Challenges before Engineering Education in India

Pawan Kumar Mishra
Research Scholar, Department Of Civil Engineering
Mewar University, Mewar

Abstract

Of late, the quality of education, particularly the higher and technical education in India, has attracted a lot of attention across the country. Failure of higher and technical education institutions in India to meet the global parameters of educational excellence can be testified with the simple fact that our institutions do not figure in the ranking lists of top educational institutions in the world. Along with the quality of education, low employability is the other verity which has raised serious concerns and necessitated the need for course correction in the domain of higher education in general and technical education in particular.

Technical Education is one of the most significant components of human resources development in a developing country like India as it creates the required manpower to facilitate the industrial, technical development of the country and consequently the quality of life of the population. In recognition of the importance of this sector, the founding fathers of Indian economic planning accorded utmost priority to this sector. There has been phenomenal growth in the field of technical education during the last seven decades of economic planning in India. At the dawn of independence, there were hardly 4 degree and 8 diploma institutions. There are at present more 3,500 institutions, with intake capacity of around 15 lakhs. This phenomenal growth in the domain of technical education has raised certain crucial concerns for the policy makers and the stake holders. Some of these are ensuring quality of education, promoting the spirit of quest, to working out meaningful curriculum which is aligned with the requirements of job market.

The essential rationale of this paper is to look into the challenges before the technical education in India and ways to align it with employability, and creation of a knowledge society which is fitting with the needs of industry and developmental necessities of the country.

This paper is divided into three sections – first section sets the background by presenting an overview of engineering education in India since independence, second part enlists the main challenges in engineering education in India, third section makes an attempt to propose certain possible solutions so as to bring engineering education in sync with the imperatives of creating a knowledge society and ensure employability.

Key Words Technical Education, employability, knowledge society, skill gap, industry interaction, absorbing capacity

Engineering Education in India:

After India achieved Independence in 1947, economic self-reliance was the foremost concern of the leaders of the newly independent nation which necessitated setting up of heavy industries, infrastructural development and technological advancement. A large number of technically educated, especially engineers, workforce was needed to accomplish these aspirations, and accordingly setting up of institutions to train engineers became the topmost priority of the educational planning and initiative. The Indian Institutes of Technology (IITs), the Regional Engineering colleges (and their subsequent conversion to the National Institutes of Technology) were set up in order to achieve this and thus began the development of engineering education in India. Very soon Indian engineers established their reputation for outstanding engineering and design skills, not only in India but abroad as well, and steered the country to the path of economic growth and self-reliance. Inspired by the success stories of engineers in India and abroad and ample employment opportunities, engineering education in India became the preferred option for students after completing school education. After the initial requirements in the core sectors, 1990s onwards enormous opportunities were created in the newly emerging IT and IT enabled sectors for engineers educated in these fields. This has resulted in a massive spurt in establishing engineering colleges primarily in the private sector.

Quality of engineering education has been a matter of concern for the Indian government since the very beginning. The All India council of Technical Education (AICTE), a statutory authority which had already been set up in 1945, was entrusted with the work to promote technical education and to maintain the standards of education. The National Policy of Education (1986) and subsequently the AICTE Act of 1987 made it the apex statutory authority for proper planning and co-ordinated development of technical education system throughout the country, the promotion of qualitative improvements of such education in relation to planned quantitative growth, and regulation & proper maintenance of norms and standards in the technical education system. AICTE has done commendable work for planning, formulating and sustaining universal standard through accreditation, funding, monitoring and evaluation and awards. The main objective of these authorities is to ensure that all admission procedures, selection criteria, entrance examination and information regarding allied preparation material are carried out appropriately all across the country.

Key Challenges in Engineering Education in India:

Like any other growing sector with such enormous expansion, engineering education to has been facing certain challenges which have been affecting the optimum outcomes in terms of quality, performance and impact. Over emphasis on expansion of technical education, without paying much attention to quality of education and facilities available, has flooded the field with a large number of engineering graduates without required skills and exposure to the industry and can be considered as the major attribute to the low rates of employability among the engineering graduates. According to the National Association of Software and Services Companies (NASSCOM), less than 25% of the graduate engineers are employable.[*]

Engineering education in India has been thwarted with several challenges which are usually linked with structural order, approach and policy perspectives for the sector. Many of these challenges are easy to resolve

---

[*] http://economictimes.indiatimes.com/jobs/only-25-it-graduates-readily-employable-nasscom/articleshow/7894300.cms

but some need a comprehensive, meticulous approach and panacea to resolve. Some crucial challenges before the engineering education in India are listed below:

1. Challenge of Upgradation of Curricula: The curricula of the courses are not updated and upgraded and they lose the sync with the changes taking place in the real world and the requirements. The cumbersome procedural order to change the curricula, reluctance and incompetence to adapt to changes and recent innovations, and lack of resources are the basic reasons for this.

2. Challenge of Shortage of Quality Faculty Members: With the expansion of engineering education, this is a major challenge and concern for the sector. Faculty having good technical knowledge and industry exposures are not available as per the requirements. The remunerations and recognition in the realm of academia is not tempting enough compared to other sectors which dissuade good scholars from joining the teaching profession.

3. Challenge of R&D and Its Incorporation in Teaching and Industry: The facility of R&D and innovation is fundamental in ascertaining the quality and effectiveness of engineering education. However R&D facilities of optimal standards is available only in few institutions and furthermore the incorporation and dissemination of the outcome is tricky and tough.

4. Challenge of Lesser Exposure to Realities on Ground and Requirements: Engineering education needs to be in sync with the requirements of the sector and ground realities and graduates are expected to have the exposure to the realities of the sector and capability to incorporate their education in real life. This exposure is severely restricted at present.

5. Challenge of Lesser Industry Interaction: Effectiveness of engineering education is based on the close interface of theoretical pedagogy with operational aspects of the industry. Technical institutions try to organise industrial visits for students to increase industry interactions but in most of the cases these are for mere formality and therefore lack the required efficacy.

6. Challenge of Good Infrastructure: Engineering education requires enormous infrastructural facilities. Lack of resources in the government sector and precedence of business motive over infrastructural requirement in private institutions where promoters want to maximise their gain with minimum investment adversely affects the quality of engineering education and poses a serious challenge.

7. Challenge of Proficiency in Language: Engineering education is conducted completely in English. Students from remote areas do most of their studies in local languages and even the brightest of them find it difficult to understand English.

8. Challenge of Lack in Absorbing Capacity: The classrooms comprise of heterogeneous group of students from varied levels of knowledge and abilities which can be understood from the wide spectrum of marks they have obtained in the qualifying examination and earlier education. This varied absorbing capability of students is a major challenge for uniformity in standard of engineering education.

9. Challenge of Getting Good Students: As number of institutions and intake seats are too high and there is no entry barrier for admission in Tier II and Tier III institutions, there are large number of students who take admissions in the engineering schools but lack the competence which results in a large mass of unemployable graduates.

10. Challenge of Rapid Growth: National Knowledge Commission, under Curriculum Reform in the Engineering Education, recommends that industries shall participate in the education process. However the rapid growth of the number of engineering institutions in India makes this practically very difficult and poses serious challenge for the education-industry interface which is crucial of quality engineering education.

11. Challenge of Employability: This is the biggest challenge the engineering education in India is facing. Because of several challenges listed above, the employability rate of engineering graduates is very low. Several studies show that merely 20-30% of graduates are employable by the industry. The situation is further grimmer for Tier II and Tier III institutions where the rate of employability could be as low as 7-8%.

12. Challenge of Lower Employer Satisfaction: For several reasons, the quality of education and skills of the engineering graduates is abysmally low which not only reduces the opportunities of employment but results in lower employer satisfaction in case these engineers are hired. A World Bank Study confirms the widespread dissatisfaction with the current graduates - 64% of employers hiring fresh engineering graduates are only somewhat satisfied with the quality of the new hires or worse.[†] Such a trend in not very healthy for employment generation and overall growth of the country.

The Way Out: Employability and Creation of Knowledge Society:

To meet the above mentioned challenges, which are adversely affecting the quality of engineering education in India which brings ill-repute to the sector and reduces the opportunities for gainful employment to appallingly lower levels, a carefully planned, comprehensive approach and a multipronged long term strategy is required. Only with such a vision and constructive approach, the outstanding standards of engineering education can be restored which is a matter of past now and can ensure the employability of the engineers in India. To provide the solutions of major challenges it is suggested that students of technical institutions should be given internship and on job training opportunities. This will lead to availability of trained human resources for the industries of the region. Further, it will also increase the placement opportunities of the students in the industries and in the service sector. Since technology has become the key factor in deciding the course of development of any nation, there is a need to encourage technology up-gradation of the industries which can be made possible only through the introduction of new curriculum in the engineering education and promotion of R&D activities. The R&D facilities have to be promoted in the industries and to be incorporated in curricula without a lag. All the inventions and innovations stem out from the developed nations, which is a result of tremendous effort that they put in R&D.

In times of rapid transformation, educational institutions have to become more responsive and inclusive to the changing requirements and priorities of labour markets and industry in order to serve the students' interest and making them gainfully employable. Unfortunately, educational institutions are particularly not working for innovation but rather they just impart the existing wisdom through a framed curriculum and there is very little scope for any out-of-box thinking and innovative ideas or transformative approach. For this fiat

[†] Blom, Andreas and Hiroshi Saeki, *Employability and Skill Set of Newly Graduated Engineers in India, World Bank*, 1 November 2010. p.1

and for several other structural-procedural limitations, these institutions are not well suited to encourage innovation or pulling together resources and strategy which is needed to respond to new challenges or requirements of the industry and developmental needs of the country. This is further aggravated in India due to the structural rigidities of the system, near absence of institutional competitiveness, and general lackadaisical attitude. To overcome this challenge, the industries must promote R&D facilities in the institutions and extend financial, managerial and infrastructural support to technical institutions. There shall be arrangements and opportunities to increase interaction between industries and educational institutions for expert exchange and sharing of resources which will lead to enhance the quality of education and ensure employability.

In recent years, several initiatives have been taken to bridge the gap. Industry specific and context-specific solutions are being tried in many sectors. Experience has shown that private institutions are far more adaptable and non-formal provisions are better in responding to the students' demand and to meet the challenges of changing environment and needs. Therefore, a equitable combination of the public and the private, the formal and non formal provisions for technical education and training provide would provide an optimal solution and would be able to meet the changing needs of economy and society.

An integrated approach of combining textual pedagogy with industrial and vocational training will be best suited to respond to changes in the job markets and challenges of employment creation. This would require building pathway between the vocational and the technical education sectors through a national qualifications framework and re-branding of vocational education. Managing public-Private Mix and devising policies that ensure healthy growth of both the public and the private sectors are needed.

Another way out could be to restrict the opening of technical institutions and setting up stringent norms for opening of these institutions which must be implemented without any exception and in totality. The admissions to engineering course should also be restricted to only deserving students and to those who have attitude and aptitude to be technical professionals and pursue long term career in the field. In order to improve the standards of teaching and quality of faculty, AICTE, ECI and other monitoring bodies should evolve framework to assess the faculty quality and to provide opportunities and resources for their continuous career development and create mechanism to motivate bright people to opt for teaching in engineering colleges.

Consultative organisations like Construction Industry Development Council should have more proactive participation in evolving industry specific strategies for quality of education and ensure employability by developing comprehensive skill sets and institute a balance between the needs of industry and curriculum, between theoretical learning and earning set of skills through industry exposure in order to make the engineers gainfully employable.

Conclusions:

Technical education in India has undergone a phenomenal transformation and expansion since independence. However, apart from some premier institutions like IITs and NITs, the core of this growth story has been quantitative expansion without much attention to the quality and to address the concerns regarding employability. At the moment, when the nation is gearing up to take the stride to become a global economic powerhouse, there is a need to reassess the state of affairs in the engineering education and find ways out to

make it compatible with the needs of the changing priorities and requirements of the economy. Technical education is crucial to accomplish the goals set for overall advancement of the country and therefore, there is an urgent need to introduce major reforms as indicated above for building a credible professional workforce which has the capability to advance the country as a global knowledge economy and build a nation for the wellbeing and holistic development of our present and future generations.

References:

1. Prof. Yashpal, "Management of Universities" Yojna-2009

2. Pawan Agarwal, "Aligning Higher education with the Labour Market" Yojana-2009

3. B.K. Saha, "Making Secondary Education more relevant" Yojna-2009.

4. Shashank Chaturvedi, "Challenges Before education in India"-2009.

5. Dr. A. J. V Prasad, Man Power Planning, & Technology, Govt. of CHHATTISGARH, "WORKSHOP ON INSTITUTE LINKAGE POLICY'' Souvenir-2006.

6. Dr D P Gupta, Director and Arvind Dewanga, "Challenges before Engineering Education in India" Researchers World, Vol – III, Issue 2 (1), April 2012

7. Ambika Chaudhary Mahajan, "1.5 Million Engineering Pass Outs in India Every Year, Fewer Getting Hired", https://dazeinfo.com/2014/10/28

8. Blom, Andreas and Hiroshi Saeki, *Employability and Skill Set of Newly Graduated Engineers in India, World Bank*, 1 November 2010.

9.http://economictimes.indiatimes.com/jobs/only-25-it-graduates-readily-employable-nasscom/articleshow/7894300.cms