

DEVELOPING A MODEL FOR FUTURE ENGINEERING EDUCATION

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SYNOPSIS

The development in the fields of Science & Technology are taking place at a very fast rate. As a result of this, various new branches of science and engineering are emerging out and the old ones as it is they become obsolete. For a country like India where there is abundance of brilliant man power, if coupled with proper management of the other natural resources, can emerge out itself as a super-power in a span of couple of decades. To achieve this a revolution in the thinking of National policy makers i.e. Governments, Industrial Managements, Co-operative and Agricultural sectors, Educational bodies and common people is needed.

Non-formal Methodologies can play an important role in continual upgradation of knowledge. Engineering Education must be looked upon as a tool to achieve an excellence in the working of the people and not a solution to solve/postpone the unemployment problem of the country.

To cater all this, a new system of imparting engineering education needs to be evolved, which is dynamic and capable in itself to change as per the need of time.

A model of such a system is proposed wherein the management of educational institute will be in the hands of industries and Government will exert only qualitywise control on that. This model will be a socialistic one and a step towards technocracy.

Introduction

Education is as important for the development of a society as water for the human body. It is considered as the key input in planned economic development of a country. In the present day situation, where

the knowledge is expanding at very fast rate, the technology must also develop with it. The developed technology should reach the practising engineers. This can be achieved by training a large number of engineers/technicians. Training is a must for every one from top managerial level to a tradesman. This

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keeps an individual ready to face the new challenges as a result of changed atmosphere. Otherwise, he will find himself unfit for the job.

Even though, India is 10th industrialized nation in the world, there is a big lag between the number of technicians per graduate engineer compared to the developed countries. Also the ratio of graduate engineers to the total population in the developing countries is one fourth of that of developed countries.

In order to remove the disparity, it is essential to think of a new model of imparting engineering education in a socialistic way which will be supplementary to the present pattern. It will also satisfy the need of imparting education in emerging branches of technology.

When we look at the scenario of the world technology market, in developing countries the quality and quantity of the educated engineering personnel is very much disproportionate which is definitely non-conducive to the overall development and the living standards of the society. Value and respect is needed to be made available to the training of the skilled workers and there should be enough scope for them to achieve higher qualifications by continuing education while on job i.e. vertical integration. At present the scope of continuing education is very much limited.

Many top engineers become managers, who are required to manage non-engineering activities which must be stopped. It should be management of development, management of maintenance, management of technology, management of innovation, management of research, etc. To do this, it is essential to update large number of teachers and adopt new educational methodologies. It is pointed out by a study

that there is no noticeable change in the direction of modernization of educational technology since independence. Hence for doing this a total revolution in the pattern of education is required. The proposed model is an attempt to solve this problem and it is expected that all the concerned will think over this positively to bring out a good.

Relevance of technical education to industry :

The industry requires engineers with skills of management of production, maintenance, innovation, technology, research, etc. However on account of shortages of qualified personnel, these jobs are done by less qualified technicians which results ultimately in inefficiency and ineffectiveness. For a country like India, where demands are ever increasing and resources are limited, it is not possible to make the two ends meet with the present manpower.

This brings us to the conclusion that industry should be involved to a great extent in the management and financing of institute and academic programmes.

Distant learning centre :

In order to face the challenges an attempt is made to formulate a model which should serve as an instrument for imparting engineering education in future alongwith conventional education system as shown in fig. 1.

The model

The proposed model suggests one central institute for the whole nation, with its branches at eight or ten places in the country referred to as Regional Centres (RC). Each regional centre in turn would have about twenty to fifty Distant Learning Centres (DLC) located at various places in the vicinity of

industrial areas. The centres operating at each level shall function in perfect integrated system which not only cater the needs of the region but emerge as a model of its own.

Central Institute shall be empowered to formulate general guide lines for the working of RC and DLC. CI should act as a nucleus institute and help in the proper functioning of RC and DLC by imparting instructions from time to time.

DLCs need to be located Geographywise and each industry should have association with the nearest DLC. DLC may be housed in the existing polytechnic or engineering college, for over a short period so that the available facilities of the institute can be used by DLC. As the time lapses when DLC units attain self sustained status the regular polytechnic or engineering college may be stopped and only a DLC be continued. The polytechnics and colleges at other places may continue to work as usual.

The DLC should award with the signature of its director a trade certificate. It should have autonomy to formulate the course content, its duration, mode of examination, etc. for the purpose of trade certificate course. It should conduct the laboratory work and classroom teaching if some contact hours of classroom teaching are essential/optional for a course for the candidates appearing diploma and degree courses through correspondence at RC or CI. This may be done in the morning and evening hours or at day time during the vacations of the candidates. It should provide various educational facilities such as laboratory, library including video library on a wide variety of subjects. It should also be capable of providing hostel facilities for outstanding candidates coming to the centre.

Management of DLC

DLC should be 100 percent financed by the central government. Each industry be levied a tax for this purpose which should be at some (say 2 to 5%) percentage of the capital or turnover of the industry. Collection of the tax should be done by Government only. Government may use more funds than the tax collected depending upon the necessity.

The industries which are attached to DLC should get representation in the general body of DLC. The general body should elect about 50 percent of executive council members. About 30 percent of the EC members be government nominees with not more than 20 percent exofficios. Balance 20 percent of the EC members be elected from the faculty of DLC. The EC should manage the affairs of DLC.

Faculty is the real governing factors influencing the quality of the DLC. Hence selection of faculty members need greatest care. A few suggestions regarding this are as follows :

Full time faculty members should include equal proportion of senior members from academic institutions and eminent engineers from industry. Remaining members should be selected from among the senior engineers working in the local or nearby industry as part time faculty members. It should be more or less compulsory to all senior engineers to engage at least one hour per week at DLC for juniors.

Regional centre

The RC should award a diploma certificate to a candidate who fulfils the requirements in terms of passing the number of subjects. Under the guide lines of CI, the RC should formulate and conduct the courses

and examinations. They should get an assistance from the DLC for all these purposes. RC should provide various facilities including conducting classes for the minimum contact hours for which the facilities could not be provided at DLC. They should have more advanced laboratories and library facilities compared to DLC. Such facilities may be provided in the areas where a certain minimum number of candidates are expected to join diploma and degree courses. The RC should reduce the burden of CI by providing such facilities that a candidate may not have to go to CI personally even during his degree studies.

Central institute

CI is expected to be a premier institute for the development of a nation. It should issue general guide lines for the course contents for trade certificates and diploma courses at DLC and RC. It should formulate the course contents for degree and higher level of studies and also the requirements in terms of passing the number of subjects for awarding the degree certificates. Financing, Management and faculty of CI be similar to RC.

The course structures at all levels should be formulated with a progressive view with a wide scope to select subjects of interest rather than making it a tough task to pass some uninterested subjects to a candidate. A candidate should have freedom to choose subjects of his interest which are more relevant to his nature of job and also the combination/grouping of subjects for satisfying the requirements of degree course.

By making the optimum use of the facilities at DLC and RC it should make it easier and economical for the knowledge hungry technocrats to get higher qualifications in the subjects of their interest. A great emphasis be given to do the applied research

on the projects from industry.

A wing of this institute should be developed to such a capability to advise in a proper way to the central government in making a policy decision regarding technical manpower planning and mobilisation. Through its publications people be made aware of the fields in which manpower requirements are available with future projections.

Socialistic approach

Like open university this model will open the doors of knowledge and a hope to get higher degrees to personnel engaged in the industry. Also this will help in continuous updating of the knowledge to the qualified persons who are interested in studying the recent developments in the fields of their interests. Such class of personnel being more aware about the working conditions are requirements of the industry their innovative ideas will definitely lead to positive industrial growth. A large section of industrial personnel being updated from time to time will change the pace of present day industrial growth and will be capable of accepting the challenge of 21st century.

Conclusions ;

Investments in human capital are the most paying investments when considered on macro level. Also in order to keep pace with the fast changing technology the knowledge personnel must also match with the technology change. In order to achieve this a continuous learning system needs to be evolved, at the same time one should have a scope to learn and develop skills in the fields of his own interest, irrespective of his basic degree. The suggested skeleton of the model is intended to be a solution for the present situation. However a more detail debate by teachers and industry personnel is

needed on the issue in order to arrive at final conclusions. Such a model will produce resourceful pull of engineers, qualitatively, and quantitatively, leading the country to technocracy.

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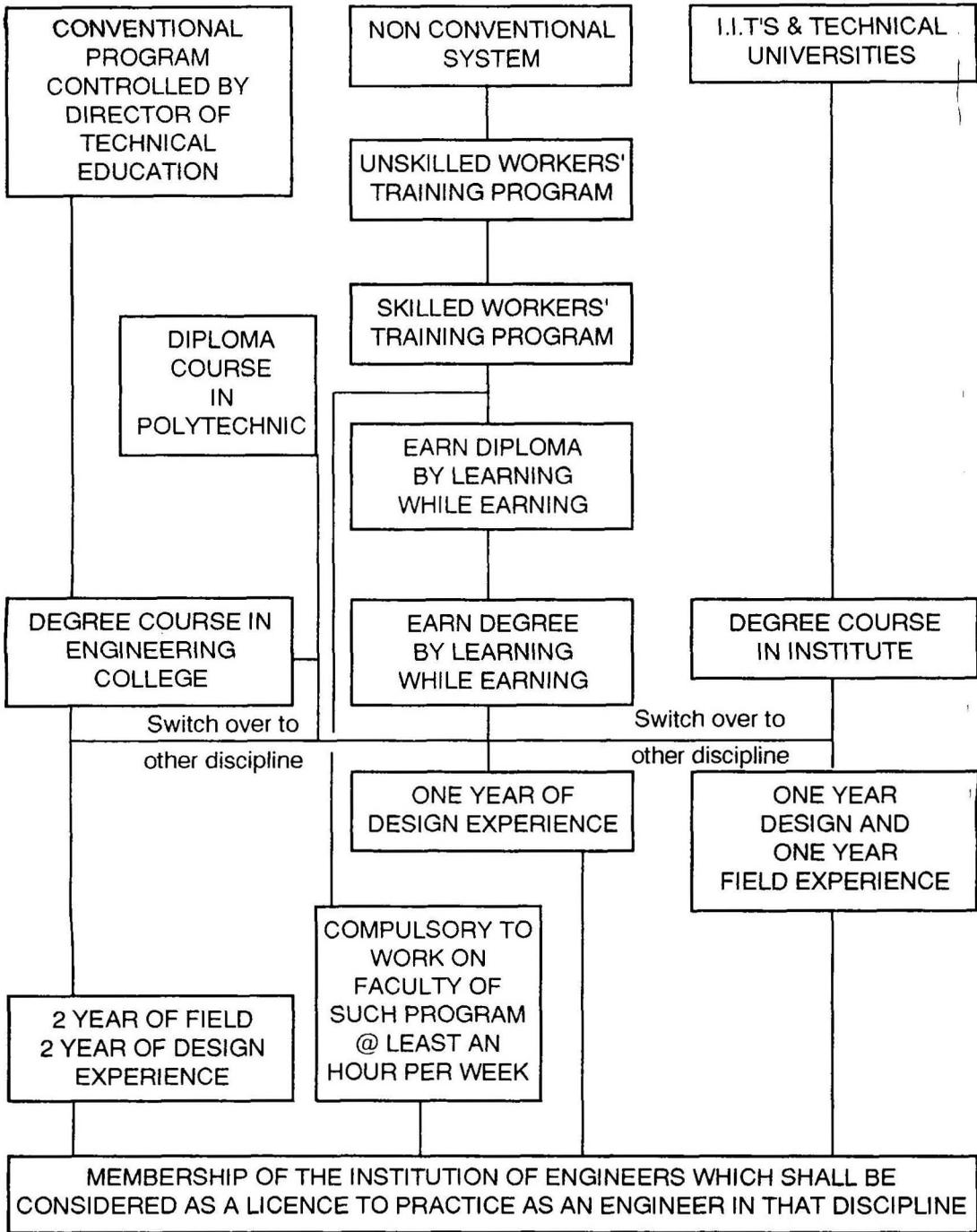
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Figure 1



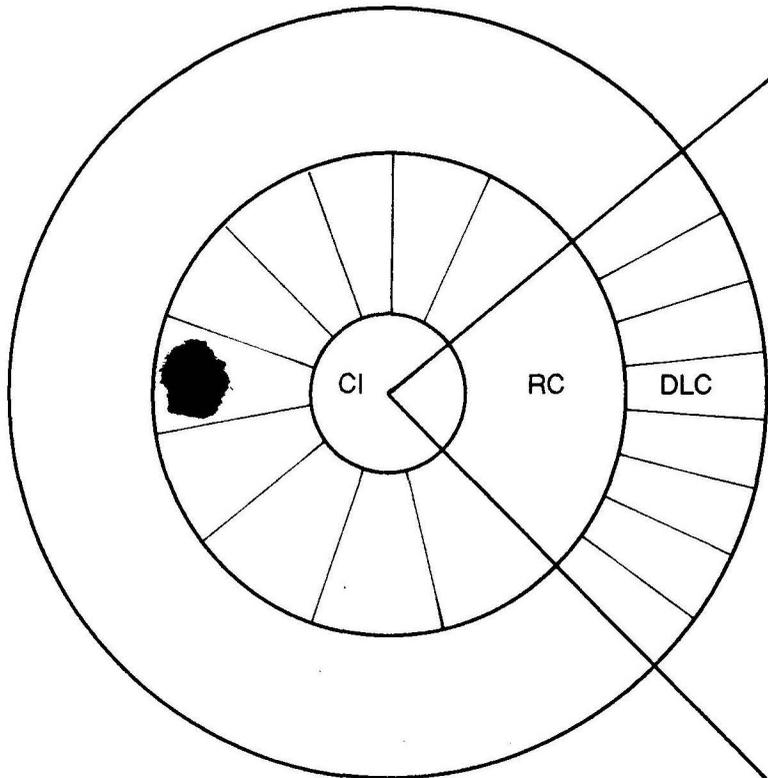


Fig. 2 : DISTANT LEARNING SYSTEM

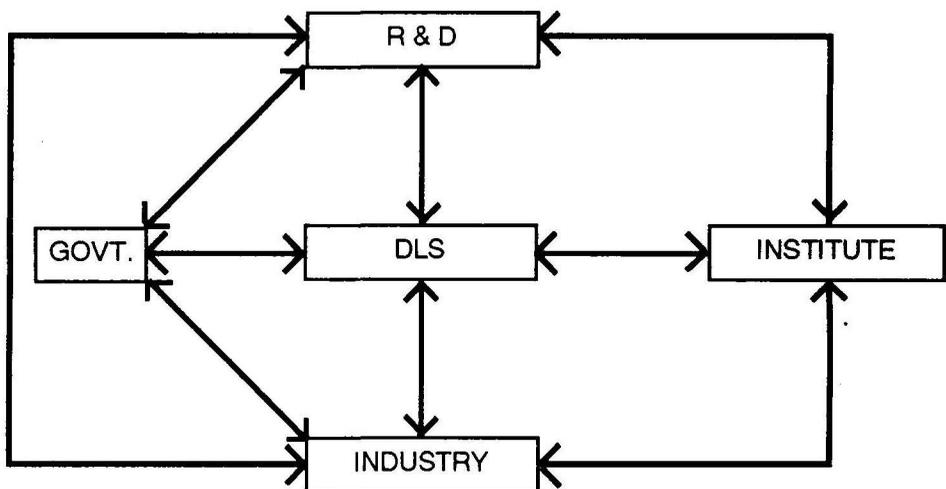


Fig. 3 : INTÉRRELATIONSHIP OF MAIN ORGANS IN DISTANT LEARNING SYSTEM