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Engineering Graduate Employability – A Tool Based Approach

By

Mr. Avinash Kajale
Research Scholar, Management Department, MIT ADT University, Maharashtra State, India
Email: askajale@hotmail.com

Dr. Ajim F. Shaikh
Faculty of Management, Management Department, MIT ADT University, Maharashtra State, India
Email: ajim.shaikh@mituniversity.edu.in

Abstract

Global IT industry has large dependency on recruiting engineering graduates to fulfil their staffing needs, with growing IT industry, requirement of fresh engineering graduate talent is increasing day by day. While industry has increased demand but still the employability of engineering graduates is a major concern globally. IT Industry skill expectations from engineering graduates has not changed significantly but industry is finding it difficult to get right talent. Industry must spend substantial time and energy while onboarding engineering graduates before they are deployed on the projects. To overcome the challenge industry and academic needs to come together and work on the structured approach to help academic institutes and students to understand Industry expectations while recruiting. The roles and job expectations offered by IT industry differs by the services they offer. Students at early stage of their engineering education should decide on his or her career preferences and start working towards it. Students needs to assess where they stand as against what industry needs and bridge the gaps before getting ready for the recruitment process. Academic institutes play key role in mentoring students throughout the process to make sure students are employable. The overall process will result in better employability and reduced time and efforts for the recruitment process. A tool developed as part of the study "Engineering Graduate Employability http://www.ege.org.in/" will help to structure the process and help in improved employability.

Key Words – Employability, Engineering Graduates, IT Industry, Academic Institutions, Employability Tool

Background

'Employability" is referred as individual's capability to gain and sustain employment **[1]**. In the academics, employability is considered as ability of a student to gain the employment through campus recruitment process. From the student's perspective, employability is to have required skills, mindset, and attitude that industry needs to gain the job one is aspiring for. From Academic institute perspective it is more of a ratio of number of students passed as against number of students placed in the industry. But largely employability is more related to the labour environment or industry situation at that point of time as hiring requirement changes due to market conditions. The study carried out by Harvey, L **[2]** identifies that some external coaching and guidance can bridge this gap in graduates to be employable in the industry. Employability and Industry connect is directly connected and success of having such connect will result in better employment.

Employability is a serious concern in India as well, former Indian President, Dr. APJ Abdul Kalam also stated that India should be focusing more on employability rather than employment. Agarwal R. et al **[3]** carried out detailed review of technical and professional education system in India encompassing Engineering colleges, Management Education colleges and many more institutes which are governed by different bodies like AICTE, Medical Council, Bar Council and allied regulatory boards. As per the study diploma or degree level technical academic institutes were unable to meet industry needs or technical or engineering workforce requirements of the country resulting in more public and private technical academic institutes during 1950's and 1960's. This also resulted in development of Regional Engineering Colleges in India. Pandey P. K. et al **[4]** identified that most of the development in technology sector resulting in substantial increase of public and private engineering colleges in India. The study done by Kaushal L **[5]** revealed that Technical and Engineering education systems in India more focuses on developing technical skills while the focus on other personal soft skills is considered as low priority.

Over the period, the information technology (IT) and Information Technology enabled Services (ITeS) industry has positioned India with strong presence globally and influenced education system to cope up with the rising demand. India had cost advantage over the competitors making it Unique Selling Point (USP) favouring India in the competitive worldwide sourcing market. Globalization has resulted in higher competitiveness in education and training. As global economy became more unpredictable, it is imperative to have presence across industry sectors and your manpower is skilled and equipped with required knowledge to cope up with the situation. A FICCI – World Bank MHRD review conducted in September – October 2009 revealed that 64% of the Indian Industries are not satisfied with engineering graduates' quality and capability. 75% of engineering graduates cannot be employed. About 25% technology Graduates and 15% Other qualified Graduates can be employed in IT / ITeS industry – NASSCOM expressed by Mckinsey Report **[6]**. Hence World Bank finding recommended that inclusion of Soft Skills and appropriate level of Industry-Academic relationship should be mandated to overcome employability challenge. Nagabhushan P. et al **[7]** study revealed major gap between academia and what Indian industry needs. As per the Annual Employability Survey 2019 conducted by Aspiring minds, it was identified that 80% of the engineers passed out from various Private and Public engineering colleges are not fit for employment. **Arora S. et al [8]** concluded that there are not sufficient internship opportunities or Industry based projects in India for Engineering students. About 40% of the engineering students undergoes internship and 36% undertake industry projects. Indian academic syllabus is more theory-based and lack teaching the application of engineering concepts applied in industry application. The study conducted by Puranik A. **[9]** identified that the engineering college students passed out in India lacks required skills to be absorbed in Indian IT or ITeS Industry. The survey conducted by The Hindustan Times revealed that about 97% of the engineering graduates lack in communication skills and were struggling to speak English fluently.

How Industry, Academics and Students responding to situation in India

A study was carried out to review employability of Pune based engineering colleges with respect to IT industry in specific. A detailed survey followed by select interviews were carried out. Accepting employability as an issue, industry, academic institutions as well as students are adapting to various initiatives and steps to overcome the employability challenge coping up with the business dynamics.

Initiatives from Academic Institutions

Within the functional boundaries of AIECTE & UGC, academic institutes are trying their best to cope up with the situation and improve the employability. Increased employability helps academic institutes to get their branding more popular resulting in more competitive admissions in upcoming year. Some of the key initiatives which academic institutes in India driving are:

- As part of Atal Innovation Mission of government of India to create and promote culture of innovation and entrepreneurship across India, academic institutes have established separate cell to drive innovation. These cell focuses on driving various industry-based projects with the help of students which can potentially generate IP (Intellectual Property) or patents and can help students to think of start-up.
- Academic Institutes are working on developing / improving industrial connect for possible option of jointly working on industry research-oriented projects or involve industry experts in coaching or mentoring students
- Academic Institutes are trying to identify industry subject matter experts who can conduct knowledge sessions for students which can also provide potential opportunity for students to have industry / subject matter expert connect to leverage for
- Various training / coaching programs are conducted by academic institutes which can help students to improve on industry required skills
- Academic institutes are trying to provide industrial certification opportunities to students which can help them to get potential job opportunities

Some of the academic institutes have identified dedicated position for industry connect where the role is expected to develop and drive new projects, engagements, and potential opportunities to work with industry.

Initiatives from Industry

IT Industry has large dependency on recruiting engineering college freshers to meet their staffing needs, some of the large IT services companies do mass recruitment while product companies do selective recruitment. The required skills shortage is impacting India growth directly or indirectly **[10]**. To get better talent recruited and to achieve numbers required Industry initiates key activities like:

- Upfront work with industry internal stakeholders to understand growth plan and define recruitment plan much in advance
- Approach academic institutes at earliest to get early recruitment slot so that larger pool of students available to select from
- Provides selection criteria, job roles to offer upfront to academic institutes so that right level of information is provided to students before the actual recruitment process
- Deliver Pre-Placement talk to students and provide company vision, details of the job role, working culture and career path
- Conducting knowledge sessions with students on technology trends and specific skills
- Driving research projects jointly with academic institutes and sponsoring such project to get “out-of-box” thinking and give opportunities to students to get hands on experience

Industries have dedicated team to manage campus recruitment throughout the year and their focus is more to have constant connect with academic institutes and work closely to explore opportunities on various connect initiatives.

Initiatives from Students

Most of the students strive hard with a dream to get a job post their engineering graduation. With all available resources available around them, they try their best to utilize those and get employment. IT Industry perceives that student do not possess skills that industry considers mandatory to be employable **[11]**. Industry has experienced that student who have been offered internship lack in communication skills, work ethics and respect towards subordinates **[12]**.

Some of the key initiatives that students take to get an employment are:

- Considering market trends look at the technology required and do the training courses, where possible go for certification
- Participate in various initiatives or events organized by their academic institute and try to leverage opportunities from that
- Get enrolled into various career-oriented courses offered by their academic institutes
- Explore opportunities for internship which can provide hands on industry exposure which can benefit during recruitment process
- Approach their social or family contacts and get their guidance / mentorship

Students closely work with college "placement" cell during the recruitment process to explore possible opportunities of interest to them and where they qualify the criteria.

Gaps that is overall impacting Employability

Some of the possible reasons about the gap in Industry and academics are mindset difference, course curriculum changes take long time to effect while industry changes are constant due to changing business scenarios, while industry drives for short term goal of recruitment for the year, academic focuses on long term perspective **[13]**. Three core coordinates in the employability process that is Academic Institutes, Industry and Students are taking various initiatives to improve employability, but still overall result of the process is not encouraging, employability factor has not significantly improved.

Narendra Agarwal carried out a study on engineering graduates' employability and identified that lack of interpersonal and technical skills has serious implications on recruiting engineering graduates for an Indian IT / ITeS industry. To mitigate the issue, most of the Indian IT companies have a dedicated Learning & Development department who conducts onboarding training programs to get them deployable for the projects **[14]**.

Some of the factors which could have direct or indirect impact on the employability are:

- Most of the IT industry have a qualifying criterion to have > 60% marks throughout but engineering colleges do not have such criteria to admit students, hence in most of the occasions such students are not even qualified to appear for recruitment process
- Industry qualifying criteria and expectations are not well understood by students

- Students do not have clarity on where they stand with respect to soft skills, standardized assessment is required which can map it to industry expectations
- Students are not clear on what skills industry is expecting and rather focuses more on current technology knowledge which is not the key consideration during recruitment process
- There are very limited internships offered to students by industry which results in limited exposure to students about industry requirements
- Academic institutes are driving various initiatives but there is no measure on how it is helping students to improve employability
- Academic syllabus is static and there is limited or no scope for academic institutes to align it what industry requires
- Soft skills related training programs are organized just before actual recruitment process and hence usefulness of such programs is not much seen during the interviews
- There is a gap in what students are expecting from IT Industry job and what is on offer from IT industry

Looking at the identified gaps, there is some level of coordinated efforts required across Industry, Academic Institutes and Students which can help during campus recruitment process and may result in productive outcome with increased employability. A "Tool" which can connect students with industry requirements via academic institutes is designed to meet up the requirements.

Engineering Graduate Employability Tool:

Though employability of student is a generic term, but it is identified that a student who is not suitable for one organization may be employable at other organization. Hence employability of a student should be looked at whether student is employable at an organization for the role.

A tool is developed which will take industry requirements and students skills as an input parameter and identify which are the students who are meets industry requirements and will also identify skills which students lack and provide list of courses that student can take up to improve the chances of getting employed.

Key factors about employability revealed by study are:

- IT Industry considers 10 common soft skills on which it evaluates students' capability while recruiting engineering graduates
- Preference of engineering branch varies by IT companies
- Overall guidance on educational scores is similar
- There are no gender specific requirements, though some of the roles do have consideration
- Students recruited during campus recruitment process undergoes onboarding training which varies from 4 weeks to 12 weeks but focuses more on soft skills and organizational process trainings

High level system function is as follows:

- Industry specific requirements are captured at Educational Performance, Soft skills expectations, technical skills expectations, any functional domain knowledge

expectations, and any other skills expected. Job related details like – role description, location and expected date of joining are also captured

- Tool captures students' details on their academic performance, technical or functional domain skills and soft skill levels (as evaluated from various commonly available tools like wheebox, 123test etc.)
- System provides flexibility to map IT industry required skills as against skills evaluated by tool
- User can define various training courses against industry required skills which will be used to provided individual development plan for a student when student is below the expected skill level
- The tool will generate two types of lists – one will be students who qualify for a role with the industry and other list will be students who do not qualify for the industry what are the specific training courses that one needs to undertake which can make them qualified for future recruitment processes
- Tool processes employability for the company and for the role while students' data can be common across companies

The developed tool is a web based and hosted at http://www.ege.org.in/ with access controls defined with appropriate data privacy considerations.

Tool Validation

The tool is piloted at one of the engineering colleges in Pune where campus recruitment drive for 2 IT companies for 2 different roles. Please refer to Table-1 for the results of the tool validation.

Table I - *Tool Validation Result*

	IT Company-1	IT Company-2
Total # of students of qualifying branch	71	147
Total # of students of qualifying branch and academic score	29	71
Technical Skills matching	6	19
Domain Skill matching	6	19
Soft Skills matching	4	11
Recruitment Process qualified by engineering graduate employability tool	4	11
# of students selected from the tool recommended candidates	3	9
Overall success ratio	**75%**	**81%**

Conclusion

A tool or a platform which will be common across Students, Academic Institutes and Industries is required which can help to improve employability. Industry skills requirement is not changing year over year and hence academic institutes should focus on developing students' skills right from early stage of engineering so that student can get required time to get them fully skilled before they appear for the recruitment process. Academic institutes should give realistic picture to students if their education qualification score is below industry requirements and provide them alternate options to consider. Internship will certainly help to

improve employability and industry needs to provide opportunities for students, if government can mandate it will help to govern.

Scope for Future Studies

Tool is developed based on requirements captured for IT industry which can be validated for other industry segments. There could be potentially gap in the skill levels expected by IT industry and accessed by the tool may vary and may required to be standardized.

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