Students' perception about the quality and employability in engineering colleges with reference to Visakhapatnam, East and West Godavari districts, Andhra Pradesh

Dr. Sayyed Abdul Gani Ansar Ali

Professor in Management Studies
Aditya PG College, Kakinada
Andhra Pradesh, India.

Abstract

The Indian constitution resolves to provide quality education to all citizens irrespective of discrepancies. In the effort to fulfil educational needs of the country, specifically for the diverse societies and cultures of the country the government has chalked out different educational categories namely, elementary education, secondary education, higher education, adult education, technical and vocational education. Higher education has spread in multidimensional wings like technical, general, professional education etc. Especially, in the liberalized era, privatization and internationalization of technical education has caused to heavy competition among private engineering and technical research institutions over the world including India. The purpose of the study is to locate sources of manpower to meet the job specifications. It is very important functions of the human resource manager because unless the right type of people is hired even best plans of the organization go in vein. The basic purpose of campus placement is to provide jobs to the students pursuing their final year course. It helps to identify whether aspiration of the students match with the employer or not. Campus recruitment is considered to be a significant factor for both the educational institutions and corporate. The primary objective of the present study is to focus on engineering students' perception towards placements, education institutions quality deliverance of education and infrastructural facilities, and views of recruiters towards students' potential. In addition, the other objectives of the study are to identify the methods and techniques followed in campus recruitment, to analyse the factors effect on campus drive, to find the competency level of the students, to know the standards and employability skills of students matches job specification or not, to study the efforts being taken by college management in conducting campus drive, to know the procedure adopted by the company for campus drive, to study the role played by hr departments of various companies in conducting campus drive and providing employability to the students. In this purpose, the population for the study consists of students of various Engineering colleges located in Visakhapatnam, East and West Godavari Districts in Coastal Andhra Pradesh.

Key Words: 1.Engineering students' perception, 2.Education quality, 3.Campus recruitments, and 4.Employability skills.

Introduction

Higher education has spread in multidimensional wings like technical, general, professional education etc. Especially, in the liberalized era, privatization and internationalization of technical education has caused to heavy competition among private engineering and technical research institutions over the world including India. In fact, how far these technical educational institutions would provide the entrepreneurial and leadership abilities in order to provide the employability to the young engineers? In this context, the present study evaluates the engineering students' perception towards their engineering institutions' ability in terms of providing the training and readiness to face the campus recruitment programmes. Securing a decent job in a reputed organization is the dream of every student. In olden days the students were compelled to go to organizations or establishments in search of a job. As the society advanced, the trend has changed. Now placements are being held in their own campus or any nearby campus of similar nature. A large number of companies are visiting to well-known and standard colleges for hiring talented

students according to their needs. This procedure is otherwise known as campus placements. These types of placements are very popular in present days. Campus placements have become useful for both companies and job seekers. They enable students to secure jobs without strain and without moving around the companies. In campus placement, the students need not carry any paper. The company itself supplies data form to furnish relevant columns including salary expected. But all colleges cannot arrange for campus drives due to lack of infrastructure and other facilities. Some colleges may not have sufficient exposure to contact the companies. In addition to this though they have facilities the academic performance may not be satisfactory so that companies always prefer the reputed colleges for campus recruitment. So, the students coming out from such college should always start their job hunting after completion of their course. They should apply for job by searching the vacancy position available through various advertisements of companies. There the competition will be high and tough and the salary package will also be very meagre so the students who have this facility in their own colleges should effectively utilize study. In this program industries visit the colleges to select students depending upon their ability to work, employability skills, focus and aim. There are two types of campus placements. They are on-campus and off-campus. On campus means a program conducted for students in the college itself by inviting various head hunting companies, whereas in off campus this program will be conducted in a common place where students from different colleges will take part.

Genesis of Indian education system

India's organized education system was created during the rule of the British over India from the early 1900s onwards. Designed to bring in more Indians into the governance system formulated by the British Government over India, the education system was elitist and based on the use of English as the medium of instruction. The education network was also created to serve the needs of the large number of English families and their children that resided in India as part of the government and armed forces. India however has also had a rich history of traditional education and this tradition spans over five thousand years. The arts, culture, theatre, spirituality and literature have for long been part of our education system that was developed using the method of *'GuruShishya'* or 'teacher-student', a one-to-one method for transfer of knowledge and learning under the *Gurukul* system where the student lived with the teacher and learned all that he needed to learn to become a master in the profession. Indian education however restricted learning to women and female children. Education was for centuries male-dominated and even within this there was selective imparting of education based on profession and social status. India therefore has a rich culture and history for strong education and transfer of knowledge through mentoring. Post-independent new education methods were developed and the system of education make non equitable and democratic. Thanks to several decade of intense focus by successive governments. India' education system has created a rich and large pool of skilled and knowledgeable talent that India has been able to reap rich harvests during the growth and globalization decades of the 1990s and 2000 (Thilagaraj, 2010).

Role of education

In every society today, education occupies a prominent place. Education in fact is a ladder, and is a proper progressive process of development of every nation if it is shared by all over the nation. Many statistical investigations carried out in the western countries have shown that output increased at much higher rate than increase in physical inputs like physical capital because of use of quality human capital. Modern economists like Schultz (1995) have argued that investment in education enhances human capital formation. Smith (1776) pointed out that a "man educated at the expense of much labour and time may be compared to one of those expensive machines" and other classical economists observed that expenditure on education could be regarded as a form of investments that promised future benefits. The strength of a nation is dependent on its intellectual and skilful citizens. It can be observed that education is an essential tool for achieving sustainability. Only a quality future human capital can envision development of its nation to meet the needs of the present without compromising the ability of future generations to meet their own need. Governments around the world have drawn upon human capital theory (Becker, 1975) in the formulation of policy in respect of higher education. Human capital theory links economic success to the education of the

workforce. The development of employability in graduates has thus become significant. When considering higher education's potential for contributing to the economic well being it is helpful to distinguish between the formation of subject specific understandings and skills and the promotion of generic achievements. Where the world of employment has, by and large been satisfied with the disciplinary understanding and skills developed as a consequence of participation in higher education, it has been less happy with graduates' generic attainments like literacy and numeracy, self efficacy and meta-cognition (Menon, 2014).

History and growth of engineering education in India

The impulse for creation of centres of technical training came from the British Raj rulers of India. While Superintending Engineers were mostly recruited from Britain, lower grades e.g. Craftsmen, Artisans and sub-overseers who were recruited locally. The necessity to make them more efficient, led to the establishment of industrial schools attached to Indian Ordnance Factories and other engineering establishments. The first engineering college was established in the Uttar Pradesh in 1847 for the training of Civil Engineers at Roorkee, Thomason College (which later become IIT Roorkee) which made use of the large workshops and public buildings there that were erected for the Upper Ganges Canal. In pursuance of the Government policy, three Engineering Colleges were opened by about 1856 in the three Presidencies. In Bengal Presidency, a College called the Calcutta College of Civil Engineering (which later became Indian Institute of Engineering Science and Technology, Shibpur) was opened at the Writers' Building in November 1856. In Bombay Presidency, the Overseers' School at Pune eventually became the College of Engineering, Pune and was affiliated to the Bombay University in 1858. In the Madras Presidency, the industrial school attached to the Gun Carriage Factory became ultimately the College of Engineering and affiliated to the Madras University (1858) (History).India is all set to produce the world's largest number of engineers. The first ever global report commissioned by the Queen Elizabeth Prize for Engineering and to be made public on Monday has revealed that while just 20% of 16 to 17 year-olds from the UK and 30% from the USA are interested in an engineering career, in India the rate is as high as 80% - the highest in the world. The report will also unveil another interesting finding - India has closed the gender gap in engineering to an all-time low of 14% in 2015. Around 66% men in the world are interested in engineering while the figure stands as low as 43% for women globally. However when it comes to India, both men and women have shown great interest in engineering - the highest percentage in the world. In comparison, 62% women in China are interested in taking up engineering as a career, 55% in Brazil, 48% in Turkey, as low as 35% in US, 33% in Germany, 28% in UK and 27% in Japan (Sinha, 2015).

Engineering colleges have been springing up like wild mushrooms in India in the last few years. Their number has gone up from a not too modest 1,511 colleges in 2006-07 to an astoundingly high 3,345 in 2014-15**.** The state of Andhra Pradesh alone has more than 700 colleges. The fact, however, remains that 20-33% out of the 1.5 million engineering graduates passing out every year run the risk of not getting a job at all**,** points out Economic Times. For those who do, the entry-level salary is pathetically low**,** and has stagnated at that level for the last eight-nine years, though the prices of everything from groceries to vehicle fuel have shot up during the same period. Whether it is the below-par quality of education provided by private colleges or the stagnating (if not shrinking) demand for the number of engineers, the huge number of engineering pass outs – which, incidentally, is more than the total number of engineers produced by the USA and China combined together, face a bleak future. The rapid growth in the number of engineering colleges can be attributed to an ecosystem built around feeding the $110 billion outsourcing market and the huge demand for engineers in the IT sector in India itself. Making matters worse is the fact that the start-up salary offered to fresh engineering pass outs is expected to stagnate at more or less the same level in the next 3- 5 years, said Live Mint last year. Entry level salary package for a software engineer which has hovered around Rs 2.75 lakhs to Rs 3.25 lakhs ($4,600- $5,400 per annum) since the last eight-nine years should not, therefore, hope for a turnaround or for better days (Mahajan, 2014). Hillageand Pollard (1998)

Diversified engineering streams in India

Engineering has existed since ancient times as humans devised fundamental inventions such as the wedge, lever, wheel, and pulley. Each of these inventions is essentially consistent with the modern definition

of engineering. The term engineering deriving from the word engineer, which itself dates back to 1300, when an engineer (literally, one who operates an engine) originally referred to "a constructor of military engines (Definition).Engineering as concept has existed since ancient times. Humans have always been devising basic inventions such as the pulley, lever, and wheel. Each of these inventions is consistent with the modern definition of engineering, exploiting basic mechanical principles to develop useful tools and objects. Engineering as a subject is a discipline and profession of applying technical and scientific knowledge, utilizing natural laws and physical resources in order to design and implement materials, structures, machines, devices, systems, and processes that safely aim a desired objective which meets a specified criterion (Engineering courses in India).

Objectives of study

1. To identify the methods and techniques followed in campus recruitment.
2. To analyze the factors effect on campus drive.
3. To find the competency level of the students.
4. To know the standards and employability skills of students matches job specification or not.
5. To study the efforts being taken by college management in conducting campus drive
6. To know the procedure adopted by the company for campus drive.
7. To study the role played by HR departments of various companies in conducting campus drive and providing employability to the students.

Review of literature

Cable and Graham (2000) in their study report that if the organization is able to manage its attributes, it may be able to come closer to the perceptions of the job seekers. In their study they used verbal protocol analysis to analyze the factors that a job seeker would consider in evaluating the organization's reputation. Audrey and Andy (2001) elucidated in their research as that building relationship is the key factor in campus recruiting. Offering student internships, connecting with the students through their alumni, academic interactions with the faculty etc., increase the visibility of the company on campus. Moy and Lee (2002) found in the students' perception towards the benefits offered by the MNCs have made the SMEs as second choice for the graduating students. Even in the Indian context, working for an MNC gives a brand image for the students also. MNCs build their reputation and image among their stake holders through various initiatives on campus and through media. Gokuladas (2010) identified that software services companies gave more importance to the soft skills during the campus recruitment process compared to the core engineering sector which emphasized more on the hard skills. Hard skills are related to the academics and soft skills deal with the behavioral aspects. Kapoor (2010) has studied the most important attributes in attracting new talents to the companies and the role of employer branding. A student studying in premier institution in India has multiple choices among the companies that come for campus placements. By leveraging its branding initiatives, a company may focus on the attributes that may attract the students who may decide to choose among the competitors during campus placements. Whilst Dearing (1997) explicitly refrained from producing a list of skills, because of the nature of individual programmes of study and their learning objectives, it is probably useful for students to see the sort of skills that the programme is aiming to develop so that they are more aware of their own personal development. Holmes (2001) observed that there is a lack of a common language of skills between higher education institutions and employers. Part of the problem with the skills agenda and initiatives in higher education is the assumption that 'skills' has the same meaning in the education context as the employment context. Jackson (1999) suggests that the recent government agenda for the basification of HE, widening participation, the key skills/employability agenda, lifelong learning etc., are leading to the unification of HE and by implication, the curtailing of academic freedoms. Harvey (2000) advocates the view that the primary role of HE is to train students by enhancing their knowledge, skills, attitudes and abilities and to empower them as lifelong critical and reflective learners. This is similar to the perspective of the Skills plus Project who see concern for employability as supportive of good learning rather than in opposition to it. Dunne and Rawlins(2000) also stated that the need for graduates prepared for employment and skilled in team work has been advocated over the last decade

internationally. With increasing numbers of students entering Groups of students often work together during the course of their degree studies. Yorke (2001) considers that it is not enough to have a range of cognitive, social, emotional and behavioural sub-skills, but that these have to be integrated into the challenges that are faced. Therefore, perceived self-efficacy or ability will play an important role in choice of degree programme, career choice and personal development, and is thus significant for an individual's employability. Morley(2001) suggests that higher educational institutions both mediate and manage government policy, and that the boundaries between the academy, government and businesses have loosened and been reformed. This raises the question of what the purpose of higher education is, whether it is to provide to the work force of the future or educational stimulus, or both. Dearing (1997) emphasised the importance of education for employability–focussing on the development of key skills and the importance of work experience. Knight (2001) found that the Innovation in education is complex although government, and others, persist in treating it as something simple, to be planned, delivered and evaluated. Johnston and Miles (2004) found that the usual practice in higher education is for students to be graded solely on the quality of a submitted piece of work or presentation without consideration of the effort or input into the product. Johnston & Miles (2004) identified that peer assessment of group work may promote reflective learning and develop critical thinking skills. However, students, in one study, showed a self-bias in self-assessment of group project work, rating their own contribution higher than that of other group members. Peer-assessment disadvantages the more able students who often award themselves a lower grade than do their peers. Griffith University (2012) said that to achieve high and consistent quality in assessment practices, investment in resources and professional development are needed with close attention paid to the role of sectional markers. Yorke (2005) observed that a set of achievements – skills, understandings and personal attributes – that makes graduates more likely to gain employment and be successful in their chosen occupation, which benefits themselves, the workforce, the community and the economy. Robinson (2000) described that the employability is therefore mainly focused on a person's skill, knowledge and attitude. These are the skills, which develop the attitude and action in the person which enable him to work along with his fellow workers and supervisors and these skills develop him so that he can take initiative and make critical decision. Saksa (2011) identified that neither the assistant director of Facilities and Grounds, or UD's landscape engineer, have received any specific positive response to the sustainable landscaping on Laird Campus. The assistant director of Facilities and Grounds has observed some "people that are involved with the field have paid attention to it," but he has "not gotten a lot of comments from people in other departments". Florea and Badea (2013) stated that the emphasized the manner in which the organizations use technology increases or decreases its positive net effect. The findings suggest that through the Internet, HR can develop an effective recruitment program, which helps manage the highly competitive and time-consuming process of finding skilled personnel. Mohapatra and Sharma (2010) found that there is limited agreement over the theory of student engagement, a significant number of studies posit student engagement as an aggregate of different factors or components. Barker (2011) considered that Clemson students expressed the desire to want to help run the "university machine". The On-Campus Internship Program will give students hands-on experience and a glimpse into a career of their choice. These students will be able to take concepts from the classroom and apply them to the university's daily problems and workload, from selling the university to prospective students to re-wiring aging buildings. Taylor (2009) found that the alumni enjoy giving career advice and students sometimes feel more comfortable speaking with a young alumnus compared to the recruiter. Silkes, Adler, and Phillips (2010) stated that it is an important opportunity for companies, as some students only know about the company through interactions with the recruiter. Soelberg (1967) stated that the longitudinal tracking of job-seeking business students suggested that recruitment timing (e.g., getting to an applicant before other employers do) might have substantial effects on eventual choices. Hansen (2006) said that one recruiter stated that spending money on career fairs overall is well worth it given the amount of exposure a company can obtain and the number of people it can reach. Atkins(1999) suggests that there is no reason why employers should have a common set of skills that they require graduates to develops

Methodology

The above mentioned objectives have been critically appraised by using primary and secondary data. The original approach to the study was to depend upon secondary data for analysis of the problems to achieve set objectives. However, it became obvious that secondary data apart from being unreliable, was not available and alternative approach had to be discussed. The only option was to depend on empirical data collected from sample units. An elaborate pre-structured questionnaire has been used to collect the primary data from selected engineering colleges. This has been supported by discussions with the concerned college managements and company representatives. Discussion with the above persons not only proved to be helpful but also gave researcher an insight into the investigation. The universe for the present study consists of engineering colleges in Visakhapatnam, East and West Godavari Districts, Andhra Pradesh. Secondary data constitutes published and unpublished reports central and state governments. The sampling technique for the survey is Snowball Sampling Technique (reference based method) and convenience-sampling method. This method is selected by considering time factor for the survey and population. About 523 students were interviewed from 30 engineering colleges across three districts in the year of 2016. The respondents were informed about the purpose of the study and confidentiality of the personal information. Finally, a two-stage analysis was undertaken on the data set. The data was analysed through Conformity Factor Analysis (CFA) by using IBM SPSS AMOS implements the general approach to data analysis known as Structural Equation Modelling (SEM), also known as analysis of covariance structures, or causal modelling The Selection of the sampling of respondents from engineering colleges is shown in table 1.And, the engineering students' general information and mode of selection of the college is shown in table 2.

Scope, Research gap of the study

This study is extended to 170 colleges registered in Jawaharlal knowledge commission and 30 engineering colleges located in Visakhapatnam, East and West Godavari Districts, Andhra Pradesh. The data collected from these institutions is more than 5 years. An effort is made through this study in order to bridge the gap between the perception of students and HR executives (Recruiters) about quality of education and preparedness of engineering students to face the challenges in duration of campus interviews as well as in the employment. Though this study was confined to three districts in the state of Andhra Pradesh, there is a lot of scope to expand the area of research to the remaining 10 districts in the newly reconstructed state of Andhra Pradesh and even to the newly constituted state of Telangana.

Limitations of the study

1. In the collection of the primary data the personal bias of the respondents may affect the authenticity of the data.
2. In the application of the statistical tools the calculations approximated to the nearest decimal points affecting the absolute accuracy of the calculations.
3. The quality analysis and results of the study would depend upon the nature and quality of responses from the respondents surveyed.

Table 1: Sample distribution of interviewed engineering students

S. No	Specialisation	No. of Respondents	Percentage
1	ECE	123	24%
2	CSE	101	19%
3	CIVIL	91	17%
4	EEE	72	14%
5	MECHANICAL	60	11%
6	IT	52	10%
7	Petroleum	24	5%
	TOTAL	**523**	**100%**

Source: Compiled from primary data

**Table 2: Engineering students' general information and mode
of selection of the college**

| Variable	Respondents' Characteristics	Respondents (N=523)	
		Frequency	**Percentage**
Gender	Male	332	63%
	Female	191	37%
Age	18 years to 20 years	0	0%
	21 years to 22 years	439	84%
	23 years to 25 years	84	16%
	26 years to 28 years	0	0%
	Above 28 years	0	0%
Occupation of parents/ Guardian	Government employee	42	8%
	Private employee	123	24%
	Business/Trade	97	19%
	Retired/Pensioner	15	3%
	Agriculture	83	16%
	Professional/Self employed/Other	163	31%
Education qualification of parent / guardian	Up to Schooling	75	14%
	Under Graduate	79	15%
	Graduate	232	44%
	Post Graduate	118	23%
	Post Graduation and Above	19	4%
Monthly income of parent / guardian (In INR)	Below Rs.15,000/-	0	0%
	Rs.15,000/- to Rs. 25,000/-	46	9%
	Rs.25,000/- to Rs. 30,000/-	75	14%
	Rs.30,000/- to Rs. 35,000/-	103	20%
	Rs.35,000/- to Rs. 40,000/-	94	18%
	Rs.40,000/- to Rs. 45,000/-	72	14%
	Rs.45,000/- to Rs. 50,000/-	63	12%
	Above Rs. 50,000/-	70	13%
Residential location	Urban	176	34%
	Semi-Urban	234	45%
	Rural	102	20%
	Tribal	11	2%
Mode of selection of the college	Management quota	94	18%
	Through convener direction of entrance test counselling	242	46%
	Self chosen college by brand (college) name	123	24%

	Parent's compulsion	41	8%
	Demonstration of PROs of the College	6	1%
	Friends, kith and kin	17	3%

Source: Compiled from Primary data

Research model

The research model is developed based on the early studies in this area. Figure 1depicts the relationships among five constructs which can be most relevant to the perceptions of engineering students towards quality of engineering education and campus recruitment programmes at engineering colleges. This research model is also followed with five defined hypotheses.

Figure 1: Research model with five constructs for students' perception about the quality of engineering education and campus recruitments
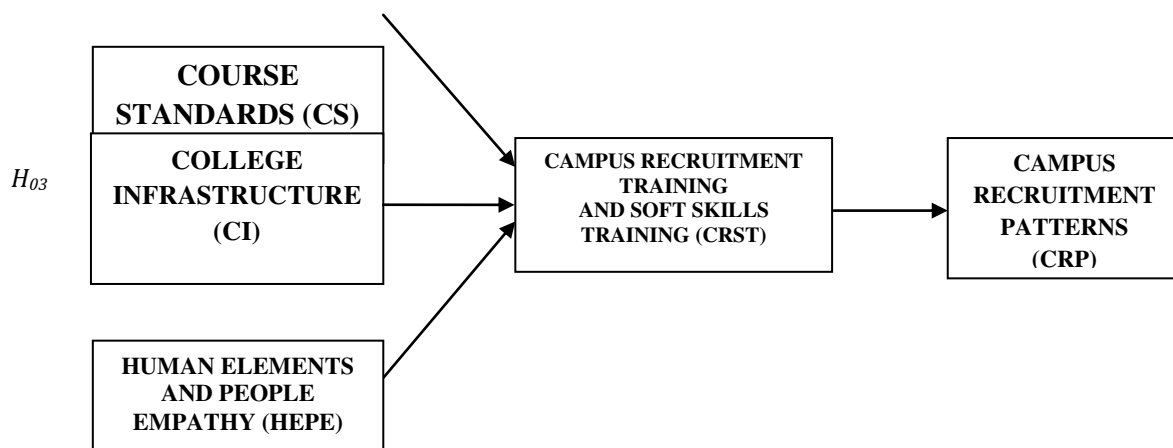
Hypotheses

This study is orderly followed with 5 defined grouped hypotheses among five constructs in order to test the dependency among constructs. The considered null hypotheses in this study are elaborated as under:

1. H_0: Course Standards (CS) are not independent with Campus Recruitment Training and Soft Skills (CRST),
2. H_0: Course Standards (CS) are not independent with Campus Recruitment Patterns (CRP).
3. H_0: College Infrastructure (CI) is not independent with Campus Recruitment Training and Soft Skills (CRST).
4. H_0: Human elements and people empathy (HEPE) is not independent with Campus Recruitment Training and Soft Skills (CRST).
5. H_0: Campus Recruitment Training and Soft Skills (CRST) are not independent with Campus Recruitment Patterns (CRP).

Results and discussion

Reliability is considered an important aspect in any research method. "The evaluation of reliability could be considered part of the testing stage of newly-developed measure" (Hinkin, 1995).The reliability of measure the extent to which the measure is without bias (error-free) and hence offers consistent measurement across time and across the various items in the measurement. Besides, the reliability of a measure indicates the stability and consistency with which the instrument measures the concept and helps to assess the "Goodness of a measure" (Sekaran, 2000) "there are many ways in which reliability can be ensured,

such as the test-retest method and Cronbach's alpha coefficient. Since it is difficult to arrange for people to be tested on the same question on two occasions to assess reliability, an alternative method is to look at the consistency of a person's response to an item at the same time and the degree of agreement for which the measurement is obtained" (DeVaus, 2003).

The testing of "Cronbach's α" of all items was considered for evaluating factors reliability on engineering students' perception towards quality of engineering education and campus recruitment programmes at engineering colleges. In this study, the Cronbach's α was tested for 5 constructs followed with 47 factors for engineering students. The reliability statistics for students' perception about the quality of engineering education and campus recruitments and Conformity Factor Analysis (CFA) with measurement model (Completely Standardized Solution) are shown in table 3 and figure 2 respectively.

Table 3: Reliability statistics for students' perception about the quality of engineering education and campus recruitments

S. No	Constructs with codes	No. of. Questions	Cronbach's α
1	Course Standards (CS)	13	0.79
2	College Infrastructure (CI)	9	0.79
3	Campus Recruitment Training and Soft Skills Training (CRST)	15	0.83
4	Human Elements and People Empathy (HEPE)	7	0.87
5	Campus Recruitment Patterns (CRP)	17	0.82
	Total	**61**	**0.85**

Conformity factor analysis (cfa) to identify the most significant factors among five constructs

Figure 2: Measurement model (Completely Standardized Solution)

Chi-square = 347.802, DF = 112, p = .000
Standardized Estimates
GFI = .933 AGFI = .908 IFI = .969 NFI = .955
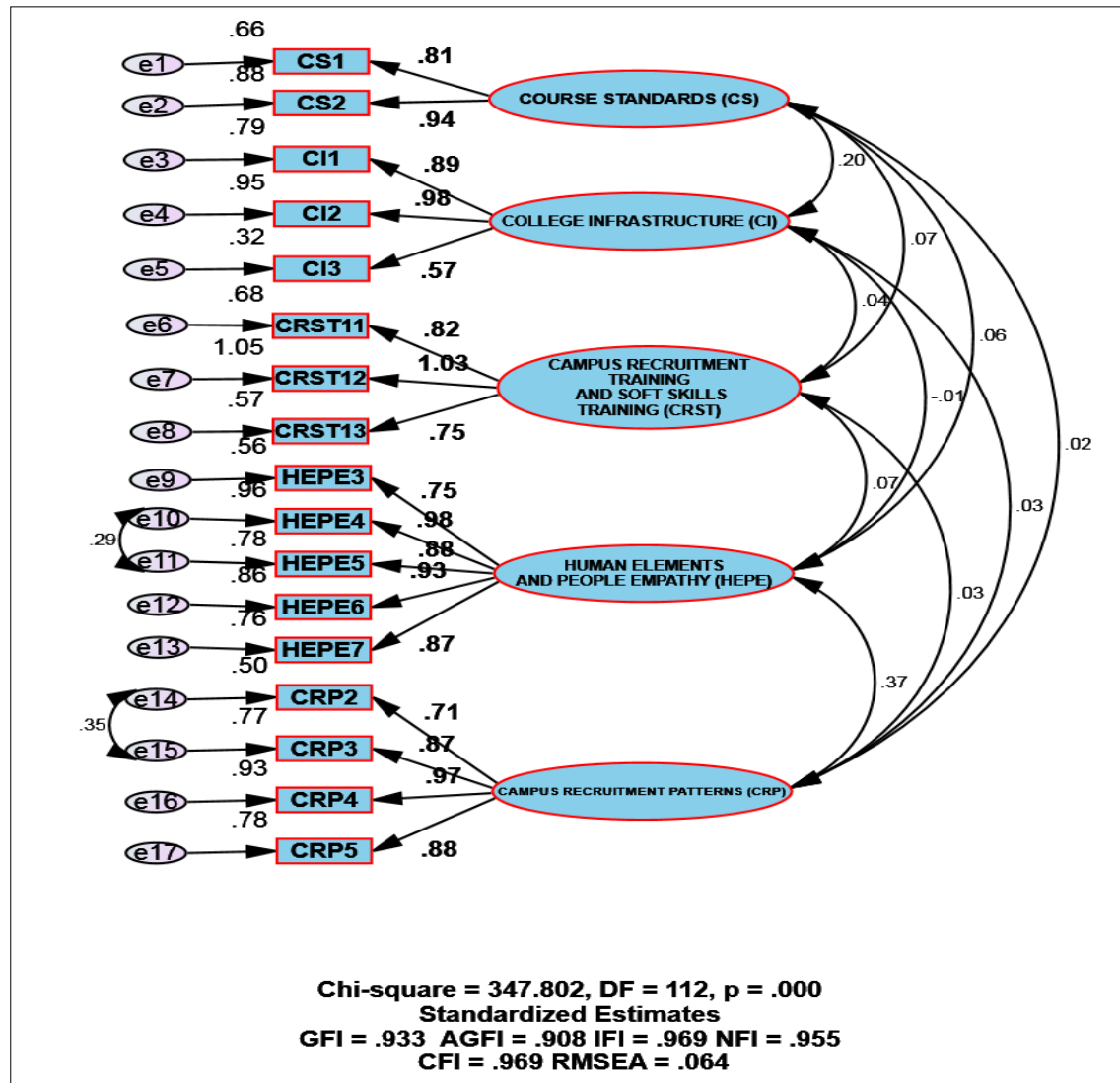CFI = .969 RMSEA = .064

Figure 2 infers that it is important to emphasize that in the confirmatory analysis the same multi-factorial structure of 17 items distributed among 5 constructs, in agreement with the reviewed literature and exploratory validation, Measurement Model of students' perceptions towards quality of engineering education and campus recruitment programmes at engineering colleges(Completely Standardized Solution). Elaborately, the item codes in the first construct of Course Standards (CS) are termed as Syllabus standards (CS1), and Faculty practical orientated teaching (CS2). The item codes in the second construct of College Infrastructure (CI) are termed as Class room infrastructure (CI1), sophisticated lab facilities (CI2), and Internet and Wi-Fi facilities (CI 3). The item codes in the third construct of Campus Recruitment Training And Soft Skills Training(CRST)are termed as Developing interpersonal relations (CRST11), Improving decision making capacities (CRST12), and Building team work and team spirit(CRST13). The item codes in the fourth construct of Human Elements and People Empathy (HEPE)are termed as College management help and guidance in problem solving (HEPE3), Inspiring and motivating seniors (HEPE4), Cooperation from friends and parallels (HEPE5), Sharing of Information among friends (HEPE6), and Support from family members (HEPE7).And, the item codes in the fifth construct of Campus Recruitment Patterns(CRP)are termed as

Campus drives conducted by reputed companies (CRP2), Relevancy of written tests and aptitude tests (CRP3), Relevancy of questions asked in campus interviews (CRP4), and Technical orientation in campus drives (CRP5).

However, the model fit indices were close to the cut-off points suggested by Hu and Bentler (1999). The measurement model obtained using AMOS exhibited satisfactory fit statistics (Chi-squared = 347.802 df = 112, CMIN/df =3.105, GFI = .933, AGFI = .908, IFI = .969, NFI = .955, CFI = .969, RMSEA = .064). While an ideal RMSEA score is .05 or less, a value of about .08 or below indicates a reasonable error of approximation and is therefore satisfactory (Bollen and Long 1993).

Table 4: Means, Standard Deviations, Factor Loadings, Composite Reliability (CR), Average Variance Extracted (AVE) and Cronbach's Coefficient Alpha

Construct	Item	$\bar{x}$	σ	Factor Loading	CR	AVE	Cronbach'sα
CS	CS1	2.69	1.26	0.81	0.87	0.77	0.89
	CS2	2.78	1.27	0.94			
C I	CI1	2.56	1.24	0.89	0.86	0.69	0.84
	CI2	2.71	1.25	0.98			
	CI3	2.63	1.15	0.57			
CRST	CRST1	2.95	1.17	0.82	0.91	0.77	0.90
	CRST2	2.93	1.11	1.03			
	CRST3	2.74	1.30	0.75			
HEPE	HEPE3	2.83	1.10	0.75	0.95	0.79	0.95
	HEPE4	2.63	1.33	0.98			
	HEPE5	2.29	1.30	0.88			
	HEPE6	2.41	1.34	0.93			
	HEPE7	2.26	1.22	0.87			
CRP	CRP2	2.98	1.25	0.71	0.92	0.74	0.92
	CRP3	2.76	1.40	0.87			
	CRP4	2.98	1.40	0.97			
	CRP5	2.57	1.31	0.88			

Note: CS= Course Standards, CI= College Infrastructure, CRST= Campus Recruitment Training and Soft Skills Training, HEPE= Human Elements and People Empathy, CRP= Campus Recruitment Patterns.

Table 4 shows descriptive statistics and factor loadings, composite reliability, and average variance extracted. These analyses were used to assess the convergent validity empirically. Significantly, all items exceed the recommended threshold of 0.50 (Gumussoy & Calisir, 2009), whereas only one item has factor loading greater than one (i.e. "CRST 2" having factor loading of 1.03) if factor loadings (regression coefficient) are continuous, they are simple linear regression coefficients and are interpreted as such, they can be greater than one (Deegan,1978). Internal consistency (reliability) of the constructs was assessed through Cronbach's coefficient alpha. The alpha values of the constructs are ranged from 0.84 to 0.95, which are above the acceptable threshold of 0.70, as recommended by Nunnally and Bernstein (1994). The composite reliabilities of all the constructs are above 0.60 which are acceptable (Hair et al., 1998). For examining the discriminate validity, correlations between the constructs were compared to the square root of AVEs of each Construct (Al-Somali, Gholami, & Clegg, 2009)and none of the correlations surpassed the square root of AVE The above tests indicated that the discriminate validity

was upheld for the measurement model. Overall, the measurement model adequately reflected a good fit to the data. However, certain positive correlations are existed among 5 constructs.

Table 5: Discriminate validity of constructs and inter-correlations

	CS	CI	CRST	HEPE	CRP
CS	**(0.86)**				
CI	0.20	**(0.83)**			
CRST	0.07	0.04	**(0.88)**		
HEPE	0.01	-0.01	0.07	**(0.89)**	
CRP	0.02	0.03	0.03	0.37	**(0.86)**

Note 1: Diagonal elements (in bold parenthesis) are the square root of average variance extracted (AVE). Off-diagonal elements are the correlations among constructs. For discriminate validity, diagonal elements should be larger than the off-diagonal elements.

Note 2: CS= Course Standards, CI= College Infrastructure, CRST= Campus Recruitment Training and Soft Skills Training, HEPE= Human Elements and People Empathy, CRP= Campus Recruitment Patterns

Table 5shows discriminate validity of constructs and inter-correlations among 5 constructs. The discriminate validity gauges the extent to which measures of 3different constructs are comparatively distinctive from each other, and that their correlation valuesareneitheranabsolutevalueof0nor1(Campbell &Fiske,1959).Hence, there is a positive correlation College Infrastructure (CI) and Course Standards (CS) with 0.20 at $p<0.01$ level of significance. Then, there is a positive correlation between Campus Recruitment Training and Soft Skills Training (CRST) and Course Standards (CS) with 0.07 at $p<0.01$ level of significance. Then, there is a positive correlation between Campus Recruitment Training and Soft Skills Training (CRST) and College Infrastructure (CI) with 0.04 at $p<0.01$ level of significance. Then, there is a positive correlation between Human Elements and People Empathy (HEPE) and Course Standards (CS) with 0.01 at $p<0.05$ level of significance. Then, there is a negative correlation between Human Elements and People Empathy (HEPE) and College Infrastructure (CI) with -0.01 at $p<0.01$ level of significance. Then, there is a positive correlation between Human Elements and People Empathy (HEPE) and Campus Recruitment Training and Soft Skills Training (CRST) with 0.07 at $p<0.05$ level of significance. Then, there is a positive correlation between Campus Recruitment Patterns (CRP) and Course Standards (CS) with 0.02 at $p<0.01$ level of significance. Then, there is a positive correlation between Campus Recruitment Patterns (CRP) and College Infrastructure (CI) with 0.03 at $p<0.01$ level of significance. Then, there is a positive correlation between Campus Recruitment Patterns (CRP) and Campus Recruitment Training and Soft Skills Training (CRST) with 0.37 at $p<0.01$ level of significance.

Figure 3: Research model with seven constructs for students' perception about the quality of engineering education and campus recruitments (Path Diagram with standardized regression weights of SEM model)
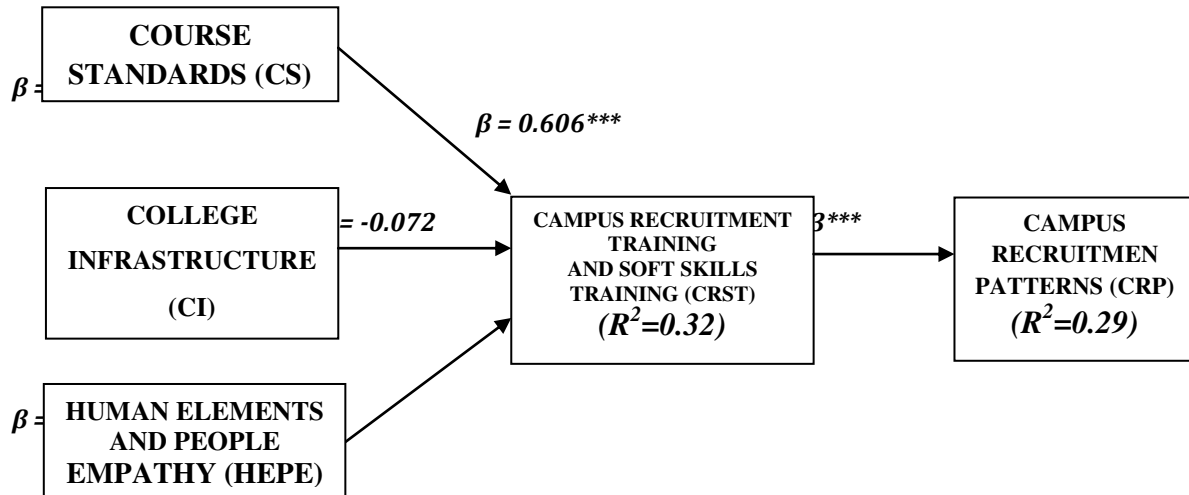

Table 6: Standardized regression weights of the constructs

Relationship of construct			Estimate	S.E.	C.R	P	Result
CRST	**<---**	**CS**	0.606	0.029	28.292	0.001	*Accepted*
CRST	**<---**	**CI**	-0.072	0.045	-1.698	0.090	*Rejected*
CRST	**<---**	**HEPE**	-0.111	0.052	-2.611	0.009	*Rejected*
CRP	**<---**	**CS**	0.617	0.029	28.292	0.001	*Accepted*
CRP	**<---**	**CRST**	-0.193	0.044	-4.316	0.001	*Accepted*

Source: Adapted from AMOS Output.

Figure 3 and table6 show the results of statistical analysis and hypotheses of the research model through standardized regression weights. The structural model is assessed by examining the path standardized coefficients beta weight (β) which shows the strength of relationships between the dependent and independent variables and the (R^2) value amount of variance explained by independent variables. Both, the R^2 and the path coefficients indicate fitness to perform this model. The stated hypothesis in table 5.16 revealed the significant and no significant relationships among the constructs. The first stated relationship between the "Course Standards (CS)" has significant relationship with "Campus Recruitment Training and Soft Skills (CRST)" with the *p*-Value of 0.001 at *p*< 0.001 level of significance in two-tailed hypothesis. Hence, the null hypothesis is accepted. Then, The second stated relationship between the "Course Standards (CS)" has significant relationship with "Campus Recruitment Patterns (CRP)" with the *p*-Value of 0.617 at *p*< 0.001 level of significance in two-tailed hypothesis. Hence, the null hypothesis is accepted. Then, The third stated relationship between the "College Infrastructure (CI)" has no significant relationship with "Campus Recruitment Training and Soft Skills (CRST)" with the *p*-Value of 0.090 at *p*< 0.001 level of significance in two-tailed hypothesis. Hence, the null hypothesis is rejected. Then, The fourth stated relationship between the "Human elements and people empathy (HEPE)" has no significant relationship with "Campus Recruitment Training and Soft Skills (CRST)" with the *p*-Value of 0.009 at *p*< 0.001 level of significance in two-tailed hypothesis. Hence, the null hypothesis is rejected. And, the fifth stated relationship between the "Campus Recruitment Training and Soft Skills (CRST)" has significant relationship with "Campus Recruitment Patterns (CRP)" with the *p*-Value of 0.001 at *p*< 0.001 level of significance in two-tailed hypothesis. Hence, the null hypothesis is accepted.

Conclusion

Since this study has many empirical insights of engineering students' perception towards quality of education and campus recruitment programmes at engineering colleges, the study can be beneficiary for all engineering students, faculty, recruiters, and even college managements by finding the path of understanding the tacit issues of students' knowledge and employability. Mere having the great technical potentiality does not ensure the engineering colleges to retain the students forever until and unless the student is employability skill conscious. The engineering colleges need to have competitive advantage in order to show the difference in student career shaping in a unique way. Hence, the competition in employment would not perhaps be the big deal to get in. In contrast, many engineering colleges would be very particular about admissions for every year rather focusing on minimal requisites to be standardised in technical education. Consequently, this situation leads to unhealthy competition among engineering colleges. However, the present study could focus on course standards that are prescribed by the concerned universities. The course standards could be identified as the crucial factor that articulate the curriculum of technical education up to the industrial requisites. The college infrastructure would also be prioritised as the way of splendid environment at engineering colleges. Most importantly, the campus recruitment training and soft skills training is found to be immense need of novice engineering student to face the tough competition of campus recruitments. The human elements and people empathy are also given much significance to make the student more interactive and warmth to all fraternity.

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