Designing Curriculum for Technical Degree Courses: a General Perspective

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ABSTRACT

Success of any Technical Education programs depends upon design, development and implementation of curriculum. In today's scenario the technology is changing so rapidly that half-life of several disciplines has dwindled down to just a few years. Mobility of engineering professionals across the national boundaries has changed the demand- supply perspective and this may eventually force the curriculum designers to take a global view. Possession of relevant knowledge, creation of new knowledge, and the capacity for its application has become the prime concern for design and development of curriculum.

Expert survey predicts that the future engineers will be required to posses some essential soft skills along with content knowledge & skill and appropriate attitude. Designing a new curriculum needs also to focus at least some of the soft skills to enable the passouts to face challenge in the field.

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Most of the institutions have adopted a generic approach in developing a curriculum by considering certain weight age for all types of courses Humanities and Social Sciences (HSS), Basic Science, Engineering Science, Design, Computer, Laboratory, Project and Specialization courses.

This paper highlighted some essential considerations in designing and developing curricula in present day scenario, an overview to design and develop a curriculum in Indian context and also discussed some modern approaches already been implemented in designing curricula.

INTRODUCTION

Design and development of a curriculum properly is the pivotal point of for running a course successfully whatever may the level of course. An institute may have good infrastructure, sufficient well qualified faculty and staff and other necessary resources, all these are of no impact if that institute has a good curriculum to follow.

It has been recognized that success of a technical degree programme too much depends upon the effectiveness of its curriculum. Possession of relevant knowledge, creation of new knowledge, and capacity for its application has be-come the determinants in the strength of nation and which can be ensured through proper design of curriculum. Technical education has come to centre stage and is today the most important agent for change and development. In today's changing scenario, design and development of curriculum must respond the changing requirements to address the growing demands and challenges. Technical education is a large system and it is impossible to predict its behaviour over far too distant future since the system parameters show a high rate of change.

Curricula design some essential considerations:

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As already said, designing a curricula is really a challenging task in present day scenario. Some of the changed parameters as described below have necessitated planner and designer of technical curricula to rethink the whole exercise.

Present scenario of technical education. Technical Education System in our country is designed to meet the current and expected demands of trained manpower for solving social problems. The system is linked with technology, market complexity and dynamics as also the society. In today's world technology is changing very rapidly. The technology in vogue today is fast becoming obsolete or being upgraded at a rapid pace. Economic Liberalization is affecting the market size, complexity as well as the norms of international trade. The mobility of professionals across national borders has widened both supply-demand perspectives making it imperative for educational planners to take a global view.

Implications for technical education system. As the domestic industry changes in respect of technology updating, adoption and adaptation of technology the technical manpower development will have to correspondingly undergo drastic changes to produce technically skilled and innovative manpower for the industry. Sufficient emphasis must be laid on learning to learn skills so that a person has the capacity to update himself partly while in employment. This obsolescence will have to be removed by a strong system of continuing education through industry-institute initiatives taken by the engineering institutes.

Changes in the technical education sector. Since education sector, particularly technical education, is the system that produces huge technical manpower at different levels, primarily for the domestic industries, some of the profound consequential changes also have been taking place in this sector as well:

● Rapid obsolescence in engineering technological knowledge

● Promotion of creativity, innovations

● Need for modernization of workshops and laboratories

● Internet information base accessibility for all.

● More problem solving abilities of the technical personnel

● More emphasis on educational management

● Need for exploration of financial resources other than state funding

● Generation of internal resources Need for stricter quality assurance of the products, services

● Development of curriculum vis – a – vis industrial needs etc.

● Continuing education and retraining of personnel

Changes in manpower requirement characteristics. In the light of the changes taking place in the industry/ business sectors the desirable characteristics of engineering graduates are also being modified. A possible list of desirable characteristics of engineering graduates is given below:

● Problem solving skills

● In depth knowledge in area of specialization

● Some knowledge of business strategies, management principles etc. Innovative and creative activity

● Communications skills

● Ability for technological assessment, adaptation, upgradation and transfer

● Willingness to keep on learning (life long learning)

● A global perspective in engineering activities

● Ability to assess impact of engineering activities on environment Concern for people – society and for relevance of engineering solutions Appreciation and understanding of world affairs – cultures

● International competitiveness/ quality — reliability, safety, ethics,

productivity etc.

- Ability to work in team situation
- Decision making capability
- Concern for energy situation
- Concern for environment
- Concern for quality
- Ability to think holistically and in global perspectives

Models for developing curriculum. Present day curriculum of any technical degree programme, what we are developing are based of some of the models suggested by suggested by different experts in different times. Out of them models suggested by R.W. Tyler and Hilda Taba are sometimes considered straining point of developing any curriculum. Salient points of both the models are highlighted below:

R.W. Tyler (Tyler's Model of curriculum Development) viewed systematic curriculum development as a process stemming from the following four fundamental questions:

- What educational purpose should the institution seek to attain?

- What educational experiences can be provided that is likely to attain these purposes?
- How can these educational experiences be effectively organized?
- How can we determine whether these purposes are being attained?

Hilda Taba (Taba's model) suggested systematic and sequential steps for developing a curriculum in the following way–

- Diagnosis of needs
- Formulation of objectives
- Selection of content
- Organization of content
- Selection of learning experiences
- Organization of learning experiences
- Determination of what to evaluate and on the ways and means of doing it

Suggested strategy for curriculum design. To undertake design of

curricula, establishment of rapport with industrial/field organizations; industrial associations other academic institutions is very essential. Involvement of professionals from world of work and technical institutions (including the faculty of appropriate institutes) has one of the salient features in taking proper decisions in curriculum design . Following are some suggested points in designing the curricula.

● Identification of potential areas for gainful employment of technical engineers

● Identification of activity profile of technical engineers in different functional areas

● Identification of competency profile for a particular programme

● Deriving curriculum areas from competency profile

● Preparation of detailed contents in the light of competencies to be developed

● Preparation of study and evaluation scheme for implementing the programmes

● Working out resources required (physical, human, information and financial) according to norms and standards laid down by the All India Council for Technical Education (AICTE) for effective implementation of curricula

Curriculum development — few modern approaches.

Competency-based approach:

Learning of learner is measures by relative permanent change in behavour after passing through a learning process. If this so, an explicit change in performance which is measurable and observable should have occurred after the learner has undergone precise learning process. Do the present ay curriculum documents specially in the technical education focus on a changed behaviour of learners? Of course, in some cases it is implicit, but in most of the cases it is not. The concept of competency relates to this. It focuses on behavioural change which should

be reflected deliberately and purpose-fully in a curriculum document. In short, competency-based curriculum follows learning modules and assessment methods based on the attainment of well defined, and agreed upon, group of competencies.

Multipoint Entry and Credit System (MPECS):

It has been observed that students demonstrate better performance in Teaching-Learning process when they are made responsible for their own learning. The Multipoint Entry and Credit System (MPECS) allows the student himself/herself to select content, learning strategies and to decide the pace in which he/she desires to learn, which results in increased motivation among the students. The influences of individual differences are also taken into consideration in order to provide flexibility to the learners. MPECS based curriculum or in other way flexibility in designing curricula is practiced in India

by different technical institutes. Under the World Bank Assisted Technician Education – phase – III all beneficiary institutes were implemented this concept to design their curricula. Some of the objectives of such system are given below:

● To allow students, possessing different academic qualifications, entry to the course at different levels appropriate to their qualifications.

● To provide opportunity to the students to pursue program of studies at flexible pace according to their capability

● To provide option to students to select courses of study according to their needs and interest

● To provide scope for working personnel to upgrade their knowledge and skills.

CONCLUSION

Though some common ap-

proach is generally followed in designing curricula, some regional factors (limitations and advantages) is also important to consider while doing the same. Finally, a curriculum no matter how good it is, will not translate into academic excellence for the institute if the persons implementing it lack a passion for excellence and the infrastructure available is sub-standard.

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