ENGINEERING EDUCATION VIS-A-VIS EMERGING FREE GLOBAL MARKET

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IMPLICATIONS OF A GLOBAL MARKET

The world has undergone a revolutionary change, recently. The most important development is that the world has become one global free market. The global market is characterised by the presence of three basic factors, namely:

1) competition,
2) constant change, and
3) customer's control *and contentment.*

In order to meet the challange posed by these factors, the following actions will be required.

- Production of goods and services of the highest quality at a competitive price.
- Creativity and innovation in the development of new products
- Flexible and sensitive response to change by the organisations.
- Commitment to excellence in every sphere of work.
- Total customer satisfaction at every level of the production - consumer chain.
- Attention to detail and improved performance.
- Happier customers and happier employees.
- Good old fashioned hard work.

ATTITUDINAL CHANGE NEEDED

In the above context, what is most needed is change in our attitudes at every level in order that those directly involved in the management of industries and services, develop appropriate and quick responses to change, competition, and customer needs in the free market.

By far, the engineers are involved in a big way in production and management acivities in industry and other spheres of economic activity. It is, therefore, necessary that their education and training should take congnizance of these fast emerging changes without any delay or inertia.

The engineers are amongst the most important people at the core of every solution to problems. Their attitudes and perceptions matter a lot for the effectiveness and efficiency of their work. Effective people are those, who do the right things right, the first time and everytime. They produce excellent quality.

The poor outcomes in any system of production are not the result so much of the products, systems or procedures, rather it is the thinking and reasoning process of the individuals and groups that is more at fault. We need to change this and change the way we go about finding solutions to problems.

To achieve this, "Wholsome Development of People" approach as applied to, Engineering Education needs to be adopted.

WHOLESOME DEVELOPMENT OF PEOPLE (WDP) :

WDP is closely related to the attitude of continuous life long learning with joyfulness leading to almost effortless creative work. Wholesomeness arises with a deep

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awareness of one's own well being, the well being of others, and the well being of the whole planet.

When our thoughts, words, and actions are congruent and arise from deeper integration, from the innermost fountains of human love and concern, then wholesomeness is there.

Wholesome development emphasizes the following aspects :

- Innovation and creativity.
- Continuous improvement.
- Effective problem solving.
- Environment concern and an environmental friendly approach to productivity.
- Conservation of resources including efficient use of energy.
- Changing prevailing mind-sets and lop sided paradigms. Freeing the mind from limited thinking.

HOW TO BRING ABOUT THE CHANGE?

In the light of the above aspects the whole process of education will need a thorough and detailed analysis followed by a review. Three steps need to be considered in this regard :-

1. Quality of inputs in respect of material as well as human resource.
2. Process control of the education and training within the institution, highlighting the human interactions.
3. Monitoring output qulaity which will be dictated by the demands of the end users of the professional engineers.

As of today, all the three steps are stagnated due to stereotyping. Except for a little tinkering here and there, the changes in the system have been negligible over the last 150 years. More new topics and technologies are taught but the basic approach to education process has not changed. On the other hand, engineers technical skills with their hands have became poorer. Mathematical analysis has become voluminous but the number of well rounded, wholesomely developed professional engineers has cosiderably dwindled.

Therefore, we need drastic changes in the whole gamut of curricula, training methods, and attitudinal changes in the light of global developments .

These changes can be brought about through a close collaboration bewteen technical institutions, engineering industry, schools of management, and professional societies. Rigidity in approach is to be given up. Instituions need not be mirror like replicas of each other. Each instituion must be fully autonomous to be able to develop its infrastructure and educational process on the basis of its strenghts and weaknesses, available facilities, its location, and finally on the basis of the most optimal response to the needs of the global market which is subject to rapid change.

Every institution will be judged by the quality of its output and to stay afloat in the market will need a permanent system of monitoring every aspect of the three basic elements mentioned above. Within the instituions, the students are our internal customers. They are at the core of the institution interacting with teaching faculty, the management personnel at various levels, and skilled technicians. There must be excellent team work and co-ordination amongst these four in, what I like to call, equilateral harmony (with the students at the centre, and the other three at the three apexes of an equilateral triangle). Only then, can we achieve excellent quality in wholesome development of the trainee engineers.

The thrust of the changes will be in respect of curricula which must have flexibility and relevance besides keeping the state-of- the art in view. The second

area is that of teaching methods. The role of participative learning and the capacity for life long self learning has got to be developed. The important art of learning is to realise an egoless centred self which enables one to cope with change and seek continuous improvement in oneself. Engineers must therfore be exposed to liberal arts and humanistic studies leading them to total awareness through meditation. A human being brought up on a solid foundation of values and ethics, full of humility and love, and skilled in his/her arts is the professional of the future which must come out of our institutions. Only such competent people can meet the requirements of international quality demanded by the market- place.

The market will ask for good return on investment of the students and a good rating of the programme by them. The views of recruiters,the prestige of faculty members; quality and methods of teaching; placement record; international recognition; quality and variety of students; and infrastructural fecilities and location will affect the market rating of the institution and these need to be systematically monitored to maintain the desired competitive and unique edge of the institution.

CONCLUSIONS

The paper makes out a case for wholesome development of professional engineers in institutions of higher learning. That is the correct way to ensure their effectiveness in a global free market which is characterised by change, competition, and control of the customer. Some approaches have been suggested.