CURRICULUM DESIGN AND DEVELOPMENT : THE HUB OF THE EDUCATION WHEEL

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ABSTRACT

This paper presents that in the context of the present scenario in India, Curriculum Design and Development (CDD) needs due attention for promoting quality education in India. The objectives of curriculum, the methodology for its development, the role played by teachers in translating so many words of curriculum into day- to- day actions, etc. , have been presented. It is pointed out that curriculum however best it is, cannot alone improve the quality of engineering graduates unless a system approach is adopted. The paper, it is believed, is thought-provoking and can be of interest to all concerned.

INTRODUCTION

Education plays a vital role in promoting the socio - economic development of a country. Curriculum is the very hub of the education system around which the whole education (system) wheel revolves. In other words, curriculum is a light-house guiding and directing the (subject) ships floating in the huge ocean of information and knowledge. The teachers are the captains of these ships. If the light-house is appropriately located and the captains are the real leaders, certainly the education system shall lead the young generations in the right direction promotng the national welfare and wellbeing. Technical education, in particular, can lead us a long way on the road of prosperity. Obviously, the curriculum and the teachers who translate it into the day- to- day actions will have to play a very significant role in turning out the quality (engineering) graduates from the system.

SCENARIO IN INDIA

Looking one or two decades back or beyond, one can easily realise that in each university in Maharashtra, there were hardly two engineering colleges. The system then was simple and managable. The teacher was whole-sole. He was the curriculum designer, teaching planner, teacher, paper setter and even very often the evaluator. Whatever he used to cover in the classe, was the syllabus and that used to define more or less the scope of examination. Inspite of limited facilites available those days, there had to be some rapport between the teachers and taught. There hardly existed quality audit of the education system as it was the seller's market. The products, therefore, produced by

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these very few colleges was acceptable to the customers, like industries, public undertakings and Government. It can be argued that the products have offered good services to the nation, and certainly the earlier generations of engineers have come up to the expectations. However, today, the scenario has completely changed. The characteristics of the present state- of - affairs in India can be attributed to :

- A large number of self-financed engineering colleges have emerged since the last decade or so. These colleges have invested over Rs.700 crores, and are turning 10 times more graduates than those being turned by the Government and aided colleges in Maharashtra, and have generated sizable employment compared to any other sector in rural and urban areas.
- In the first eight months of the year 1993, foreign investment worth over Rs. 5792. 5 crores has been poured as a result of the Government of India's policy of economic liberalization. World Bank has granted us a loan worth US $ 517 million dollars for the development of polytechnics in India.
- Industries can now hardly be provided with local protection. These are thrown into cut-throat international competition. They are, therefore, struggling for ISO 9000 certification. This has made industries quality- cost conscious. For quality products with optimum cost, naturally they have to be in search of trained technical man power with quality and competence. This has compelled us for first time to think about the quality of the passed out graduates from our universities. We have now realised that the technical institutions will have to adopt, install and implement the concept of Total Quality Management in their functioning [1]. Several organizations excluding universities having identified the market needs have stepped in and doing roaring business in promoting trained technical manpower in various need-based areas, like, computer, electronics, tailoring, telephone operator, Autocad, etc. If we fail to pace with the time, the university graduates will have no place in the market, and we will simply accelerate the rate of unemployed graduates. After the publication of the New Education Policy Paper in India in 1986, several suggestions have been made to improve upon the situation. Some of these are : Institution-industry interaction/ collabera -tion/partnership, delinking degrees from jobs, identification of mission and thrust areas, curriculum reformulation, etc. However, these have yielded very very limited results, the reason perhaps being that we are beating around the bush and forgetting the core of the issue [2]. The core is the need for sound and need-based Curriculum Design and Development (CDD), flexible and adoptive study programmes, and above all the lack of professionally trained teachers capable of translating so many words of curriculum into day- to- day actions. Else, short term technical courses shall flourish, and we shall miss the train.

OBJECTIVES OF CURRICULUM DESIGN AND DEVELOPMENT

The major objectives of curriculum design and development can be summarised as given below :

- To help explore through curriculum value judgement, need- based knowledge and information, skill

enabling institutions to produce marketable products [3];

- To promote creative and innovating thinking amongst the students community so that self - learning becomes dominant in and off the class [4]. In fact, there does not exist the so called teaching process. What we actually do is an attempt to mould students for self-learning. We uncover the layers of ignorance and expose them to the knowledge within.
- To design a sound feed - back system so that input to and output from the system can be measured.
- To monitor the technology of teaching involved in study programmes [2].

LIMITATIONS OF THE EXISTING CURRICULUM

It is unjustifiable to say that the existing curriculum and study programmes have become totally outdated. However, in view of the present and future needs, it needs certain modifications. Some of its major limitations are :

- Undue stress on written examinations.
- Non- provision for such elements as understanding, creative thinking, etc.
- Term work and laboratory work have become rituals and a means for enhancing marks.
- Examination orientation of the whole education system.
- Evaluator is other than the teacher who normally supervises the students.
- Less clarity for scope of the syllabii and no guidelines provided for teaching schedule.
- References are incomplete and presented not in proper norms.

The result is production of square pegs for round holes. In view of the objectives of CDD listed above, the CDD can help minimise the above shortcomings and should promote the following :

- Need - based skills aquisitions in physical operations, analytical and diogonostics areas, communication, human relations and organised commonsense.
- Self - learning and innovating thinking.
- Understanding industrial work - life and work- culture.
- More stress on understanding rather than the written part of it.

PROPOSED METHODOLOGY FOR CURRICULUM DESIGN AND DEVELOPMENT

Curriculum design and development is a gradual and continuing decision making process involving formulation of teaching plans so as to turn quality (engineering) graduates who can satisfy the needs of the individuals and the society as a whole . CDD must specify the aim(s) of a course included in a study programme, and clearly indicate the attributes the students are going to acquire, if a student undertakes the said course. This can be achieved if CDD is worked out on a line similar to that of ISO 9000 or so, wherein all procedural details, such as, teaching-aids, quality of teachers, industry involvement, teaching schedules, etc., are pinpointed with proper documentation support at every level in the teaching-learning process. In view of this discussion the following six phases of CDD have been proposed [5].

- **Recognition of Need**

The curriculum need to be designed

for satisfying both short range and long range requirements of industries. It must cater to the local needs in general, and national in particular. This needs a thorough survey of the market. Such a market research is missing in India. CDD should neither be a ritual nor a mere formality. Experts working in different walks of life, such as teachers, industry personnel, social leaders, educationists, religious leaders, experts from professional bodies, etc., need to be invited for CDD. These experts should identify broadly the market demand of today and tomorrow, and work out definite strategic planning at the national level. The Board of Studies or some other similar bodies which have been vested with CDD will have to work hard in view of the national planning and goals set to turn the existing system of CDD, this vital phase is missing. Recognition of need will help us in going for a flexible, need based and quality - conscious curriculum. The answer to the following questions shall make the point further clear :

- What is the quality of inputs both of students and teachers involved in the teaching - learning process ?
- What exactly we have to achieve : quality engineers or a large number of unemployed graduates ?
- What are our todays and tomorrow's needs ?

Definition of Problem

The CDD problem can be defined as :

Design and develop the curriculum in such a manner that quality engineers shall be produced through the engineering education system who can serve the motherland squarely with quality audit and assurance check points, periodical teachers and students evaluation and correcting actions, if any, etc. In short, CDD is a gradual and continuous process evolving an appropriate frame structure with an objective of imparting quality education to students. It needs periodical review and updating thereafter.

-Synthesis

Proceed from part to whole. This is a very vital phase, because it reflects the quality of output expected to be obtained from a system. The persons involved in this phase must be men of vision, foresight, sincerity, patriotism, integrity and honesty. Small group working of such personnel can be a right solution to the present problem. A few suggestions in this respect are :

- Study the past, and integrate it with present and future needs. Make curriculum more flexible, versatile and adoptive.
- Adopt system approach so that all the components of the education system, like students, principal, faculty and supporting staff, laboratories and library, training and placement officer, students and staff performance evaluation systems, can work in one pointed direction [1].
- Install rigorous quality check points at appropriate levels in the system.
- Install a procedure for measurement of system inputs and outputs and monitor it strictly for deviations, if any.

Analysis and Optimization

This is the crux of the issue at hand. It goes from whole to part and critically analyses each component involved in a system. And an attempt

is made to optimize effectiveness of each part. The proven technical teachers backed up with sound professional training can handle this task effectively. Their major task will be to analyse the details and strike a balance for CDD i n the light of both the broader policy set at national level and, the local and regional needs. A few design considerations influencing CDD are :

- Weightage for theory and practices : equal weightages.
- Total number of contact hours in a week : 35 hours per week
- Total number of subjects in a term : not more than four.
- In built students continuous assessment. Adopt cummulative performance for award of degrees. Give more stress on understanding and for creative approach rather than written part of examination. This can be assessed by a teacher provided there exists close rapport between teacher and taught.
- Nature of theory subjects : scope be limited and well defined with time schedules (e. g. define the aim(s) of a topic, specify coverage topicwise, keep only essential descriptive part, etc.), references be standard and edited as per norms; availability of the course material at the time of students registration (i. e. books and teacher's self-prepared notes), home assignments, etc.
- Nature of laboratory work : include only experimentation part of laboratory eliminating such part as " assignment on " and " study of". Experimentation should be done in the spirit of investigation and not as a ritual. Define aim of an experiment and see to it that students are well versed in handling the instruments, and fully made aware of their accuracy, availability, prices, etc. Industry - oriented laboratory work can take us in a right directon. Lab - work book be ready at the time of students registration. It needs to be compact, concise and short eliminating all other garbage type write-up.
- Provision for in built component for inculcating industrial work-life and work- culture amongst students through such means as compulsory industrial inplant training, industrial visits, industrial projects, etc. , under teacher's close supervision.
- Analysing data regarding the quality of students being admitted to the courses, capability and potential of teachers and supporting staff and other infrastructure available in institutions.

The task group should analyse such and many other local factors which predominantly influence the quality of education and optimally design the curriculum. The group shall also be responsible for its effective implementation. Preferably this can be done on a unit basis of, say, 4 -5 districts. The group should come forward to handle the issues surfaced while implementing the curriculum. This group, thus, can present a few workable alternative solutions to a set of institutions in a unit.

Evaluation and Selection of a Curriculum

A viable solution out of many at hand, can be chosen considering such factors as feasibility of successful implementation of a curriculum, its implementation cost, and marketability

of students.

Presentation

Once curriculum has been accepted, it needs proper presentation. For example, it should be syntax- error free, and should have full references as per norms, clarity, time schedule, clear-cut directives for subjective assessment of student of student's performance, etc.

All the six phases discussed above must be effectively integrated for optimal CDD.

SCOPE FOR FUTURE WORK

This paper provides a simple guideline how to design and develop a curriculum. However, it should be done in view of the other vital components of the education system, such as, quality of teachers, examination pattern, instituton- industry collaboration, etc. Thus, unless a system approach is adopted, only curriculum, however best it is, cannot alone bring the expected end results. Obviously, there is wide scope for future work for integrating CDD with other components of the engineering education system.

CONCLUSION

This paper advocates adoption of a scientific approach to curriculum design and development. It has presented the objectives of curriculum, six phases of design, the major design considerations, etc. It is pointed out that the curriculum however best it is cannot alone yield the end results unless a system approach is adopted. All other components of the technical education system, like, students, staff, etc. need to be properly integrated with CDD for quality education. The paper, it is believed, can prove a useful guideline to all concerned.

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ACKNOLEDGMENTS :

The Author is extremely grateful to Dr. J. S. Khadilkar, Ex-Principal, Government College of Engineering, Aurangabad, for his timely invaluable suggestions made while preparing the manuscript of this paper.