

TRANSFORMING TECHNICAL EDUCATION TOWARDS INDUSTRY NEEDS

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ABSTRACT

Technical education plays a pivotal role in the socioeconomic circumstances of a nation. There is a huge talent crunch prevails in the global arena. In order to acquire and impart skills to bridge the void, a sound professional training caters to skilled human resources. In India, only 12% of the engineering graduates come out with flying colors while compared to the mammoth graduates from over 4500 engineering colleges. It indicates lack of employability skills rather than lack of opportunity. The contemporary Indian educational system tests the memorizing skills of the students than practical knowledge or knowledge of application. Hence there is a discrepancy which flanks the education system as it doesn't cater to the needs of industries. The measures such as Memorandum Of Understanding (MoU) signed with industries, industrial training for faculties and students, effective regulation and monitoring by statutory organization like the All India Council for Technical Education (AICTE) and the University Grants Commission (UGC) might help to improve the quality of the graduates by making them employable for the economic augmentation of our nation.

Keywords: MoU, UGC, AICTE, NAAC, NBA, NASSCOM

1. INTRODUCTION

During the 1970s & 1980s, the graduates pursued engineering stream in India were few and faced unemployability despite having good academics, scholastic abilities and the unemployment rate of 80% [14] was at its crest [1].

In 1991, financially viable reforms altered the face of the Indian job market. Industrialization, the augmentation of public and private sector enterprises, etc. boosted employment opportunities as well as better-paying jobs. Today, software and hardware industries have boomed up to cater Technological Knowledge (TK). We are outsourcing harvest and services to international companies.

Apparently, there is no lack of opportunity and there is no plummeting of engineering graduates either. The quantity of higher education institute has left up. India rolls out the highest number of engineering graduates every

year in the world. This is especially pronounced in states like Andhra Pradesh, Maharashtra, Haryana, Karnataka, Chhattisgarh and Tamilnadu (TN), which accounts to TK % of all engineering colleges in the country [2]. According to a survey, there are more than 3,225 engineering colleges in India [20] with a total seat of 14.86 lakhs.

Especially, with respect to the state of Tamilnadu, there are more than 500 engineering colleges with a total seat of 1.5 lakhs. However, for the past five years, merely more than half of these seats remain deficit in the colleges of Tamilnadu [11, 12, 13 and 18] Figure 1 shows the total number of engineering colleges in the state. Figure 2 gives the clear picture of state wise enrollment and intake ratio in the academic year 2017 – 2018.

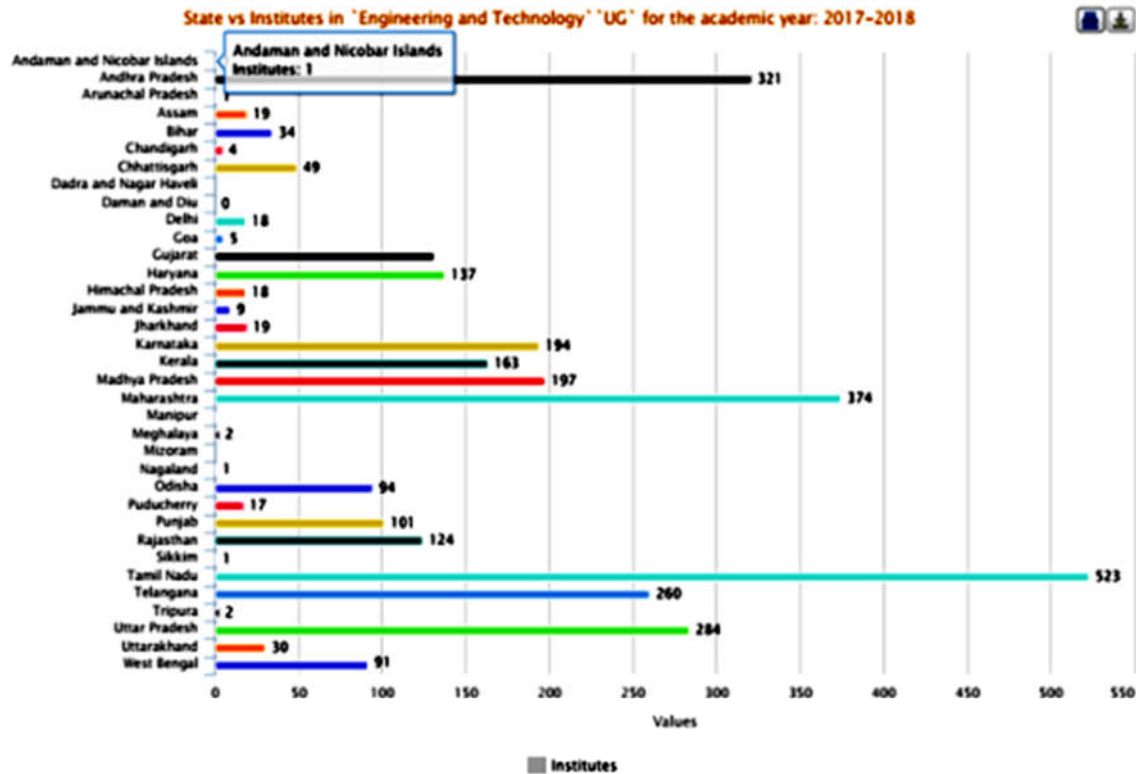


Figure 1: State Vs Engineering institutes in the year 2017 – 2018

2. EMPLOYABILITY

From the perspective of the employers, employability skills can be defined as the transferable skills needed by an entity to make them 'employable', along with exceptional technical understanding and subject knowledge. Employers often delineate a set of skills that they want from an employee which would let the employee to perform their role to the best of their ability. To be employable, an engineering graduate should possess three significant skills:

- ✓ Core academics and the aptitude to relate these skills to realistic situations in the workplace or a custom activity.

- ✓ Employability skills such as grave thinking adaptability and problem-solving that are needed in the vocation
- ✓ Technical job-specific skills.

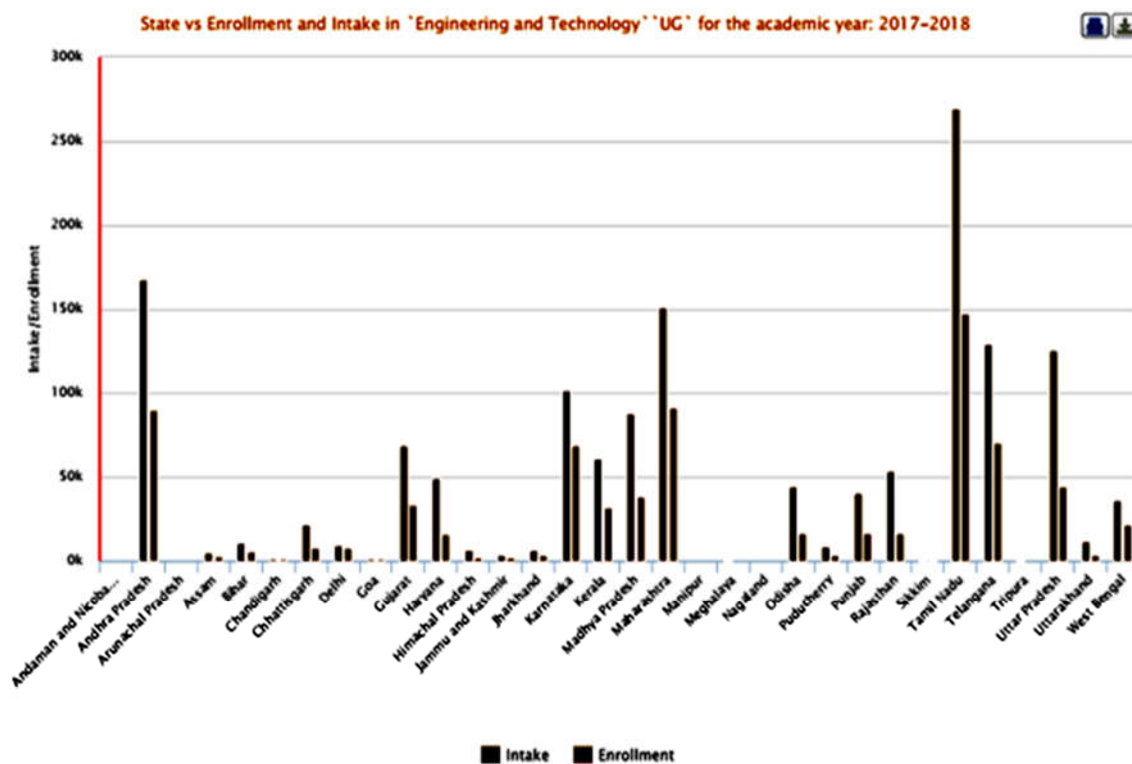


Figure 2: State Vs. Enrollment and intake ratio in the year 2017 - 2018

2.1 Core Academic Skills

Students need basic academic knowledge, particularly in mathematics and in English. Employers recognize oral and written communication in English as one of the crucial competencies which should be possessed by every graduate. The ability to communicate is precious for obtaining employment and maintaining successful job performance. While working as a team, effective communication helps in solving collision management problems. Mathematics is needed for data analysis, reasoning, designing and solving technical and commercial issues.

2.2 Employability Skills

As per employers, employability skills are key performance indicators in the 21st-century work environment. These skills include communication and interpersonal skills, problem-solving skills, being self-motivated, working under pressure and towards deadlines, organizational skills, team working, aptitude to learn and

adapt, numeracy, valuing diversity and cooperation skills. Out of these, employers highlighted the need for the following skills:

- **Problem-solving** - the aptitude to appreciate a problem by breaking it down into smaller parts, and identifying the key issues, insinuation and recognizing solutions.
- **Team work** - working well with other people from dissimilar disciplines, backgrounds, and know-how to do a task or goal.
- **Creativity and Self-motivation** - having new thoughts of their own which can be brought into reality.

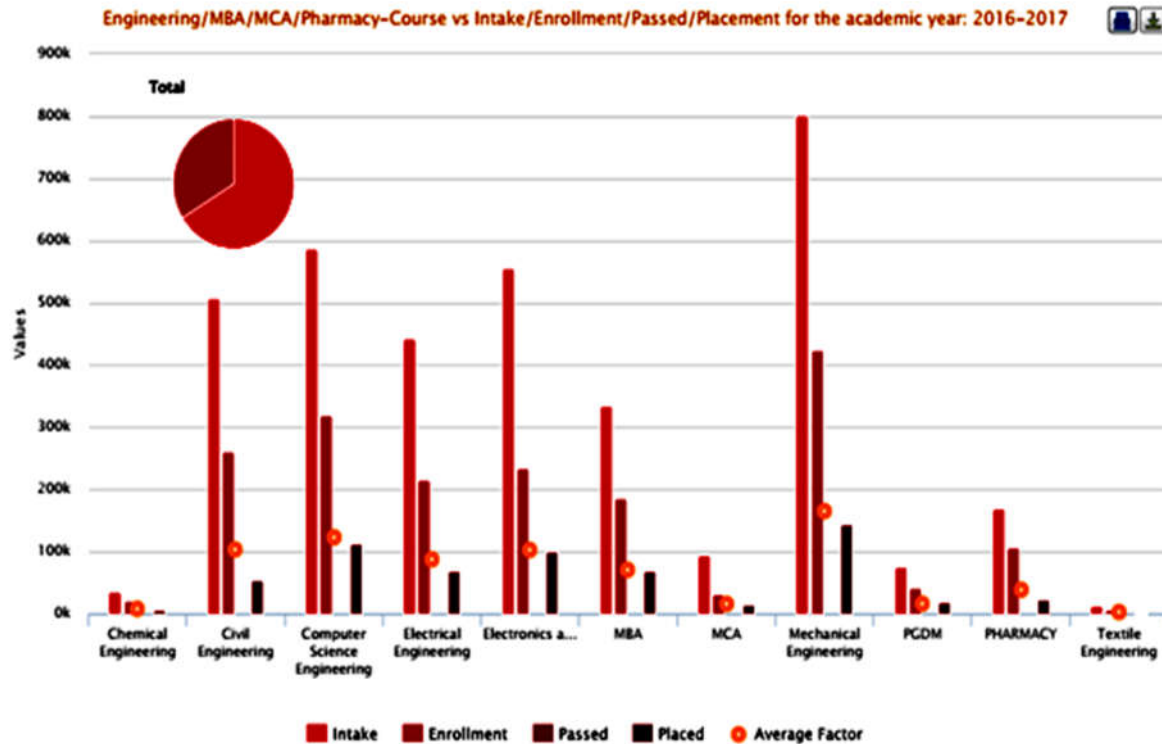
2.3 Technical Skills

It is also called "hard skills," as opposed to soft skills, which are personality and character traits. Technical skills are those abilities acquired through learning and practice. They are often job or task specific: a meticulous skill set or ability required to do a specific job or tasking. Some of the employers provide career opportunities with on-the-job training to graduates with the ability to learn and adapt skill, while some of them look for graduates with a specific technical skill [14].

3. UNEMPLOYABILITY

Companies – both domestic firms and multinational agencies -- are not ready to offer jobs to many engineering graduates because of their lack of employability skills. Industry experts aver that even after pursuing 4 or 5 years of engineering education, India's graduates are not suitable for a job. "India does not have a problem of unemployment, but unemployability," said India's former President, Abdul Kalam [21]. The problem is the need for employability skills or employable aptitude among Indian engineering graduates. The National Association of Software and Services Companies (NASSCOM) reports that of the 37 lakhs eligible graduates' every year, only a quarter are employable in the IT-BPO sector [22]. Figure 3 shows that the department wise placement record ratio of the nation in the academic year 2016 – 2017 gets worse according to a new TK survey conducted in TN. They estimate that only 12% of the current engineering alumnae are employable, 56% can be made useful through supplementary training, and the remaining 36% are not even trainable [3]. A Pearson- Educomp company, Purple Leap, has conducted the survey across the country on the Industry Readiness Index and found that more than 90% of the students in tier-2 (NAAC, NBA, autonomous institutions) and tier-3 (Self unaided private institutions) engineering colleges are not readily employable and one third are unfit for employment.

"Our engineers are not unemployable," said Kiran Karnik, Senior Vice President, NASSCOM. "They just don't have industry-ready talent. In other words, they lack the skills required for the jobs that are available to them." [4]



2017 – 2018 yet to be released by AICTE*

Figure 3: Department wise placement record ratio in the year 2016 - 2017

4. DEFICIENCY IN THE EDUCATION SYSTEM

The reasons quoted for unemployability are the lack of skills, old syllabus, poor academic delivery, lack of work culture awareness and the prominence given to the aggregates instead of knowledge acquisition. Some of the problems with the current academic system are:

4.1 Impractical Syllabus

Today's education system is focusing more on theoretical knowledge, not on the application of principles. When a question is posed to a mechanical engineering student about the technology concerned in the creation of an automobile, and several of them will be ready with the details. If you inquire them to test a motor on their own, only a handful will be ready to do it. What's the intention of such an education? The syllabus is so unrealistic that it never helps the students to do a realistic work.

4.2 Competition in Education Business

Owing to the recent method of ranking of engineering colleges based on pass percentage (grades/marks), it forces engineering colleges to focus on getting ranks and not on imparting quality education. Students are forced into rote learning. Even though they don't know how to apply it practically, they memorize it thoroughly without understanding anything.

4.3 Lack of Experienced Faculty

In recent years, numerous new engineering colleges have sprung up, which have complexity in attracting top-class faculty, have a hold on them, and pleasing to eye their skills. The value of students' emergence of such engineering colleges and non-academic cope colleges donate to non-employability or underneath employability.

4.4 Standard of Question Papers

By and large the same sets of questions are repeated year after year in the university examinations. Students can rapidly pass their exams by memorizing questions from guides available in the market. If their memorization skills are right, they can do well in the exams. But it doesn't really mean that they have the skills the industry is looking for.

4.5 Communication Skills

Many graduates lack English skills and nearly all of them struggle to converse still in their mother tongue. They are unable to write even a small paragraph without spelling and grammatical errors. Communication skills lack importance in the engineering curriculum [28].

4.6 Computer Skills

Nowadays, having necessary technical skills in computer is essential to get a job. Almost everybody has relatively easy access to the computer and the Internet.

4.7 Initiative and Self-Motivation

Most of the graduates today have no practical knowledge to apply to real life situations or have new ideas on their own. Students don't do projects, but they buy them from project centre [23]. This is a proof and an evidence for the growing numbers of projects centers in Indian cities. In most colleges, project reviews and

laboratory examinations are vacuous. Most of the alumnae exhibit their exceptional theoretical knowledge, but when it comes to problem-solving, they do not have necessary analytical skills [24].

5. BRIDGE THE GAP

Experts are of the view that the curriculum emphasizes theory rather than realistic technological applications in the industry. The main challenge today is not making the engineering alumnae employable but also to make sure that there is more quantity of competent industry-ready engineers for better productivity and novelty. A fresh engineering graduate is considered for the work place ready if he/she can contribute to the company's development by competently conducting the day-to-day tasks. However, the first-day first-hour ready workforce is a myth. He/she has to experience induction programs or 3-4 months of training at an average cost of Rs. 200,000 per employee to make the freshly-inducted employee meet the industry standards [25, 26]. Experts agree that there is a wide gap between the quality of engineers produced by engineering colleges and the quality of engineers required by industries. If an institution wants to perk up the employability of their graduates, they have to focus on reducing these important skill gaps. Here are some of the suggestions.

5.1 Improvements in Curriculum

When does a student lose his/her creativity? It is found [27, 28] that the worst phase is between 10th standard to 12th standard where there is more “stabilization” in their thought process, and there are most important life decisions taken. Students are forced into rote learning to score a higher rank and to secure a place in professional courses. High school education and teaching methods need to be augmented, monitored and decoupled from rote learning. Engineering curriculum should be scrutinized and updated from time to time in order to meet the requirements of the industry. Colleges should offer students with a curriculum based on integrated academic and technical content along with employability skills. Industrial training must be a fraction of the curriculum which provides work-based learning opportunities that facilitate students to connect what they are learning to real-life scenario. If industry training is given to the students during their engineering studies, they can be directly deployed in the field instead of spending money and time in training them for the job. For that, every institution should have to sign the MoU with the industries in their related disciplines which will benefit industries, students, and the colleges. Mini projects should be a part of the syllabus for all core subjects. Project work should be done only in the college or in the industry with the MoU. To enhance creativity and problem-solving skills, colleges should have a 24-hour functioning Project Development Centre, where students can experiment their innovative ideas.

5.2 Employability Skills

To improve employability skills, especially with respect to tier 2 & tier 3 engineering colleges, it should be made compulsory that the students have to undergo employability proficiency test such as communication, interpersonal, and analytical proficiency tests before the start of their first semester classes. Special classes should be conducted for those who failed. Employability skill development should be designed as a part of the syllabus for all the years.

5.3 University Examination and Questions

Questions should be posed in such a way that it is the solution to a practical problem or to a real-life scenario or by stimulating creativity. There may be many correct answers for a question. Multiple choice questions should be included. To prevent students memorizing some questions and answers from guides available in the market, asking repeated questions from the previous years should be avoided. The question paper should reflect the set of proficiency that a graduate is supposed to have after each semester towards employability.

5.4 Faculty

Increasing the number of seats in engineering colleges created a shortage of qualified faculty in Indian engineering colleges to almost triple by 2014 [15]. The faculty in most of the engineering colleges, particularly tier 2 and tier 3 cities are neither trained well nor do they have sufficient knowledge. Technology is virtually changing every six months, and staff members lack the motivation to update themselves with changing technology. Demotivation like poor infrastructure, facilities, low or default salaries, lack of appreciation by some private managements are a few reasons for the low quality. Faculty should be given proper training. Universities and colleges should tie up with companies to train the faculty to empower them with innovative teaching techniques and tools to enhance employability skills of engineering graduates. To be aware of latest industry practices and technology, it should be made compulsory to have industrial exposure or industrial training.

5.5 Statutory Organizations

AICTE and the UGC are required to work with universities and colleges in developing employable graduates by ensuring that they provide physical infrastructure, motivated and quality academic staff with relevant support and resources, updated curriculum and course design and industrial partnership. They should plan and regulate (increase or decrease) the number of seats according to the demand of the industries. AICTE

and UGC have high responsibility for ensuring the quality of engineering graduates produced in India and our country's growth.

6. CONCLUSION

India's growth largely depends on the technological abilities of our young graduates. The poor quality of the students graduating from the engineering colleges will be a big challenge and hindrance for the growth. The Government needs to wake up, and Statutory Organizations, like AICTE and the UGC, initiate some strict and rigorous measures to perk up the excellence of Technical Education in the country.

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