

## **EMPLOYABILITY SKILLS OF ENGINEERING GRADUATES: AN EMPIRICAL EVIDENCE FROM HYDERABAD CITY**

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***Abstract:** Globalization has created a momentum, which is re-allocating work around the world. India had a knowledge-based education system for centuries but now the youth of India must quickly embrace skills and employability-oriented education to reap the benefits of ensuing job influx. Part of the skills gap problem is that only a small percentage of India's young go on to higher education. Even a more fundamental level of education is proving difficult with nearly 40 per cent of people over the age of 15 being illiterate. Ironically, it is becoming even harder to create a robust and continuous pipeline of talent. The university systems of few countries would be able to keep up with such demand, and India is certainly having trouble. The best and most selective universities generate too few graduates, and new league of colleges are producing graduates of uneven quality. Further, universities and educational institutions have been unable to update their syllabi in tune with the high speed changes taking place in the world of technology. Hence, the students churned out are not equipped to meet the current industry requirements and often companies have to incur additional expenses (time and monetary) to train new hires. The reasons for the poor employability may be multiple. But the costs associated with it are heavy and immeasurable. Hence, the present paper is trying to find out the reasons for poor employability among the engineering graduates and to find the ways and means to come out of the same. The results reveal that, demographic, organizational, and environmental and teaching learning systems equally contributes to the employability skill gaps among the engineers and it can overcome with a sustainable and turnaround quality strategy.*

***Key words:** Engineering education- skill gaps- employability- quality-strategy*

### **INTRODUCTION**

The very purpose of the graduate education is not gaining knowledge and skill but also to acquire employment fit to the qualification (Keeling, 2016). The challenge of

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new graduates is not completed with merely getting a job; the challenge continues even after entering into the job. Hence, variety of skills and competencies are required for new graduates (Nijhof, 2015). In general, Rao (3) explained two types of skills; hard skills and soft skills (Gill and Lashine, 2013). According to him, hard skills are technical or administrative procedures that are related to an organization's core business and in contrast, soft skills or generic skills are behavioural skills characterized by intangible attributes and entail emotional intelligence (Andreas Blom, 2011). Most of the studies were conducted on employees/executives skills, (Knight, 2012). This study differs as it covers employability skills and competencies of new graduates. It is a matter of grave concern that as per the NASSCOM Report, hardly a 10% of our Graduates are found employable. Recent surveys on Engineering and Business Students indicate that only less than 24% of them are employable (Hassan B, 2007). By considering the facts presented by the industry and media, the current study is undertaken to assess the factors influencing the employability skills among the engineering graduates in the sample area.

#### NEED FOR THE STUDY

There has been significant growth in educational institutions over last decade with increasing number of engineering graduates passing out year by year. One of the good things to happen in India in recent times has been that professional higher education has spread its wings to reach common man and ordinary people now dream of becoming an engineer or doctor or management professional unlike few decades back when it was for few privileged class getting into limited government colleges (Analoui and Hosseini, 2001). This clearly means that thousands of qualified graduates pass out every year and get started with journey to fulfill their dreams (Krishnan, 2008). One of the studies has put increase in number of professional's colleges as three times in last decade.

Also recent times have witnessed explosive growth on various sectors in India with emerging as one of major surprise sector in last decade (McLaughlin (1995). Industry has been a choice of popularity by youth because of its charm, dignity, high income and "white collar" status. Bio- medicine / Pharmacy has been another technologic/research field gaining momentum in last few years. Standing of Infosys on global platform is manifestation of IT revolution in India in last decade (Long, 2007). Projections indicate that industry would require additional 6 million software professionals over next ten years India wide. This clearly means opportunity is huge even going by moderate estimates for youth which open flood gates for youth to fulfill their dreams. India 2020 dream of becoming a super power and big stakeholder in international matters would need talented and employable workforce with India's youth population becoming one of the major prime movers for our growth (Sherer and Eadie 2007). The similar growth is expected in all other core sectors like auto, mining, manufacturing, power, cement and infrastructure and service sector like banking and financial services, Chung-Herrera *et al.* (2003).

**RESEARCH PROBLEM**

Part of the skills gap problem is that only a small percentage of India's young go on to higher education. No more than 7 per cent of Indians aged 18-25 go to college, according to official statistics. Even a more fundamental level of education is proving difficult with nearly 40 per cent of people over the age of 15 being illiterate. Further, universities and educational institutions have been unable to update their syllabi in tune with the high speed changes taking place in the world of technology. Hence, the students churned out are not equipped to meet the current industry requirements and often companies have to incur additional expenses (time and monetary) to train new hires Athey and Orth (2009). One of the approaches to tackle the problem of lacking job readiness in the Indian Industry is partnerships between the industry and academia Tas (2008). Many organizations have taken such initiatives to provide hands on experience, practical skills and soft skills to bridge this gap and provide training in high-demand job skills Charner (2008). The question is whether the organizational variables affecting the employability skills or the demographical variables influence?, hence, inherent qualities of an individual may play a major role in employability skills improving at a given point of time. Hence, the present paper is focused in establishing the association between the demographical variables and the employability of the engineering graduates.

**OBJECTIVES OF THE STUDY**

The Present paper is focused on the following objectives:

1. To assess the degree of association between the demographics and the employability skills among the engineering graduates.
2. To find out the factors influencing employability skills among the engineering students

**SCOPE OF THE STUDY**

The study is conducted at Hyderabad city. The researcher, have selected the reputed engineering colleges affiliated to JNTU, Osmania University and University of Hyderabad. There are ten engineering colleges having more than 10 years into engineering education were selected as sample and from each college, six branches of students are covered under the study. The corporate colleges with deemed status are not covered under the study.

**METHODOLOGY**

The current study adopted the descriptive methodology to assess and explain and to express the reasons affecting the employability of the engineering students in the engineering colleges. For the purpose of study ten engineering colleges were approached. The colleges offering more than six courses and having more than 10 years in engineering education is considered for study. Quota sampling is adopted in

the study. The pilot study was conducted by distributing 100 questionnaires to retail investors of various broking firms in Chennai city but only 100 responses were suitable to be taken up for testing the internal consistency and reliability of the constructs. Cronbach Alpha Test was used to determine the degree of consistency among the multiple measurements of each factor. It measures the inter-item reliability of a scale generated from a number of items. Ideally, the reliability coefficient above 0.5 is considered acceptable as a good indicator of constructing reliability (Nunnally, 1976), above 0.6 is treated satisfactorily (Robinson *et al.*, 1991), but alpha above 0.7 is considered sufficient (George and Mallery, 2001; Pallant, 2005). Therefore the total sample size is 600. From each college 60 samples were selected and distributed the questionnaire and collected back. From the primary scrutiny it is found that, errors of omission and double entry and those are treated as defective and removed from the sample. Only 512 good responses were considered for analysis.

#### DATA ANALYSIS TOOLS AND TECHNIQUES

The data collected from the respondents is converted in to master data sheet by assigning labels to the variables. For the purpose of analysis SPSS 23.0 version is used. The first part of the analysis is carried out by using the simple percentage analysis and explained the profile of the sample. The second part of the analysis is focused on proving the null hypothesis using inferential statistical tools like t-test and ANOVA.

#### RESULTS OF THE STUDY

The present chapter is dealing with data analysis using the different statistical tools through a computer version of SPSS package version 24. The tests are selected on the basis of the nature of data and the appropriateness of the usage of a technique.

**Table 1**  
Distribution of sample on the basis of Gender

<i>Gender</i>	<i>Frequency</i>	<i>Percentage</i>
Boys	358	69.9
Girls	154	30.1
Total	512	100.0

*Source:* Primary data/ Structured Questionnaire

It is observed from the table 1 that 69.9 percent of the students studying engineering courses are boys with 69.9 percent of the sample and the remaining 30.1 percent of the students are girls in engineering courses at Hyderabad. It indicates that the majority of the students' are boys. The reason behind could be the technical component and the location of the colleges and the tenure involved in the courses is considered by the parents before admitting their wards in to colleges. Furthermore transport and safety issues play a major role in the selection of course and college of study. Hence, it is obvious that the majority of the students joining in the engineering colleges located at the outskirts of the city are boys. The situation is coming to a stage that, some of the

corporate colleges are offering engineering courses within the city limits by establishing technical universities as deemed universities. This can improve the girl student admissions in the engineering colleges (Podolny, 2009). The point to keep in mind is Social stigma of admitting a girl student in engineering is also prevailing in the society. This is recent in nature, still the craze for state university affiliated colleges are preferred for engineering colleges (Paucar-Caceres, 2008).

**Table 2**  
Distribution of sample on the basis of Branch of study

<i>Branch of study</i>	<i>Frequency</i>	<i>Percentage</i>
Mech/ AUTO	63	12.3
ECE/ETC	162	31.6
CSE/IT	153	29.9
EEE	90	17.6
Civil/Structural/Design	44	8.6
Total	512	100.0

Source: Primary data/ Structured Questionnaire.

It is noted from the table 2 that the branch wise distribution of the sample in engineering colleges is as follows. 31.6 percent of the students are from electronics and communication and telephone technology, it is followed by computer science and information technology with 29.9 percent, electronics and electrical engineering with 17.6 percent, mechanical and automobile engineering with 12.3 percent and civil, structural and design technology with 8.6 percent in the order of priority. This indicates that electronics and communication engineering ranks first in the preferences of the students in engineering colleges (Hambrick (2007). It may be due to wide range of employment opportunities, preferred by many recruiters are the driving forces. It is followed by computer science and IT engineering courses. This may be due to the latest developments in the software industry growth and development in the country and future prospects projected for employment (Ghoshal, 2005). All other courses stand with normal range of demand. Hence, for employability, course selection is one among the prime success factors in the engineering colleges. It indicates the relationship between the course selection and the employability of the engineering graduates.

**Table 3**  
Distribution of sample on the basis of Parental Educational Qualification

<i>Parent's Qualification</i>	<i>Frequency</i>	<i>Percentage</i>
No formal Education	101	19.7
Below SSC	120	23.4
UG	127	24.8
PG	85	16.6
Professional	79	15.4
Total	512	100.0

Source: Primary data/ Structured Questionnaire

It is observed from the table 3 that 24.8 percent of the parents of the engineering graduates are with UG degree, 23.4 percent with below SSC, 19.7 percent with No formal education, 16.6 percent with PG degree and 15.4 percent with Professional qualification is found among the sample respondents. This indicates that there is no relationship between the parent's education qualification and the admission in engineering colleges and employability skills of the wards (Porter and McKibbin, 2008).. The reasons could be, on those days the opportunities for the higher education is poor when compared with today. In addition, availability, accessibility, affordability of the courses, colleges are less Pfeffer and Fong (2002). In turn, today, quality based institutions offering engineering courses becomes the issue and it decides the employability of the graduates.

**Table 4**  
Distribution of sample on the basis of Mother tongue

<i>Mother tongue</i>	<i>Frequency</i>	<i>Percentage</i>
Hindi/Urdu	129	25.2
Telugu	200	39.1
Tamil/Kannada/Malyalam	82	16.0
Others	101	19.7
Total	512	100.0

Source: Primary data/ Structured Questionnaire

It is found from the table 4 that 39.1 percent of the students in engineering courses are from Telugu as mother tongue, it is followed by 25.2 percent are from Hindi/Urdu, 19.7 percent are from others and finally 16 percent are from Tamil/Kannada/Malyalam as mother tongue is found among the students in the sample. It is clear that, Hyderabad is a cosmopolitan in nature in terms of attracting students from the various states, languages and culture (Mohamed, 2009). In addition, this indicates the reputation, availability, accessibility and affordability of the engineering courses in Hyderabad. It is an indicator that, the engineering education at Hyderabad is doing well and attracting many from various parts of the country (IAU, 2006). Hence, employability is also considered to be high among the graduates from engineering colleges.

**Table 5**  
Distribution of sample on the basis of previous medium of study

<i>Previous Medium of study</i>	<i>Frequency</i>	<i>Percentage</i>
Telugu/Hindi/Urdu	145	28.3
English	367	71.7
Total	512	100.0

Source: Primary data/ Structured Questionnaire

It is noted from the table 5 that the majority of the students joining into engineering courses are from English medium schools and the same is observed from the sample

survey with 71.1 percent representation and the remaining 28.3 percent are from other vernacular languages like Telugu, Hindi and Urdu. This indicates that the students from English medium are more willing to join in the engineering courses when compared to others in the sample. The employability is also more among the students coming from English medium with good level of communication skills (Neubaum *et al.*, 2009).

**Table 6**  
**Factors influencing the employability along with mean and SD**

<i>Factors influencing learning and employability skills</i>	<i>Mean</i>	<i>SD</i>
Gender	3.60	1.289
Medium of study-previous	3.77	1.305
School of study-previous	<b>3.93</b>	1.211
Place of study-previous	3.49	1.416
Parental educational back ground	<b>3.98</b>	1.148
Learning behaviour/attitude of surroundings (neighbor hood)	3.73	1.361
Learning habits of the friends/peer group	3.43	1.436
Learning habits of the reference groups	<b>3.98</b>	1.246
Learning bahaviour of siblings	<b>3.94</b>	1.215
Availability of class rooms and its acoustics	<b>4.00</b>	1.076
Comfort ability in seating and hearing from the teacher	3.76	1.358
Free from Disturbance from the neighbor classes	<b>3.83</b>	1.279
Availability of subject experts/Degree of autonomy	<b>3.94</b>	1.199
Delivery capacity of the subjects by the faculty	3.76	1.371
Number of class hours conducted	<b>3.83</b>	1.337
Number of practical sessions	<b>3.87</b>	1.334
Freedom to present views and discuss in the class	<b>3.88</b>	1.167
Equal learning opportunities to all in the class	3.78	1.351
Individual focus and control	3.76	1.287
Combination of Teaching methods adopted as per the subject	3.67	1.357
Counseling and guidance practices	<b>3.96</b>	1.207

*Source:* Primary data / Structured Questionnaire.

It is noted from the table 6, that the variables influencing employability skills among the engineering graduates are of four kinds and the prime factors among the four categories are mentioned in the following table along with the mean and SD. They are:

**Demographical variables** influencing the employability of engineering graduates are the previous school studied by the ward and the parent's educational back ground as quoted with high level of mean scores. In a sense, it is true, that if the fundamentals are strong, the student can able to learn better and it will improve the employability of a graduate.

**Environmental variables:** The prime environmental variables affecting the employability of engineering graduates in the sample study are learning habits of the reference groups, learning bahaviour of siblings and Availability of class rooms and its acoustics(Anninos and Chytiris, 2011).

**Organizational variables:** These includes, Free from Disturbance from the neighbor classes and Availability of subject experts/Degree of autonomy (Albrecht and Sack (2000).

**Teaching learning and evaluation variables:** The TLP variables influencing the employability skills of the graduates are Number of class hours conducted, Number of practical sessions, Freedom to present views and discuss in the class and counseling and guidance provided by the college during the class hours (Reinstein and Bayou (2007).

### Inferential Analysis: Hypothesis-I

**Ho:** There is no significant difference between the perceptions of boys and girls with regard to role of demographic variables in influencing employability skills among the engineering graduates in the sample.

**Table 7**  
Showing the t-test results showing the perceptual differences between the students with regard to role of demographic variables influencing employability among the engineering graduates

Role of demographics in employability skills	Gender		Mean	SD	t-value	P value
	Boys	Girls				
	Mean	SD				
Demographical variables	80.69	7.11	78.06	8.29	3.644	0.001**

Note: \*\* indicates highly significant at 1% level of significance.

Since P value is less than 0.01, (t=3.644;p=0.001) the null hypothesis, There is no significant difference between the perceptions of boys and girls with regard to role of demographic variables in influencing employability skills among the engineering graduates in the sample is rejected at 1 % level of significance. Hence, it is concluded that, there is a highly significant difference between the perceptions of boys and girls with regard to role of demographic variables in influencing employability skills among the engineering graduates in the sample. Based on the mean value, it is noticed that, high level of agreement on the role of demographical variables on the employability skills is observed among boys when compared to girls in the sample survey (Raghavan, 2007).

### Hypothesis-II

**Null Hypothesis: Ho:** There is no significant difference between the perceptions between English and mother tongue medium students with regard to the role of environmental variables on the employability skills.

Since P value is less than 0.01, (t=3.108;p=0.002) the null hypothesis, There is no significant difference between the perceptions between English and mother tongue medium students with regard to the role of environmental variables on the employability skills is rejected at 1% level of significance. Hence, it is concluded that,



**Table 8**  
Showing the t-test results showing the perceptual differences between the students with regard to the role of environmental variables on the employability skills

Role of environmental variables in employability skills	Medium of study				t-value	P value
	English		Mother tongue			
	Mean	SD	Mean	SD		
Environmental variables	78.26	8.70	80.54	6.99	3.108	0.002**

there is a highly significant difference between the perceptions between English and mother tongue medium students with regard to the role of environmental variables on the employability skills. Based on the mean value, it is noticed that the high level of agreement for the same is represented by the students from mother tongue medium of study when compared to others in the sample. It may be due to change of teaching learning environment could have been affected more when compared to other variables (Howard (2010). This can overcome over a period of time with constant efforts to learn the vocabulary in English and grammar aspects of English language. In addition, the focus to improve the environment variables like learning habits of the reference groups, learning behaviour of siblings and Availability of class rooms and its acoustics needs to be improved (Varalakshmi, 2009).

**Null Hypothesis:** There is no significant difference between the various branches of study with regard to the role of organizational variables in employability skills of engineering graduates.

**Table 9**  
ANOVA Table showing the relationship between the various branches of study with regard to the role of organizational variables in employability skills of engineering graduates

Role of organizational variables in employability skills		Branch of study					F value	P value
		CSE/IT	ECE/ETC	Mech/AutMega/Aero	EEE	Civil/structure/design		
Organizational variables	Mean	74.73	79.41	81.22	82.94	78.25	14.151	0.001**
	SD	(9.25)	(6.49)	(7.42)	(6.66)	(6.78)		

Since p value is less than 0.001, the null hypothesis, There is no significant difference between the various branches of study with regard to the role of organizational variables in employability skills of engineering graduates is rejected at 1% level of significance. Based on the mean value, it is noted that the high level of agreement for the same is endorsed by the students from electrical and electronics branch when compared to others in the sample. Hence, there is a need to improve organizational variables like Free from Disturbance from the neighbor classes and Availability of subject experts/Degree of autonomy (Lindquist, 2002). These can help in improving the employability skills among the engineering graduates.

**Null Hypothesis:** There is no significant difference among the students with regard to Role of TLP variables on employability skills in engineering colleges.

**Table 4.4.1**  
ANOVA Table showing the relationship between the students with regard to the Role of TLP variables on employability skills in engineering colleges

Role of TLP variables on employability skills			Parent's Level of Education					F-value	P value
			No formal education	Below HSC	UG	PG	Profession		
Teaching Learning variables	Mean		75.85	80.55	79.45	80.67	83.96	14.910	.000**
	SD		(8.17)	(7.28)	(6.38)	(6.76)	(7.39)		

Since p value is less than 0.001, the null hypothesis, There is no significant difference among the students with regard to Role of TLP variables on employability skills in engineering colleges is rejected at 1% level of significance. Hence, it is concluded that, there is a highly significant difference among the students with regard to Role of TLP variables on employability skills in engineering colleges. Based on the mean value, it is found that, students having parental educational back ground as profession, are highly endorsed the role of teaching learning and evaluation practices role I employability skills among the engineering graduates when compared to others in the sample (Horvat (2003). This may be due to feel of the quality of teaching by the faculty and the problems in understanding the conceptual aspects of technical and practical skills (Karisiddappa, 2004). The TLP variables influencing the employability skills of the graduates are Number of class hours conducted, Number of practical sessions, Freedom to present views and discuss in the class and counseling and guidance provided by the college during the class hours (Nijhof, 2005).

## RESULTS AND DISCUSSION

1. 69.9 percent of the students studying engineering courses are boys with 69.9 percent of the sample and the remaining 30.1 percent of the students are girls in engineering courses at Hyderabad. It indicates that the majority of the students' are boys.
2. 31.6 percent of the students are from electronics and communication and telephone technology, it is followed by, computer science and information technology with 29.9 percent, electronics and electrical engineering with 17.6, mechanical and automobile engineering with 12.3 percent and civil, structural and design technology with 8.6 percent in the order of priority. This indicates that electronics and communication engineering ranks first in the preferences of the students in engineering colleges.
3. 24.8 percent of the parents of the engineering graduates are with UG degree, 23.4 percent with below SSC, 19.7 percent with No formal education, 16.6 percent with PG degree and 15.4 percent with Professional qualification is found among the

- sample respondents. This indicates that there is no relationship between the parent's education qualification and the admission in engineering colleges and employability skills of the wards.
4. 39.1 percent of the students in engineering courses are from Telugu as mother tongue, it is followed by 25.2 percent are from Hindi/Urdu, 19.7 percent are from others and finally 16 percent are from Tamil as mother tongue is found among the students in the sample. It is clear that, Hyderabad is a cosmopolitan in nature in terms of attracting students from the various states, languages and culture.
  5. Majority of the students joining into engineering courses are from English medium schools and it is observed from the sample survey with 71.1 percent representation and the remaining 28.3 percent are from other vernacular languages like Telugu, Hindi and Urdu. This indicates that the students from English medium are more willing to join in the engineering courses when compared to others in the sample Pember's (2003).
  6. Since P value is less than 0.01, ( $t=3.644$ ;  $p=0.001$ ) the null hypothesis, There is no significant difference between the perceptions of boys and girls with regard to role of demographic variables in influencing employability skills among the engineering graduates in the sample is rejected at 1 % level of significance.
  7. There is a highly significant difference between the perceptions between English and mother tongue medium students with regard to the role of environmental variables on the employability skills.
  8. There is no significant difference between the various branches of study with regard to the role of organizational variables in employability skills of engineering graduates is rejected at 1% level of significance.
  9. Since p value is less than 0.001, the null hypothesis, There is no significant difference among the students with regard to Role of TLP variables on employability skills in engineering colleges is rejected at 1% level of significance. Hence, it is concluded that, there is a highly significant difference among the students with regard to Role of TLP variables on employability skills in engineering colleges.

## **RECOMMENDATIONS AND SUGGESTIONS**

1. Improvement in teaching learning resources: Engineering education has a long a way to go in terms of quality of delivery of teaching. Reputed institutions are also in the list of poor delivery of the subjects for some courses in the recent past. The reasons for the same could be appointment of inferior and poor quality teachers without sufficient subject knowledge and delivery skills. The industrial and practical experience holders with good communication skills and novel ideas need to be appointed at engineering institutions.

2. Quality measurement and checking: The accreditation and affiliated bodies need to check the quality of infrastructure and the resources from time to time in order to ensure the prescribed quality. The practical and employability skills need to give high level priority in the curriculum rather than the theory part. The regulatory bodies for affiliation and accreditation should be inspected at frequent intervals.
3. Organizational variables like ergonomically designed class rooms with good ventilation and air, pleasant atmosphere, availability of faculty members to clear the doubts from time to time, tutor and mentor system, review and feed back of students performance at frequent intervals can help in improving the subject knowledge and confidence in the employability skills.
4. Teaching learning process need to be streamlined in accordance with the industry requirements and to the present level of skill requirements. The multi facet skill set expected by the industry need to impact to the students from day one in engineering education. Vocational courses, additional courses for employability skill enhancement need to be imparted. All these steps in a rigorous manner can help in improving the employability skills among the engineering graduates.

#### SUMMARY AND CONCLUSION

The Engineering education is undoubtedly at the cross roads. The high level technical institutions are also suffering from knowledge tank lapses and there by unable to produce high quality research and teaching deliverables. In turn, this is affecting the knowledge level of the students and there by employability becomes a big question mark. In this scenario war footing action on revamping the old syllabi, systems and procedures along with induction of quality based teaching learning systems and procedures can help to resolve the issue in simple manner. But the level of resistance for the same form all the stake holders is high. Hence, it can be implemented in a phased manner. But the steps taken in this direction should be solid and concrete with a continuous improvement strategy.

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