very good academically but they fail to perform well in interviews. There are many reasons contributing to this. For most

of the students, such interviews are for the first time and therefore they fail to communicate properly. Training and placement cell should arrange seminars, and lectures on the topics of personality developments, effective communications, public speaking, group discussions, how to face interviews and english speaking. Students should also be prepared for competitive examinations, general knowledge and general aptitude tests. Such programmes should be conducted throughout the year as per a predecided calender. Efforts should be made to have participation of students as much as possible.

All the engineering institutions now have facilities of computers available with them. An information system consisting of institute's information should be developed which may concentrate primarily on the database of students and academic information. This system will be useful to answer many of the queries raised by industries in the form of printouts, and graphs.

Curriculum development workshops can be arranged in which maximum possible participation from the industries can be incorporated. General information about the institute in the form of newsletter may be sent to all the industries where employment potential exists. This will help industries in knowing the institute better (Fig.2).

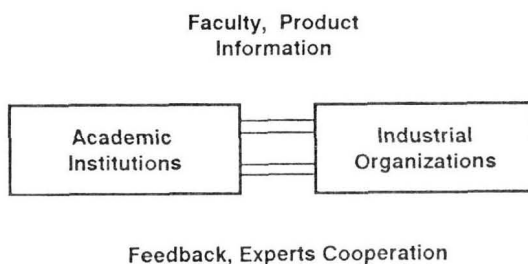


Fig. 2

APPROACH OF INDUSTRIES

The role of industries in training and placement of candidates is different from what it happened to be a decade ago because possibilities of technology gap can not be denied. However the gap can be reduced with the liaison with the industries. In the existing system, the industries have little contribution in educating an engineer, but as soon as a student is passing out, it is expected that candidate will be able to take care of all their problems responsibly.

The industries are required to keep contacts with educational institutes, provided suggestions in forming the curriculum and interact with the faculty members of the institutes with reference to technological changes.

Another very important area where industries will have to extend the

cooperation is vocational training. This training should not be considered as useless or fruitless efforts or obligation on educational institutes. On the contrary, it should be realised that this will ultimately be utilized by industries only. Contribution in imparting training to these candidates will make them more suitable to be used immediately on appointment. Industries should adopt systematic approach to impart training to these young to be engineers. Concentration of the training should be on high tech instruments and equipments and not just the overall form of organisation and its working. Maximum possible students should be permitted and sufficient time should be spent on them. The training should be independent of the fact whether there is requirement of new engineers in near future or not.

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