

TECHNICAL EDUCATION AND EMPLOYABILITY

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With a manpower of over one billion, it is ironic that India suffers from dearth of talent and skill to fulfill the present day need of industry and as a result it is a serious challenge to mitigate shortages of skills required by in industry sector. Study reveals that of the 6 lakhs engineers that graduate annually, only 18% are employable for the software engineer-IT services role, while just 4% are appropriately trained to be directly deployed on projects. For core jobs in mechanical, electronics/electrical and civil engineering profession, only a mere 7.5% to 8% are employable.

Education is a concurrent subject under the purview of the Central Government as well as the State Government. In addition, statutory bodies like All India Council of Technical Education (AICTE) and the University Grants Commission (UGC) have their empowerment by the Acts of Parliament to regulate higher education. Technical education is imparted at three different levels in India:

- Industrial Training Institutes (ITI), constituted under Directorate General of Employment & Training (DGET), Ministry of Labour & Employment, Union Government of India, under the ownership of the State Government conduct trade specific courses for the post school level students to provide the workforce required for doing the skilled jobs in the Industry.

The ITI's over the years faced the problem of availability of inadequate trained vocational instructors, lack of modern equipments and machinery and weak linkage with Industry as a result of which there was a mismatch between the trained manpower produced by the ITIs and those required by the industry.

To address these issues, the Finance Minister in his Budget speech 2007-08 announced a scheme for up-gradation of ITIs under Public-Private Partnership (PPP). The scheme envisaged the up-gradation of the ITI through a tripartite arrangement between State Government (owner of the ITI, shall continue the recurring expenditure, appoint new instructors), Central Government (provide Rs 2.50 Cr funds for up-gradation) and an Industry (provide management expertise to run the ITI).

Vocational training/craftsmen courses to train skilled workers are offered by Industrial Training Institutes (ITIs) under the overall guidance and supervision of the National Council for Training in Vocational Trade (NCTVT).

- Polytechnic Institutes, which conduct diplomas to produce middle level technicians to support shop floor and field operations serves as a link between technicians and engineers and offer three year generalized diploma courses. The students gather special skills in reading and interpreting drawings, estimating, costing & billing, supervision, measurement, testing, repair, maintenance etc.

The Polytechnics are also facing problems like inadequate infrastructure facilities and obsolete equipment which are stumbling blocks in the way of upgrading / introducing the

syllabus and courses in new and emerging areas. This is primarily due to inadequate financial resources, inadequate industry institute participation and inadequate quality teachers. These inadequacies ultimately led to production of a sizeable number of unemployable youths. As a result existing polytechnics seem to struggle for survival.

Over the years, the diploma courses have lost the skill components and are perceived as diluted version of degree education. The Polytechnics are under the administrative control of State Governments, although there are private participations also.

The Polytechnics are broadly guided by the policies of the Ministry of Human Resources and Developments, Government of India (MHRD) and the course structures are framed by the guidelines of All India Council of Technical Education (AICTE), the apex body controlling technical education in India. However, polytechnic courses are framed and supervised by the Board of Technical Education (BTE) in various states.

- Engineering Colleges come under the purview of the Ministry of Human Resources and Developments (MHRD), Government of India, which conduct undergraduate and postgraduate degree courses in engineering and technology.

The engineering education is vastly diverse as there are seven types of institutions in India: (1) central universities – A university established or incorporated through a central act (2) state universities – A university established or incorporated through a provincial or state act (3) private universities – A university established through a state or central act by a sponsoring body such as a public trust, a company registered under Section 25 of the Companies Act, 1956, or a society registered under the Societies Registration Act, 1860 or any other corresponding law in force in a state (4) deemed-to-be universities – high-performing institution that has been so declared by the central government under Section 3 of the University Grants Commission Act, 1956 (5) institutions of national importance – An institution established by act of Parliament and declared an institution of national importance (6) institutions under a state legislature act – An institution established or incorporated through a state legislature act and (7) colleges – Colleges award degrees through the universities with which they are affiliated.

Several entities are involved in the regulatory framework, including state governments, national and state-level professional councils, and affiliating universities and made the entire system complex. While general higher education is regulated by the UGC, engineering institutions are regulated by the AICTE.

AICTE established the National Board of Accreditation to evaluate technical education institutions. Currently, accreditation is voluntary, and it lasts three to five years, depending on a satisfactory assessment outcome. The NBA was originally constituted in September 1994 to assess the qualitative competence of the educational institutions from diploma level to postgraduate level in engineering and technology.

- Another route for pursuing technical education is to get Associate Member of Institution of Engineers (AMIE) certification, which is an alternative option to become an engineer.

Those unable to pursue a degree course leading to a BE or B Tech can opt for this certification, which is recognized as equivalent to a degree by the AICTE, the Union Public Service Commission (UPSC), the Staff Selection Commission, and the government departments.

Those who pass the AMIE examinations can appear for the Indian Engineering Services Examination conducted by the UPSC, the Graduate Aptitude Test in Engineering (GATE), and the Graduate Record Examination and can do ME or M Tech programmes.

It is very unfortunate that AMIE students once succeeding to pursue post graduate programme from Tier – I or other institutes cracking a good marks at GATE and thereafter for Phd, but they face obstacles in joining any good academic institution.

From the above,

- It is amply clear that the absence of one single body in imparting technical education in India and that creates the basic confusion. The bottom most level, i.e. ITI education is controlled by someone, the middle and upper levels, i.e. Polytechnics and degree engineering education are controlled by others who apparently have no synergy in functioning.
- There have been proliferations of teaching institution covering technical / engineering discipline all over India. With the objective of Assurance of Quality and Relevance of Education, especially of the programmes in professional and technical disciplines, i.e., Engineering and Technology, Management, Architecture, Pharmacy and Hospitality, NBA in its present form came into existence as an autonomous body with effect from 7th January 2010. NBA has introduced a new process, parameters and criteria for accreditation. These are in line with the best international practices and oriented to assess the outcomes of the programme.

Out of more than 2500 engineering colleges in India, NBA has shortlisted 220-odd engineering colleges as Tier-I institutes IITs/NITs/BITS Pilani besides many autonomous and deemed universities whose undergraduate engineering programme is in tune with what is required under the Washington Accord.

- The share of engineering students among all students in higher education is around 10 percent in India, relative to the total population of the country, the number of engineering students is actually the lowest in India. The proportion of students enrolled in PhD programs is less than 1 percent in India.
- The challenge facing small institutions is their limited financial resources whether from government funds or student fees. Thus, small institutions encounter difficulties in maintaining investments in the necessary upgrades in faculty skills and equipment, which are usually particularly expensive in engineering.

- Within the framework of guidelines of AICTE, each institute has the limited scope to mold the curriculum according to the current needs. Although, Tier – I and some Tier – II institutes have the requisite resources to change the course curriculum, but for others, the move in this direction is not possible. This has resulted in discrepancies in the whole arena of technical education. Moreover, the institutions mostly follow the traditional method of teaching. Thus students lose interest as the lecture classes are more of content delivery than knowledge delivery.
- Only the chalk and board methodology of teaching, the routine assignments given fail to motivate and attract students to serious learning at engineering level.
- The philosophy of the semester system and the continuous evaluation process presently followed stressed the more on in a routine manner and they concentrate only on grades and not on learning. The semester is so short lived; even a well-meaning teacher cannot afford time to experiment newer methods of teaching evaluation (like open book / on line examinations or seminar by students).
- The faculty members to each discipline shall have to design their classes to meet the current needs of the industries. The faculty members and the institute as a whole shall have to interact with the users who employ the fresher. Moreover, the faculty members are employed on the basis of their academic credibility and not on the basis of industrial experience. It is difficult to find suitable motivated young faculty in engineering institutions because the brighter lot of students in the undergraduate level are picked up by the corporate sector and in majority of the cases the mediocre and left overs opt for higher studies and faculty positions.
- The issue of the engineering faculty in India is not only one of quantity; it is also an issue of quality. Very few amongst the postgraduates opt for research programmes and hence the percentage of engineering faculty with PhD degrees is low.
- The Tier – I and first level Tier – II institutes have in house R & D activities where innovative ideas are tried and cultivated. The students get the orientation for not only in entrepreneurship, but also find involvement with the current social need. These facilities are generally absent in a lower level institute which becomes a mere degree awarding organization.
- After India was liberalized in 1991, the service sector was initially the fastest growing part of the economy, contributing significantly to GDP, economic growth, international trade and investment. Manufacturing contributes just around 20% to India's GDP, compared to a near 60% contribution by services and agriculture around 20%. For the manufacturing sector, India is generally dependent on home market. India's unique positioning in the global marketplace as a services-led economy is in contrast to most other developing economies, including China, which took the traditional route of labor-intensive manufacturing followed up by higher value-added part-labor, part-capital intensive manufacturing. China's manufacturing sector contributes near 45% in GDP, almost equal to service sector, rest being agriculture.

- The emergence of the IT sector as the engine for growth in Indian economy has also affected the quality of graduates in other traditional engineering disciplines in last two decades. Knowing that it is easy to get a job with a high salary in the IT sector, students from other disciplines also migrated to IT related jobs. Many engineering institutes started functioning based on the service sector especially IT and allied courses. The importance was given on the development of soft skills and ignoring the subjects of the disciplines. It seems employers have accepted the fact that students with soft skills can be trained in the industry and thus do not expect a high level of knowledge in discipline subjects. This is partly responsible to destroy the backbone of engineering education.
- After the downfall of global economy in last decade, the service sector related to IT and ITes have started shrinking; resulting a surplus in supply chain. This has resulted in fierce competition, and the focus has shifted to quality and basic knowledge. As India is shifting its focus to be a developed country, there is a huge requirement of building the infrastructure and there is a requirement of students with knowledge in core engineering discipline. As a result of the void created in the last two decades, it is to be seen how India can face the challenge.