Higher Technical Education in India – Overview & Challenges

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Abstract— *Technical education in India has witnessed tremendous growth. In 2006-07 total of 1511 engineering colleges with approved intake of 550986. In 2017-18 total of 4397 engineering colleges with approved intake of 1581372 are imparting Technical education at UG level. Maintaining quality for such huge number is challenging task. Regulatory authorities like AICTE, DTE and Universities are giving directions on regular basis for improvement in quality of technical education in general and technical education at undergraduate level in particular. Increasing number of students opting for technical education abroad, unemployment among graduate engineers and various other factors have resulted in decline in number of admissions in engineering colleges. Over view of higher technical education scenario in India is presented in this paper. The various initiatives taken to maintain quality technical education is also presented.*

Keywords— **Accreditation, quality, stake holders, technical education.**

I. INTRODUCTION

AICTE has been in existence since November 1945 as a national level Apex Advisory Body and as a statutory body through an Act of Parliament in 1987. AICTE Supports Institutions for Autonomy, Accreditation of Programmes, Ranking of Institutions, schemes such as Margdarshan, Adjunct Faculty, Trainee Teacher and Unnat Bharat Abhiyan, launching of Student Startup Policy 2016, Smart India Hackathon 2017, a MOOCs platform SWAYAM are a few of the important initiatives embarked upon by AICTE during the last year. It has initiated several new initiatives such as revision of all Under Graduate and Post Graduate model Curricula, teacher training Programmes for both new teachers and in service teachers, innovative student Induction Programme, mandatory Internship for students, support for innovation and entrepreneurship, Industry Interaction Cells, starting the work on a national Perspective Plan for Technical Education. In addition to its role as regulator, AICTE is also acting as a true mentor, facilitator and enabler in bringing out the best in each Institution.

II. HISTORY OF TECHNICAL EDUCATION IN INDIA

The beginning of formal Technical Education in India can be dated back to the mid-19th Century. Indian Universities Commission was appointed in 1902. Indian Education Policy resolution issued in 1904. Indian Institute of Science established in 1909. Government Leather Institute, Kanpur in 1916. The Government of India decided in 1954 to set up a Board of Management Studies under AICTE to formulate standards and promote Management Education. The National Council of Hotel Management and Catering Technology were set up in 1982. AICTE was given statutory powers by the AICTE Act of Parliament in 1987. Technical Education in this context includes fields of Engineering and Technology, Pharmacy, Architecture, Planning, Applied Arts and Crafts, Hotel Management and Catering Technology and Management.

The number of Engineering Colleges and Polytechnics (including Pharmacy and Architecture Institutions) in 1947 was 44 and 43 with an Intake capacity of 3200 and 3400 respectively. The tremendous growth in technical education is mainly due to change in Government policy, which allow participation of Private and Voluntary Organizations in the setting up of Technical Institutions on self-financing basis

III. CURRENT SCENARIO

At present (for 2017-18) there are 4586, 4397 & 5498 approved institutions offering Diploma, UG and PG education respectively. Approved intake in these institutions are 12,62,902, 15,81,372 and 7,06,999 respectively. There are 10,402 approved technical institutions with approved intake of 35,52,713.

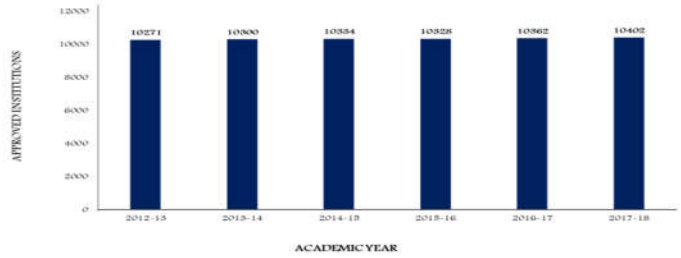

Fig.1: Growth of Technical Institutions in India

Figure 1 shows growth of Technical Institutions in India. Figure 2 shows approved intake in Technical Institutions. Submit your manuscript electronically for review. As can be seen from Figure 2, most of the colleges are opting for reduction in intake / closure.

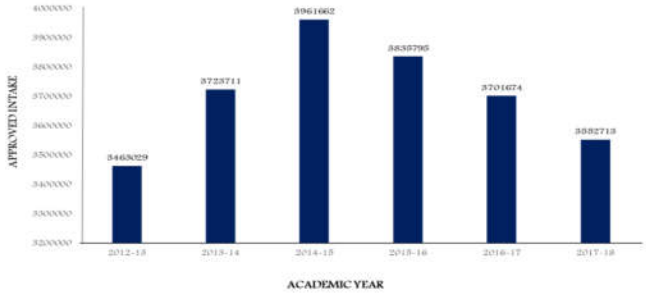

Fig.2: Approved Intake in Technical Institutions

Course wise intake for the year 2017-18 is shown in Figure 3. As can be seen from Figure 3, Engineering and Technology forms 47% of total intake followed by 36% for Diploma / Post Diploma, 11% Management, 4% Pharmacy, 2% MCA.

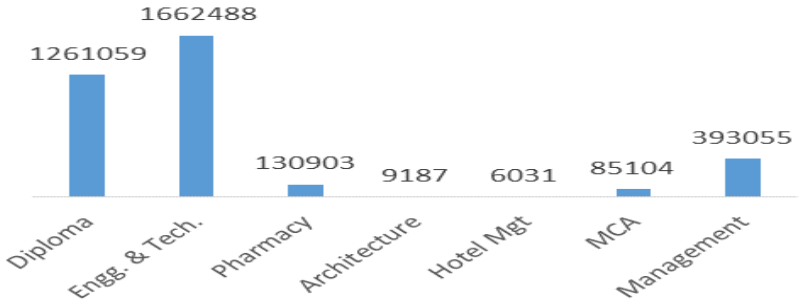

Fig.3: Approved Intake for different courses (2017-18)

The variation in intake for Engineering and Technology for last 12 years is shown in Figure 4.

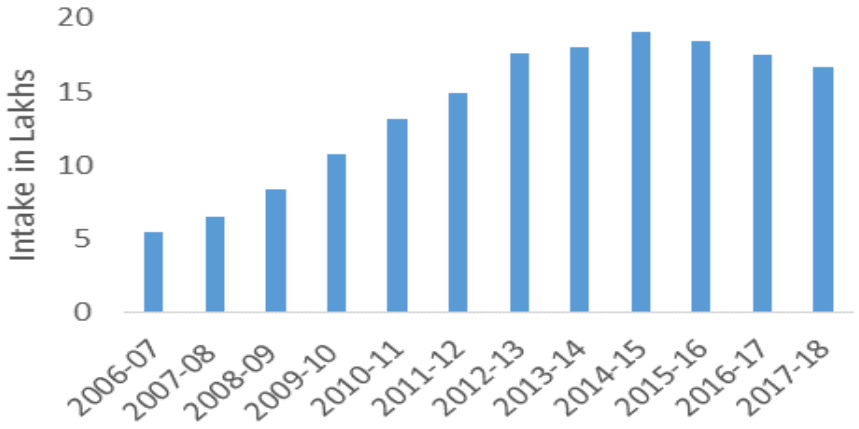

Fig.4: Approved Intake for Engg. And Technology

However with rise in number of engineering colleges and with rise in number of seats available, the quality of education imparted and quality of students admitted started declining. Relaxation in eligibility criteria for engineering admissions is one move to ensure good number of admissions.

Table1: Year wise Institutes (UG-Engg. & Tech.)

year	Total Institutes	New Institutes	Closed Institutes
2012-13	3371	114	9
2013-14	3383	51	16
2014-15	3400	46	15
2015-16	3363	35	39
2016-17	3291	30	47
2017-18	3224	35	28

From Table 1 it can be seen that number of institutions applying for closure is increasing every year. Year wise admissions of number of boys and girls in lakhs for UG in Engineering and Technology is shown in Figure 5.

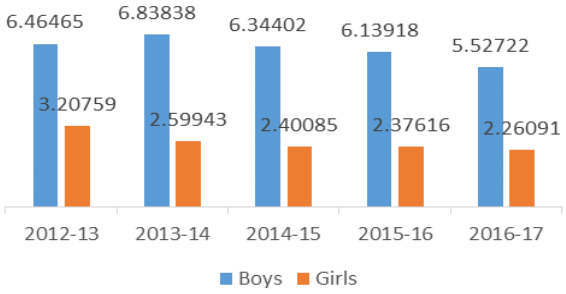

Fig.5: Gender wise admissions (UG-Engg. & Tech.)

Admission in percentage and placement in percentage for UG Engineering and Technology is shown in Figure 6. It can be seen that admissions of UG (Engineering and Technology) is decreasing.

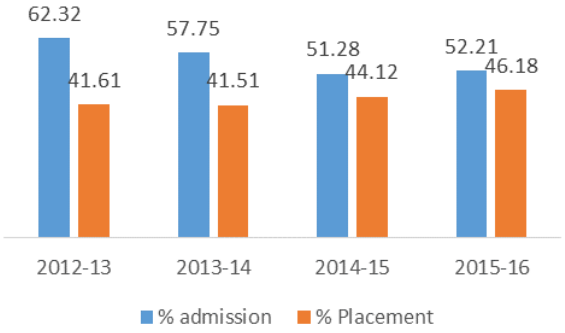

Fig.6: % admission and placement (UG-Engg. & Tech.)

The fifth edition of National Employability Report 2015-16 conducted by job skills matching platform Aspiring Minds has found that over 80 per cent of engineers in India remain unemployable. Thus there is immediate requirement of ensuring skill among the engineering graduates. This is possible when certain quality ensuring measures are taken. There should be restriction on number of new colleges coming in a particular state / region. In this context, most of the state have prepared their perspective plan. Perspective plan key points of few states is given below:

Chhattisgarh – At the time of inception in 2000, there were 11 engineering colleges with intake of 2730 and 10 polytechnics with intake capacity of 1495. Present strength is 47 engineering colleges (UG) with intake of 19297. 60 polytechnics with 10702 intake i.e. increase of 607% at UG level and 616% increase in Diploma level. Till 2009-10 vacancy in BE courses was around 15%. In 2017-18 it increased to 67.72%. Only 5% faculty are with Ph.D. qualification. Capacity expansion is not permitted. New colleges may be started in districts which does not have a single college. Course / Institutions with less than 10% admission in last three years should be closed immediately.

Madhya Pradesh government has recommended not to give permission to start new colleges in 2018-19.

Maharashtra: Vacancies in Diploma courses in last three years is 48.34%, 55.94% & 56.64% (17-18). For degree in Engineering (UG), it is 42%, 44.78% & 40.87% (17-18). In view of this, state government has requested AICTE not to give permission to start new colleges.

Haryana: % admissions for B.Tech in last five years is as follow: 41% (13-14), 43% (14-15), 32% (15-16), 28% (16-17), 31% (17-18). Average % admissions in last five years is, Diploma Engg. 50%, Diploma Pharmacy 96%, B.Arch. 63%, B.Tech. 35%, MBA 42%, MCA 22%. No new technical institutions are allowed.

Telangana: Number of engineering colleges in 2016-17 is 220 with 70.33% admissions. In 2017-18 engineering colleges 201 with 53.32% admissions. No new institutions to be started in 2018-19.Maximum intake per UG branch to be restricted to 120 and 24 for PG. B.Ed. type course for Engineering Teachers to be started.

Thus in general most of the states have requested AICTE not to give permission to start new colleges in 2018-19. Even AICTE has taken the following decision. “Institutions having Course(s) where admission is less than 30% of “Approved Intake” for the past 5 years consistently, the Council shall reduce 50% of the “Approved Intake” in such Course(s) in the current Academic Year with the approval of the Council”. Maharashtra state government has decided not to give scholarship to students, who are taking admission to non-accredited programs (with effect from 2019-20).

Thus of late government, Universities and AICTE have realized the ill effect of mushrooming technical institutions and need for skill improvement in engineering graduates.

IV. WAY FORWARD

The exponential rise in the number of engineering institutions in the last two decades in India has facilitated the entry of aspiring students into engineering institutions. However due to lack of infrastructure, qualified staff and many more reason, graduates lack the skill they are expected to have. Lack of practical knowledge is also main contributing factor. Lab sessions are restricted to kit based experimentation rather than design and implement based approach. The other factors for pathetic condition are out dated syllabus, exam based learning, absence of R&D activities and lack of industry exposure. Core Employability Skills, Communication Skills and Professional Skills need to be improved. Autonomous colleges enjoy academic autonomy. They can have updated syllabus. However most of the colleges are affiliated and hence does not have the academic flexibility. However they can take few initiatives to make their students employable.

Project based learning: Mini projects can be given to students from first year itself. This is helpful to students to acquire skills in team work, communication and task execution. Appropriate weightage can be given to project work while awarding internal assessment marks.

MOOC: Faculty and students to be encouraged to take online courses like NPTEL (National Programme on Technology Enhanced Learning) is a joint initiative of the IITs and IISc. Through this initiative, online courses and certification in various topics is offered. Enrolment to a course is free. To write examination, nominal fee to be paid. 994 courses are available from different streams of engineering. 19428 videos are available. Around 15000 candidates are registered and around 13500 candidates got certificates. 300+ colleges have NPTEL chapters. 3200+ students has availed scholarship.

Virtual lab: An Initiative of Ministry of Human Resource Development (MHRD) Under the National Mission on Education through ICT. Seven IITs, IIIT Hyderabad, AMRITA VISHWA VIDYAPEETHAM, DAYALBAGH UNIVERSITY, NIT Karnataka and COE Pune are the participating Institutes. Virtual labs are available in following areas: Electronics and Commutations, Computer Science and Engineering, Electrical Engineering, Mechanical Engineering, Chemical Engineering, Biotechnology and Biomedical Engineering, Civil Engineering, Physical sciences and Chemical Sciences.
Students can conduct experiments, verify results with actual readings.

Industry interaction: Students should be sent to industry during vacation period. Periodical review of their experience will enhance their skills. Faculty visit to industry will be of great use. Expert talk by industry person on regular basis and visit to same industry will be added advantage.

V. CONCLUSION

With numerous engineering colleges, quality of technical education is compromised. The need of hour is to have capable engineers who have required skills both technical & soft. Colleges can take various initiatives to achieve this. Which will give good results in long run.

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