

TECHNICAL EDUCATION IN INDIA: CHALLENGES AND PROSPECTS

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Abstract— India's higher education system is the world's third largest in terms of students, next to China and the United States. Since Independence, the Technical Education System in our country has grown into a fairly large-sized system, offering opportunities for education and training in a wide variety of trades and disciplines at certificate, diploma, degree, postgraduate degree and doctoral levels in institutions located throughout the country. The overall scenario of higher education in India does not match with the global Quality standards. Hence, there is enough justification for an increased assessment of the Quality of the country's educational institutions. In order to maintain the standard of technical education, The All India Council for Technical Education (AICTE)- was set up in 1945. AICTE is responsible for the planning, formulation and maintenance of norms and standards, quality assurance through accreditation, funding in priority areas, monitoring and evaluation, maintaining parity of certification and awards and ensuring coordinated and integrated development and management of technical education in the country. An attempt is made through this paper to explore the current scenario of Technical Education prevailing in the country, the challenges faced and the future prospects

Keywords- Education, Quality, Technical

TECHNICAL EDUCATION IN INDIA

Technical education contributes a major share to the overall education system and plays a vital role in the social and economic development of our nation. In India, technical education is imparted at various levels such as: craftsmanship, diploma, degree, post-graduate and research in specialized fields, catering to various aspects of technological development and economic progress. The provisions AICTE Act , "Technical Education" means programs of education, research and training in the following fields:-

- Engineering & Technology
- Architecture
- Town planning & Management
- Pharmacy & Applied Arts and crafts
- Such other programmes or areas as the Central Govt. may declare in consultation with the council by a gazette notification

As per the statistics posed by department of Higher Education, Govt. of India, around 18,000 institutions are functioning in

the country with approx 5.00lakh teachers employed under various streams. Many technical institutions are globally acclaimed for the standards and quality they deliver but it is a matter of concern that none among the 621 Universities in the country features among the first 200 in the world. Here, it is to be noted that 3,2,2,1 & 2 Universities from Hongkong, Singapore, South Korea, Taiwan and China respectively are ranked within the 100 best Universities in the World. The main reason behind the same is the lack of high end research facilities. The overall scenario of Higher Education in India does not match the global standards. It drives enough justification for an increased and tightened assessment of the quality of the higher education institutions in the country. Mere investments in libraries, ICT, laboratories and state-of-the-art infrastructure makes the system face hardship in delivering cutting edge research. The 9% growth rate achieved consecutively during the past 5 years has uplifted India as one among the most promising economies in the world and higher education had played a vital role in helping our country to achieve the same. The number of Engineering Colleges at the dawn of independence in 1947 was 44 with an intake of 2500. In the early eighties, Govt. allowed private participation in the setting up of technical institutions on self financing basis. Following the same, a large number of privately managed institutions were established in the past 25 years and the growth of technical institutions countrywide with a detailed split up among the States from 1980-2012 is shown in table 1.

The compound annual growth rate of institutions during the 61 year period is 6.7% excluding the IIT's and NIT's and the percentage increase in the number of engineering institutions between 1995 to 2005 is 298.66%. The sanctioned intake has increased from 2940 in 1947 to 7.8 lakhs in 2008 to 11 lakhs in 2012. The growth has brought along some serious concern of quality as well as efficiency. The rapid growth in Technical Education has created a serious problem regarding quality of faculty, students getting admitted, adequate infrastructure and even an appropriate teaching learning environment. NASSCOM had reported in its recent studies that hardly 26% of the present day graduates are employable and the rest have to make up the deficiencies through rigorous trainings through finishing schools. The New Generation Colleges attract students using attractive websites and colourful brochures with glorified mission and vision statements but the factors in reality remain as jargons as far as a good number are concerned.

Table 1. Growth of Technical Institutions in India

STATE	1980	1990	2000	2005	2006	2007	2008	2009	2010	2011	2012
Andaman and Nicobar Islands	0	0	0	0	0	0	0	1	1	1	1
Andhra Pradesh	83	112	463	852	907	1111	1450	1672	1769	1813	1840
Arunachal Pradesh	2	2	3	4	5	5	5	5	5	5	5
Assam	8	8	23	24	26	28	32	42	44	46	47
Bihar	25	29	44	53	53	55	63	71	76	82	88
Chandigarh	3	3	10	13	13	13	14	14	14	14	14
Chhattisgarh	9	16	31	43	48	57	82	105	109	109	109
Dadra and Nagar Haveli	0	1	1	1	1	2	3	3	3	3	3
Daman and Diu	0	1	1	1	1	1	1	1	1	1	1
Delhi	10	14	59	71	74	79	83	83	86	88	89
Goa	2	4	11	15	15	16	16	16	16	17	18
Gujarat	36	48	121	196	223	244	280	349	399	430	443
Haryana	28	34	87	141	156	213	346	410	453	491	504
Himachal Pradesh	8	10	13	17	21	32	42	63	72	79	80
Jammu and Kashmir	9	12	27	31	34	34	35	38	39	42	47
Jharkhand	15	16	32	41	41	45	49	52	57	61	61
Karnataka	62	137	413	523	537	578	651	731	777	789	798
Kerala	30	37	106	244	250	252	263	291	315	345	358
Madhya Pradesh	36	47	150	278	311	379	432	510	546	563	569
Maharashtra	106	192	556	740	859	926	1087	1286	1461	1550	1598
Manipur	0	0	3	3	3	3	3	3	3	3	3
Meghalaya	1	1	1	3	3	4	4	5	5	5	6
Mizoram	0	1	2	3	3	4	4	4	4	4	4
Nagaland	0	0	0	0	0	3	3	3	3	3	3
Orissa	19	25	98	134	145	164	210	277	293	299	304
Puducherry	5	8	15	18	18	20	23	26	30	31	32
Punjab	21	25	80	178	189	209	262	313	354	386	402
Rajasthan	37	46	103	174	199	232	284	335	467	484	504
Sikkim	0	0	4	4	4	4	4	4	4	4	4
Tamil Nadu	88	160	578	784	817	900	1046	1220	1328	1382	1422
Tripura	4	4	5	7	7	8	8	8	9	9	9
Uttar Pradesh	93	111	287	428	470	537	688	879	1039	1101	1143
Uttarakhand	17	21	49	69	85	93	119	148	165	175	182
West Bengal	37	40	111	167	178	183	201	223	238	247	258
Grand Total	794	1165	3487	5260	5696	6434	7793	9191	10185	10662	10949

This calls attention to have a system ensuring quality, its measurement and implementation. In order to promote quality, (NBA) is the accreditation agency in the country for accreditation of Technical Institutions and has certainly to cater to a large number of Courses for accreditation. The National Board of Accreditation was formed as a Society on 7th January 2010, and is now an autonomous body of AICTE. It is again a sad part that even now, India continue only to be a provisional member of the Washington accord since 2007. The accreditation process that had been carried out so far was

based on the previous criteria which are not acceptable by Washington accord. It is now high time that all Technical institutions should possess NBA accreditation as mandatory for receipt of any grant in aid from Central/State Government or for the conduct of PG and Research programmes.

CHALLENGES IN TEACHING LEARNING PROCESS

Excellence in engineering education results from innovative teaching techniques and effective instructional materials. This would require one to change the traditional way of delivering

engineering education. Teaching is that profession where success of the teacher depends on the ability of students, but there have been such teachers who have made even the worst of students the best of learners. So it is evident that understanding of a subject taught by a teacher depends on the methods of teaching adopted by that teacher. In the traditional teaching methods, teachers offer course materials in a classroom where students listen, take notes, copy materials, execute homework and complete assignments. In many cases teachers fail to transfer knowledge to students effectively despite personally having sound technical knowledge in the subject area. This occurs because it is often hard for students to take notes and listen with good comprehension simultaneously. In fact, better teaching techniques do exist but are often difficult and time-consuming. Pedagogical challenges regarding teaching and facilitated learning exists from the perspective of both the teacher and the student. Often student learning is not as good as expected, rendering it difficult to ensure all students masters the material presented. Sometimes, the students need varied approaches tailored to their type of learning. Furthermore, engineering programs needs to improve student problem solving and learning skills and instill an ability to continue learning throughout the career. Such a work ethics allows graduates to adapt to challenges encountered on the job.

PROSPECTS AND INITIATIVES

India is renowned for producing graduates of the highest caliber but only very few compared with its population receive high-quality technical education. India has over the years significantly bolstered the quality and availability of technical education, doubling the employment rate of graduates who are now better-suited to the needs of Indian industry. There are two components to the project. The first component is school-based reforms and innovation. The second is to develop a robust higher education system. The All India Council for Technical Education has framed various norms and standards to regulate the technical institutions in the country for maintaining quality in these Institutions. The AICTE act is eminently suitable to perceive all needs of technical education and has been promoting technical education in the country. This has been further facilitated by the implementation of e – governance which has provided complete transparency and accountability to all its stake holders. It is a matter of appreciation that AICTE has introduced PG education in the second shift which helps the faculty who are employed in various technical institutions possessing BE / B.Tech as their qualification to pursue M Tech education in the second shift. In order to meet the requirements of reaching out to all sections of society in any state, expansion in technical education is required. All states in the country need to expand on the institutional facilities so that access, equity and education for all can be realized. The Expansion in industrial output is directly linked to Education levels in a country consequently raising the GDP of a country. It is a matter of concern to see that the GER in our Country is about 18.8 in Higher Education and the Technical Education contributes

GER just about 5.3. Certainly serious when seen in the context of GER in the United States where it is about 80. 25 million students go to higher education in colleges and about 25 million drop out. It is extremely important that these 25 million students who are dropping out also get an opportunity for admissions to higher education and hence they need quality inputs so that they also make the grade. After such initiatives if we were required to provide higher education to these 25 million students which would also enhance current GER we will be required to double the number of colleges in the country. Hence AICTE takes a pragmatic view of promoting higher education amongst all sections of the society and provides for enhancing the capacity building initiatives so clearly required in the Country.

Some of the best technical and engineering minds in the world were trained in India's renowned Institutes of Technology. These elite institutions were accessible to but a few qualified students however: in fact, only 1 percent. The remaining 99 percent of technical education students in India also need quality and need to perform. India also needs to overhaul its technical and engineering education sector to generate the pool of highly skilled professionals and creative thinkers to sustain the nation's progress in infrastructure, power, water, information technology, and manufacturing. Quality engineers and engineering research and development (R&D) were crucial for India to address challenges from climate change and natural disasters, such as flooding. India needs to overcome the rigid thinking of the past and create a dynamic, demand-driven and quality-conscious technical education system. The current policies of AICTE certainly are directed here. The All India Council for Technical Education (AICTE) has framed various norms and standards to regulate the technical institutions in the country for maintaining quality in these Institutions.

AICTE has various schemes for improvement of quality and standard of higher education in the country such as

- Research Promotion Scheme (RPS) scheme for promoting research in the field of engineering.
- Set up National Board of Accreditation to regulate and monitor the quality of engineering education in the country.
- Research and Institutional Development (RID) Schemes for improvement of quality of Engineering Education
- Quality Improvement Programme (QIP)
- QIP Degree
- QIP Polytechnics
- Early Faculty Induction Scheme (EFIP)
- Faculty Development Programs (SDP)
- Emeritus Fellowship (EF)
- Visiting Professorship (VP)
- Career Awards (CA)
- Seminar, Symposium and Workshop Grants
- AICTE-INAE Distinguished Visiting Professorship
- National Doctoral fellowship (NDF)

- National Faculty in Engineering & Technology with Industrial Collaboration (NAFETIC)
- Nationally Co-ordinated Project (NCP)
- Post Graduate Scholarship
- Industry Institute Partnership Programmes
- Development of Model Curriculum for different courses
- PG Programmes have been allowed to be conducted in the 2nd shift in order to promote M.Tech qualification among B.Tech qualified faculty.
- In order to promote research culture amongst faculty & students, which is need to promote quality education, the best in the world e-Journals have been made mandatory.
- All Govt & Govt aided institution have been allowed to act as QIP centers, so that faculty & students can pursue P.G.Education.

These schemes have significantly improved the delivery mechanisms for education. Further AICTE has notified a Tuition Fee Waiver Scheme for sons & daughter of parents having annual income of less than 4.5 lakhs from all sources which is mandatory for all its approved technical institutions offering Bachelor program, Diploma, Post Diploma program of three/ four years of duration. The seats up to maximum 5% of sanctioned intake per course supernumerary in nature are available for these admissions.

CONCLUSION

Engineering education is one among the premier measures of any developing country as it has to play a vital role in producing good engineers for the development of the nation in all aspects. The prospects and development in the higher

education sector in India needs a critical examination in a rapidly globalizing world. There is an urgent need to work for the development of the technical educational sector to meet the need of the emerging opportunities, increasing younger generation population and challenges of the 21st century. The decisions that are going to be implemented are likely to hold the key to India's future as a center of knowledge production. We need higher and technically educated people who are skilled and who can drive our economy forward. If India could provide skilled people to the outside world, then we could transfer our country from a developing nation to a developed nation in a short span.

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