

TECHNICAL EDUCATION IN INDIA CHALLENGES OF THE CHANGING WORLD AND STRATEGIES.

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Introduction :

According to a report of the United Nations Population Fund, (i), the world in 2000 AD. will be more crowded, more polluted and more tension ridden than today.

This is attributed to the ever increasing industrialisation, which is the outcome of the super-rapid technical and technological developments.

It may be stated in the most un-equivocal terms that the problems that are being faced, and the challenges the future holds for, are a direct result and consequence of the technological developments and growth of technical education. Obviously, the corrective measures to combat these challenges will have to be evolved through, a proper re-shaping of the present engineering education system by way of research and proper policy making and implementation, so as to develop suitable effective strategies of approach to counter the challenges.

In this paper, a broad based discussion of the above is presented, with respect to the following aspects:

1. A review of the Engineering Educational System and its current status in India

2. Identification of the foreseeable future challenges of the rapidly changing world on technical education.
3. Evaluation of the current technical education system, potential vis-a-vis inadequacies and strategies to counter the challenges.

Review of the Engineering Education :

Technical Education, in our country, is imparted mainly at two levels :

- i. The Engineering Diploma Course in Polytechnics and
- ii. The Engineering Degree and the post Graduate Degree courses in Engineering Colleges.

While in the Engineering Diploma Courses, emphasis is laid on preparing the students for handling shop-floor and field jobs, the Engineering Degree courses lay more stress on training the students to get oriented to the Design, Research and Development. Since the country becoming independent in 1947, expansion of technical education both at the degree and the diploma levels has taken place at an amazingly rapid rate, Today, while there are more than 450 polytechnics in the

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country, the number of Engineering Colleges is more than 150 (2).

The future Challenges of the Changing World

Looking at the fantastic marathon development that the world is undergoing in the field of electronic and computer technologies at the turn of the century, twenty first century will usher in as an electronic and computer era. The erstwhile 'all electric homes' will be "all electronic and computerised homes". Other emerging areas, the robotics, the supercomputers, the space and satellite technology and Electronic Communication Media are going to find extensive applications in the coming years and will bring out revolution in the technological field. The changing scenario by the turn of the century and the beginning of the 21st century in socio-economic, industrial and technological areas, call for a thorough overhauling of the present technical education system and evolving a totally new model which is geared up to encounter the challenges that the changing world has been throwing up and provide appropriate solutions.

Evaluation of the Current Technical Education System :

Evaluation of the current technical education system, its inadequacies and the strategies to overcome the same are discussed under classified heads in the following paragraphs :

a) Management of the technical education system :

At present, Management of the Institution in India, is three pronged :

- i. Direct Government Controlled Institutions.
- ii. Direct Financial Aided Institutions and

- iii. Unaided Institution managed by private agencies from their own financial resources. Hence the growth and degree of expansion of engineering institutions tend to be different.

In order that all Institutions should have equitable opportunities for the growth and development, the pattern of financing and funding needs to be uniformly regulated throughout the country. The overall planning, implementing, monitoring and evaluation of the schemes should be the responsibility of the AICTE in co-ordination with the Directorate of Technical Education, Regional Boards, Universities and the Governing Bodies of the concerned Institutions. Establishment of separate technical universities may prove more effective in making the schemes purpose and result-oriented.

b) Uniformity of Technical Education system throughout the country :

At present there are engineering institutions affiliated to Universities, Boards of Technical Educations and autonomous like the Indian Institutes of Technology, the Indian Institute of Science (which caters to technical education also) and others. The level of excellence of the products from these institutions vary to a great extent. Because of the special status given to the IITs, the IISc, a few other institutions, the quality of products of these degree level institutions is fairly good and reasonably comparable to international standards. This is not at all a desirable trend. The remedy lies in outlining uniformity of technical education in institutions throughout the country so that the quality of out

turn will be more or less of the same standard level.

c) Programmes and Curriculum Development:

To meet the requirements of rapid changes and developments in technology, the undergraduate courses are being diversified with an emphasis on specialisation. Many areas of emerging technology such as Electronics, Computerisation, Micro-processors, Environmental Engg. Laster Technology, Water Resources management, Robotics, Space Technology, Oceanography etc. have been identified and have become new areas of thrust. However there are a large number of new emerging technologies in which India has yet to make a meaningful beginning. Further, very close and continuous monitoring of the phenomenal technological advancements that have been taking place elsewhere in the world in the emerging areas needs to be observed and the respective courses regularly and continuously updated from time to time.

Computers and electronics gadgets have become the most important tools in all professions and walks of life requiring priority consideration in providing education and training in the areas at different levels in all the institutions.

Curriculum development forms one of the vital elements of technical education. The current projected needs of industry and user system on a continuing basis to meet the challenging requirements of rapid technological advancement should be assessed and an appropriate and

dynamic curriculum drawn up to incorporate these needs.

d) Research and Development and Collaboration of Engineering Education Institutions and Industries :

In India, Engineering Research and Development Programmes exist mainly in IITs, Institute of Science and institutions conducting post-graduate courses, and Research Institutions. Even here, main focus appears to be fundamental research and applied research activities is rather on a low key.

Every institution - polytechnics as well as degree colleges should have facilities for carrying out applied research, innovation and product development projects relevant to the changing needs of industries. Interaction of Engineering Educational Institutions with the industry in the role of consultancy is recognised as key to the future development of technical education and offers an opportunity to the faculty to contribute to the live problems and to solve the problems too.

Periodic meetings, conferences and seminars involving participation by institutions, industries, administrators and the management will surely provide excellent opportunities for exchange of experience, research and viewpoints and problem solving.

The institution - industry interaction also helps institutions to solve the challenges and problems faced by them in regard to their training needs and quality assurance - both for faculty and students.

e) Involvement in High-Technology in emerging areas :

It is noteworthy that with the shifting of emphasis in industrial production and engineering education from the good old traditional and conventional fields to the more sophisticated fields of new emerging technologies, the application of High Technology has, with a view to meeting challenges of the impending twenty first century, extended to such diversified and specialised branches of modern engineering as (i) Water and Land resources management, (ii) Environmental engineering, (iii) Telecommunications System Technology, (iv) space Technology (v) Robotics, (vi) Electronics, (vii) Computer Engineering, (viii) Nuclear Technology etc.

It is imperative that high technology in the fields of modern science and engineering is evolved and utilised in a proper and philosophical perspective adopting 'service before self' as its inspiring motto and oriented to a 'need based society' and not 'greed-based society'.

f) Utilisation of Engineering Education Institutions for Innovations and Entrepreneurship :

The programme of action formulated by the Government of India as per the national policy on education (2) has laid stress on innovation, Research and Development and Entrepreneurship. Innovation forms a very important form of entrepreneurship. There is a tremendous scope for technical education institution to play their vital role in promoting entrepreneurship (7).

g) Teachers - assessment, appraisal, training, Research and Development :

Suitably qualified and trained teaching faculty constitutes by far the most vital component for promotion of effective and meaningful technical education. Infact, it is the backbone of any technical institute.

In this country, currently, facilities are available for continuing education of teachers through long-term and short-term training programme which enable the teachers to improve their qualifications and quality of teaching. However, they are inadequate and need to be upgraded and expanded.

Exchange of faculty at inter-institutional and national as well as international levels will tend to generate a healthy competitive spirit among teachers. An appropriate national policy needs to be evolved.

Other issues for consideration in this regard are :

- i) Active involvement through publication of articles in journals, presentation of papers in seminars etc - should be made more or less mandatory.
- ii) Encouraging the faculty participation in industrial seminars organised by industries and professional bodies.
- iii) Faculty involvement in consultancy jobs referred to the institutions by industries and also as individual consultants.

Staff appraisal and assessment on a continuing basis in respect of the potential for teaching, research, interaction with students etc. should be incorporated as a regular feature in

the activities and programmes of the institutions.

h) Role of developed nations and international professional bodies to achieve the goals set as above :

It is a very obvious fact that the developing countries can accomplish the goals set for gearing up their technical education system to face the challenges of the changing world and successfully combat them, with the active help, co-operation and guidance from advanced nations and international professional organisations such as, to mention a few. The United Nations, The World Bank, The W.H.O. etc.

The Government should establish National Technology Watch Groups consisting of eminent engineers, scientists, technologists and educationist from institutions, research organisations, industries and administrators. They will be constantly on the lookout for new and emerging technologies, recent technological developments and innovations in other developed countries, evaluate their relevance and feasibility in the national context and their potential for adoption. On their advice the Government should procure the technology transfer and/or international collaboration. Finally, the information should be disseminated to the institutions, industries and other interested organisations.

In conclusion, it may be stated that, looking at the way the world is forging ahead with the scientific and technological advancements in the present era, the future will bring out a revolutionary change in the technical

world and with that a new environment in man's socio-economic life.

Man should be in readiness to adapt to the changes. Among other factors, technical education plays a very significant role in shaping the future of man and hence the technical education system of the country needs to be thoroughly overhauled and restructured so that the system can effectively absorb the challenges and provide appropriate solutions to the ever-changing problems.

References :

1. Abraham AS : 'The State of the World in 2000 AD : Grim Prospects' - The Times of India Bombay July 6. 1990.
2. National Policy of Education 1986 - Publication of the Govt. of India, New Delhi 1986
3. Hussain K : 'Role and Responsibility of Technical Education Institutes in Innovation and Entrepreneurship' - Proc. Seminar on Entrepreneurship, Nanded, India Jan. 1990.
4. IVETA Newsletter, Vol. 6, July 1990.
5. Chopane B.B. : Areas of International Collaboration in Technical Education, A note for private circulation among the technical Institutes in Maharashtra State, India, Jan. 1990.
6. Chopane B.B. : 'Construction Planning and Control Techniques' - Prod. Seminar on Construction Supervision, Bombay, Nov. 1989.
7. Hussain K : 'High Technology and its Philosophical perspective' - Seminar on High Technology, Aurangabad, March 1989.
