

Ensuring Quality and Productivity through Teaching Economics in Indian Engineering Education System

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The aim is to write this paper is the highlighting the importance of Economics Education for the economic growth and development of the country for engineering students. Engineering, in general, is application of science for enhancing efficiency and productivity. Therefore, all engineering activity has economic implications. An engineer must be aware of the principles which govern the Economic aspects of an engineering decision. This is the reason that Economics is being taught in one form or the other in almost all engineering education system of the world. The development & socio-economic condition of a nation, determines by the Technical Education, which is the indicator of technically skilled manpower for the country.

Keywords: Quality, Productivity, Education System, Efficiency, Productivity, Socio-Economic Condition, Technical education, skilled manpower.

Introduction

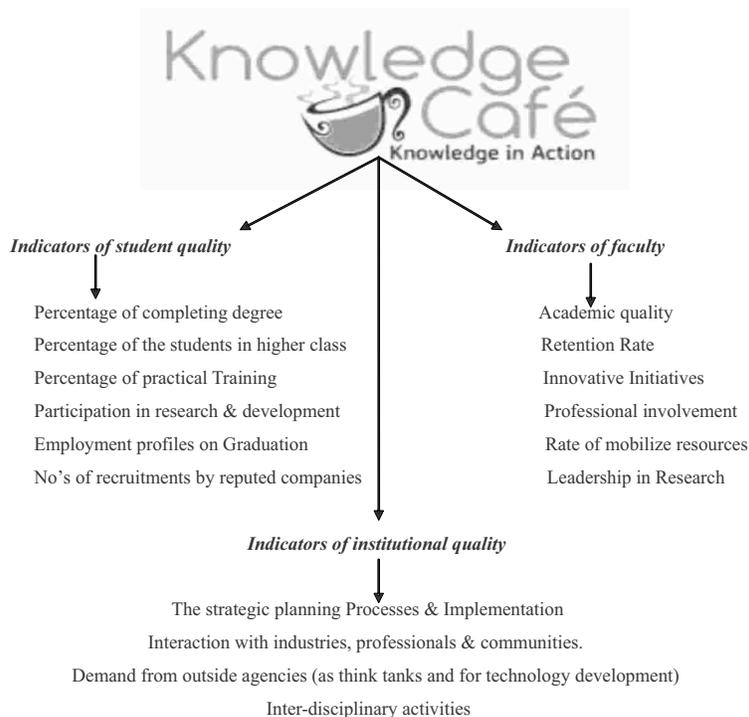
It's very difficult to assess the quality and productivity of Indian Engineering Education System. Indeed, faculty members and even academic administrators are uncomfortable with quality and productivity, under changing global scenario of higher education. There is enough doubt today about the quality and productivity of technical education relating their contribution to economic development or providing services to the community.

Quality and Productivity improvement call for a paradigm

shift which includes viewing the customer as a specific person or group with specific needs, rather than as a vague concept. Quality is the responsibility of every member of organization rather than the responsibility of the academic administrators or a quality and productivity department in industry.

Indicators of Quality

The question is what is meant by quality, who defines qualityAccording to my point of view the quality should involve in different indicators. It should reflect knowledge in action -



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How Economics Blooms in Indian Engineering Education System

During the past decade, as technology has once more become a significant element in government economic and industrial policy, technical education-industry relationships have come to receive new attention. Interest in these relationships is also more intense because of the growing perception that industries products and services are increasingly dependent on fundamental scientific understanding-

- Knowledge of new and emerging industries (e- commerce high technology)
- Experience solving global business problems such as market penetration strategies becoming a low-cost products and international supply chain relationship.

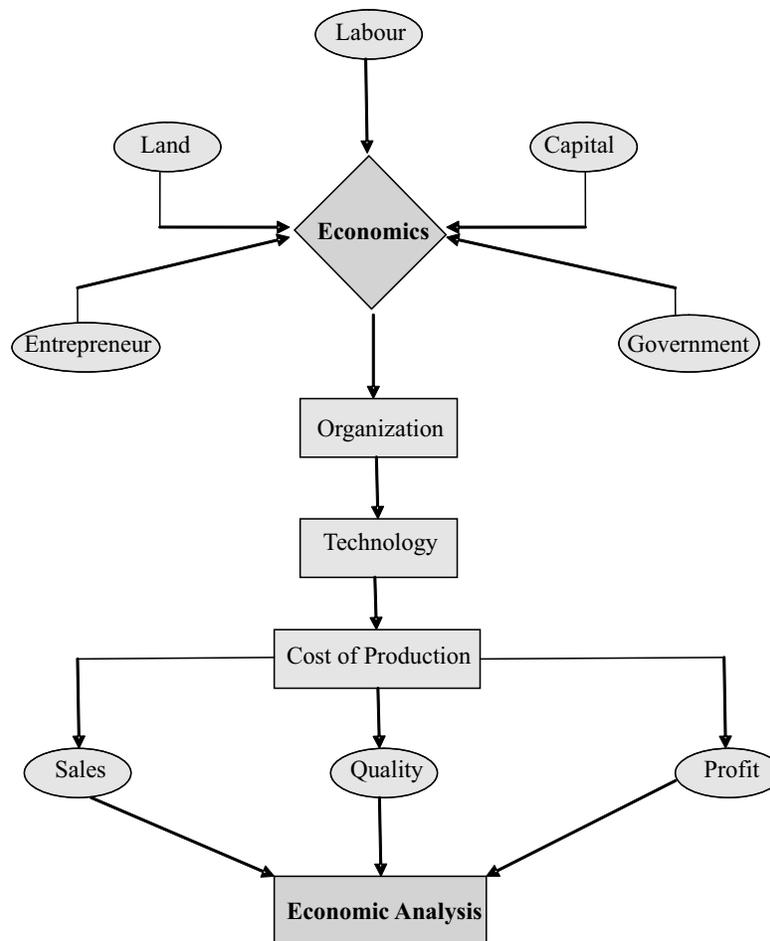
Now a day's organizational environment may be broken down into-

- Societal factors
- Environment factors
- Internal factor

So globalization is alarming to all Economies for the dynamic and inevitable changes. It's mandatory for every economy to allow FDI & open its boundaries to all for competition among firms. Today business world has gone sea changes because of changing conditions ranging from market forces, to people issues, to leadership competencies, in respect of organization & firms. Because to survive one has to strive and thrive, to prove the Darwin's Principle of Survival of the Fittest, which has been transformed to the Survival of The Fastest and finally to the Survival of the Most Competitive. So Firms have to become intense and every organization should be flexible enough to implement the changes whenever required for its survival.

Engineering is an application of science which is used by human beings for enhancing efficiency and productivity of their economic affairs. And Economics is a social science which indicates the human behavior i.e satisfaction. So, for maximizing their satisfaction Economic theories are most applicable, because production is a part of engineering activities but it starts with economic activities. Also there is direct relationship between Economics and Engineering activities. Understanding will be better with this figure:

Figure-1 Path of Economics to Engineering



So each engineering activity must be judged on the basis of two Economic Crucial issues-

- Is the process or product technically feasible?
- Is it economically viable?

The answer of these questions are-

“To create designing, developing or manufacturing any engineering product or process, engineers must have knowledge of economic principles.”

In the era of liberalization and opening up of the economies, when geographical boundaries have lost its significance and economic boundaries are continuously being blurred under various norms of WTO and other agreements, markets are becoming increasingly competitive, firms are opting for cost-effective upgraded technology as a survival strategy to be able to exist in the global market. Therefore, economic aspect of engineering projects has become a important than ever before. The engineers need to have in-depth understanding of basic technologies as well as recent development in the area of technological advances, but the economic environment under which they have to operate. Professional career of practicing engineer is going to be significantly affected by their ability to deal with economic aspect. Understanding of Economic principles and their application in engineering activities becomes even more important for engineers in a developing country like India which is reeling under low labour productivity, large scale existence of informal sector, inaccessible and remote rural area sets.

Technology and National Economy

Technology is the driver and it is associated with products, production, services or marketing. We can easily make the positive relationship between Technology and National Economy

There is vicious circle between it.

Figure- 2. Technology and National Economy



Technology has always played a major role in creating the wealth of nations and influencing standard of living and quality of life. Economists have debated the value of

technology in modern societies for years. Creation of wealth & technological growth is the indicator of development of economies The U.S. National Science and Technology Council, in its report-

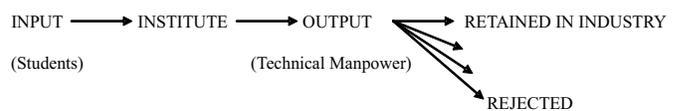
“Technology in the national Interest (1996) emphasized that technology is the engine of economic growth” it reported that “Performance of individual companies- the agent through which economic growth occurs- is strongly linked to their use of technology”.

Industry-Institute Interaction

Most of the institutes have a memorandum of understanding to facilitate & coordinate institute & industry collaboration, Industries provide training facilities to the institution and in return the Institute offers continuing education to their working professionals. They work as a team. Infact now a days every reputed institutions are designing their syllabi with their help & under their guidance for career building. Because the terminologies and technologies are changing now. They believe to design their curriculum pattern on industrial knowledge base or we can say Industry- Academic integration in Technology Transfer. That is called Industry Integrated Programme.

Industry managers, supervisors, and executives, who are able to share practical experiences with the students, are invited as guest lecturers. Student's vacations are effectively utilized by working in the industry with a small incentive in the form of scholarship or wage. Every department of the institution has an R & D section partly funded by industry, with one staff member being its coordinator. The involvement of students under the guidance of a supervisor for undertaking industry-oriented projects is not only useful to the students & academic staff but also promotes interactive networking between the institution & the involved industries. If their knowledge will be in collaboration with Applied Economic, might be applicable for them.

Figure-3 Present system in Input



What should be taught under Economics in Indian Engineering Education?

Realizing the relevance of Economics for engineers, All India Council for Technical Education (AICTE) has also laid down norms for inclusion of Economics along with other subjects related to Humanities and Social Sciences in the engineering curriculum. But in that courses Economics has been included for the sake of inclusion and not much though has been given to the selection of the topics under the subject. Topics being taught are fragmented and sometimes do not seem to be very

relevant for engineers also. It has been observed that there is lack of structured course format of economics at degree level in engineering education system and dissimilarities exist between courses of Economics being offered in different branches of same institutions.

It is clear from the discussion in previous part; topics under Economics have been adopted in the engineering course without considering its actual applicability and utility for engineers... Topics should be first adopted for engineers and then adopted in the engineering curricula. Process of adaption of the topics require detailed discussion among the representatives of engineering institutions, industries, working engineers, technologist, economists and students in conference, seminar, brain storming etc. Subjects thus selected may be known as applied economics as physics is known as applied physics in engineering curricula.

How should be Taught under Economics in Indian Engineering Education System?

Economics may not be taught in the same fashion of the engineering students as it is being taught to the students of social science stream. Time allotted for the paper may be distributed 50-50 between theories and practical. Theories of the subject may include discussion on very important concepts and phenomenon useful for engineers. Rest 50% of the allotted time should be devoted for practical purpose that may include assignment, report, seminars, market survey etc. Practical exposure may be considered effective but to have a better understanding of the subject, it must be preceded by teaching of theoretical concepts and phenomenon. Again from pedagogical point of view, it is always better to teach the broad contours of subject before teaching specific issue such as Small Scale Industries and Organizational Behavior. In the examination also, 25% age weight may be given to the seminars and project report. All students should be required to present research papers in the class rooms.

First semester of Economics course may be introduced in the initial years of the engineering education. Students of engineering may be given a brief knowledge of micro economics, macro economics, public finance, international trade and accountancy,. Students must be sensitized towards the burning problems of Indian Economy. India being a developing Economy, have some specific problems as subsistence agriculture, informal sector etc. They are reeling under low capital and labour productivity. After liberalization and opening up of the economy, these sectors also have to face international competition. Appropriate technology may ameliorate these problems up to certain extent. It is quite natural for engineers to aspire for higher emoluments and better job prospects. However, they should be sensitized towards these problems faced by the Indian Economy. Even if one percent of the students are inclined towards these issues, the impact will be overwhelming. The first paper of Economics may act as an interface between Indian economic problems and

engineering education. Courses on engineering economics may be introduced as separated paper of Economics which may be introduced at an advance stage of engineering education.

Conclusion

Engineering, in general, is application of science for enhancing efficiency and productivity. Therefore, all engineering activity has Economic implications. An engineer must be aware of the principles which govern the economic aspects of engineering decisions. This is the reason that Economics is being taught in one form or the other in almost all engineering education system of the world.

Globalization and opening up of the economy has enhanced the importance of Economics for engineers than ever before. While designing the course, it should be kept in mind that the students of engineering do not have proper exposure of Economics. So, Economics should be taught in degree level engineering programme. Before teaching engineering Economics analysis students should be given basic understanding of the economy and Economics. It is an accepted fact that technology is capable of solving the problems up to certain extent. So, engineers should be sensitized towards these issues also. Pedagogy for Economics in engineering education need to be different from the pedagogy of Economics in social science stream and it has to be developed accordingly. Theory of the subject should discuss very important concepts, phenomenon and application aspects.

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