A STUDY ON STUDENTS PERCEPTION OF EMPLOYABILITY SKILLS WITH REFERENCE TO ENGINEERING INSTITUTION

THESIS

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By

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DECLARATION

Certified that the thesis entitled "**A STUDY ON STUDENTS PERCEPTION OF EMPLOYABILITY SKILLS WITH REFERENCE TO ENGINEERING INSTITUTION ”** is the bonafide record of independent work done by me under the supervision of Dr. K.Maran. Certified further that the work reported herein does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred earlier.

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I hereby certify that the thesis entitled, "**A STUDY ON STUDENTS PERCEPTION OF EMPLOYABILITY SKILLS WITH REFERENCE TO ENGINEERING INSTITUTION"** submitted to the St. Peter's University, for the award of Degree of Doctor of Philosophy is the record of research work done by the candidate V Chandra Shekar under my guidance and that the thesis has not formed previously the basis for the award of any degree, diploma, associateship, fellowship or other similar titles.

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ABSTRACT

Engineering graduates now require a far broader range of skills and attributes than the technical capability that was formerly demanded. In order to prepare engineers to meet these new challenges, engineering training and education must be revised and modernised. The lack of awareness of engineering students on the employability skills that are required to get employed added to the laid-back approach by the engineering institutes in administering these life skills have only compounded the problem and perceptions of engineering students towards understanding the need of employability skills.

The significance of the study is to bring awareness to engineering student fraternity and the academic institutions to change the perception on what constitute the employability skills and to re-iterate that technical skills alone shall not be the competencies that are required to get employed. The perception based on their belief and little experience of life about employability skills without any timely supporting mechanism to correct and guide them in the direction of desired goal lives them unemployed.

The research work undertaken by the researcher has adopted the convenience method under non-probability sampling method. A sample size of 700 respondents chosen was the students from the engineering colleges/ institutions from Chennai. In this study, factor of employability skills of students in engineering institutions has been identified. Employability skills were measured by twenty nine variables. Based on the agreement given by the selected engineering students, Factor analysis with principal component method using vari-max rotation was applied to group the twenty nine variables into six factors by analyzing correlation between variables.

Hypotheses was framed to observe the association of different attributes towards the employability skills and the t-test was conducted to know the level of importance of each of the variables and how the students from various college/university perceived on each of these issue were analysed. Comparison of engineering colleges and universities towards opinion, expectations, support and satisfaction of employability skills was carried out using appropriate tool.

The statistical inferences are more useful to the student community, to identify the respondents perceptions on the employability skills in different dimensions including training, communication skills, mock interview, basic academic skills, high order thinking skills, problem solving skills and team work. In this context, the research is more focused on the budding engineers and institutions to equip their skills and facilities to excel in the competitive market. The overall performance of engineering student's skills for rural areas is poor, the main reason is lack of communication skills, problem solving skills, self management skills. Hence, the rural based colleges have to initiate and put more effort for betterment of student community and placement areas.

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INTRODUCTION

1.1 INTRODUCTION

The question “What is the role of an Engineer?” and “What is Engineering”? will baffle even the most experienced and well learned engineer. The terms "Engineer" and "Engineering" are the most misunderstood, misused and misinterpreted nomenclatures and that no precise definition of these terms exists in India or, perhaps, elsewhere in the world. In some countries – Australia, Bahrain, Canada-Ontario, Korea, Malaysia, South Africa and USA – there is an Engineers Act that defines who an "engineer" is in that particular country. However, this definition varies from country to country. It covers a wide spectrum of activities that is complex, varied and dynamic.

As described in Wikipedia, An **engineer** is a professional practitioner of engineering, concerned with applying scientific knowledge, mathematics, and ingenuity to develop solutions for technical problems.**Engineering** is the application of scientific, economic, social, and practical knowledge in order to design, build, maintain, and improve structures, machines, devices, systems, materials and processes. It may encompass using insights to conceive, model and scale an appropriate solution to a problem or objective. The discipline of engineering is extremely broad, and encompasses a range of more specialized fields of engineering, each with a more specific emphasis on particular areas of technology and types of application.

In an increasingly global environment for businesses and for professional practice, engineers who will be employed by industry need to be much broader than graduates of previous generations. And they will need to be credentialed in ways that are recognized across national borders and available

in sufficient quality and quantity to meet the expanding need of employers seeking graduates with superior quantitative and problem solving skills.

In today's context, engineering is a broad field that embraces knowledge and training in business/management, science, mathematics, social science and (computer) technology. In order for engineers to function effectively in such a multidisciplinary environment, engineering education must have the capacity to instill its graduates with skills and attributes from the diverse areas like Social Science, communication skills, social skills, presentation skills, interpersonal skills, Business/Management, leadership skills, business management skills, team-working skills, accounting skills, Computer/Technology, computer skills, programming skills, technical skills, design skills, Mathematics/Science, problem solving skills, research and development skills, analysis/synthesis skills.

The big question which is alarming that has to be answered is "Does our Engineering Institutes in India embrace and address these skills and attributes to our engineering students"?

In Australia, Engineering is described as a profession directed towards the application and advancement of skills based upon a body of distinctive knowledge in *mathematics*, *science* and *technology*, integrated with *busine*ss and *managemen*t and acquired through education and professional formation in an engineering discipline. Engineering is directed to developing and providing infrastructure, goods and services for industry and the community.

1.2 NEED OF ENGINEERS

In the globalised work place, everyone has the equal opportunity to get employed appropriately based on various factors that are inclusive of educational qualification and strength of the individual. Unfortunately, the employability level of fresh engineering graduates from India is in pitiable state. According to the widely quoted report by the National Association of

Software and Services Companies (NASSCOM) and McKinsey in 2005, only 25% of the engineering education graduates are employable by a multinational company, which has marginally improved and has a long way ahead. This issue of unemployability in the global environment that has limitless opportunities has posed a challenge to study the reasons for this deplorable situation. Dr. APJ Kalam as president of India righty said that the country does not have problem of unemployment but unemployability. The engineering graduates lack other skills, beside the academic or technical skills.

There are numerous study conducted and researched at different levels across the globe on the employability skills and has targeted the lack of employability skills by the fresh engineering graduates as the major cause for their unemployability. The directly affected and aggrieved party is the student community. However, it shall be prudent to realize that "Today's children are tomorrow's citizen". Towards this, there is a social responsibility by various stake holders along with the student such as the teachers, parents, engineering institutes/University, policy makers, employers and business industry. The stake holders have to take the responsibility and be held accountable in addressing the issue of unemployability of fresh engineering graduates and to provide a progressive path towards employability. To shy away from the problem, shall result in more problems that depict the present state of unemployability of fresh engineering graduates. Graduate employability is multi-faceted and encompasses academic performance, career management skills, and market awareness.

The dynamic world in which engineers operate presents them with new demands and provides new challenges in the diverse, profound and incessant changes which confront mankind as it heads into the new era. Such change is occurring in technology, its practice and application, in the natural environment and, of course, in society's evolving expectations. In such a rapidly changing environment, too great a focus on technical competence for engineers and not

enough on competence in non-technical skills and attributes such as communication, problem solving and management skills has added to the problem of unemployability.

Engineering graduates now require a far broader range of skills and attributes than the technical capability that was formerly demanded. In order to prepare engineers to meet these new challenges, engineering training and education must be revised and modernised. . The lack of awareness of engineering students on the employability skills that are required to get employed added to the laid-back approach by the engineering institutes in administering these life skills have only compounded the problem and perceptions of engineering students towards understanding the need of employability skills. Though there are many stake holders and related issues in addressing the employability skills, the primary need of the study is focused to address the present perception of engineering students of various engineering institutes/university on various employability skills/attributes that is required to get employed appropriately and the responsibility of university/colleges towards acquiring the much needed employability skills..

1.3 ENGINEERING STUDENTS PERCEPTIONS ON EMPLOYABILITY SKILLS

Perception can be defined as the way we receive, select, organise and interpret or give meaning to the information we receive via our senses.Perception is our sensory experience of the world around us and involves both the recognition of environmental stimuli and actions in response to these stimuli. Perception not only creates our experience of the world around us, it allows us to act within our environment. However, what one perceives can be substantially different from objective reality. People's behaviour is based on their perception what reality is, not on reality itself.

There are various factors both external and internal that leads to our perception on any issue and at times distort perception. Some of the influential factors are Characteristics of the Perceiver that depends on attitudes, motives, self-concept, interest, cognitive structure, emotional and motivational states together with expectation and culture. Some distortions in our perceptions could also be due to Halo Effect, Contrast Effect, Projection and Stereotyping. One of the problems of stereotypes is that they are widespread, despite the fact that they may not contain shred of truth or that they may be irrelevant. Their being widespread may mean only that many people are making the same inaccurate perception on the basis of a false premise about a group.

For decades engineering education in India is perceived as purely technical in nature, across the society irrespective of social status, economical background, demographical location, urban, rural, culture, educational background. This mindset that has imprinted over a long period in the society and stereo-typed repetition on the views of engineering education has become a hindrance to realize, acknowledge and change our perceived ideas about engineering education. The need to transform our mindset and perception of engineering education from its narrow approach to a broader approach with the view of employability in the ever demanding global business environment is urgent.

Perception on any issue is largely based on the belief and experience. It is the collective responsibility of various stake holders like parents, academicians, industry, institutions to bring awareness amongst the ignorant student community on what constitutes the engineering education in the present context and transform their perception. The fact the institutes/university have largely designed the engineering curriculum addressing only the technical subjects, the young engineering students ignorantly believe and perceive the engineering employability skills is all about technical subjects, without understanding the hard reality of employability skills.

Understanding student perceptions and achieving student 'buy-in' to employability skill development is important for a number of reasons. Firstly, it is logical that effective learning requires a clear understanding of the value of presented material and associated activities enhanced by constructive alignment with explicit future learning outcomes. Further, students placing a high value on what they are learning may also impact on their ability to transfer acquired skills across different contexts, such as from the university classroom to the workplace. Also, undergraduate appreciation of the importance of employability skills may prompt better use of portfolios to showcase developed skills in future job applications, thus enhancing their employment prospects. Explicit understanding of the importance of employability skills, and their transparent inclusion in curricula, will enhance student ability to articulate to employers their own capabilities. As the scope and diversity of engineering field is so wide and vast, the engineering students perception on the employability skills required becomes unclear and acts as a barrier to awareness and understanding of what is expected of them.

The report by UNESCO (2010) on engineering issues, challenges and opportunities for development is a reality check on how ill-informed people are and skewed perceptions we have on engineering education. United Kingdom (UK) though is one of the most developed nations and hub of higher learning, the public perception on engineering education was alarming. The survey verified that the people in UK have little or no understanding of the nature of engineering, its scope, diversity and impact on society. This limited awareness and understanding of engineering is coupled with a significant lack of confidence in and knowledge of the profession and the work that engineers do. Six out of ten people thought 'hardly anyone knows what engineers do'. This perception on engineering education is a wakeup call to the society at large. The report opines, perhaps the reason for this perception is that the engineers operate across a broad range of activities and sectors and it may be that this breadth is, in fact, a barrier to awareness and understanding of what they do.

1.4 EVOLUTION OF ENGINEERING EDUCATION

An array of powerful forces, including demographics, globalization, and rapidly evolving technologies, is driving profound changes in the role of engineering in society. The changing technology needs of a global knowledge economy are challenging the nature of engineering practice, demanding far broader skills than simply mastery of scientific and technological disciplines. Engineering is progressively becoming less and less of a standalone subject. Other disciplines are influencing and being increasingly incorporated in engineering curricula in order to increase the attractiveness of a university's graduates, thereby responding to industry demands in management, business strategy, marketing, philosophy, communication, ethics, environmentalism, sustainability, etc.

The heavy traditionalism of many courses have the perspective of teaching only real engineering, i.e. defining and isolating problems and achieving technical solutions. Exposure to this culture of traditionalist engineering education not only discourages reflection, but also generates future engineers who both lack and do not appreciate the value of the skills of reflection. This engineer's stereo typical negative image of the socially inept genius can inhibit student recruitment and retention.

Engineers in the past were mainly concerned with the technical aspects of engineering, commonly known as hard-engineering. Times, and the roles of engineers have changed however, and a shift in the paradigm of engineering is becoming more appropriate in today's environment. Although the shift involves a movement towards soft-engineering, the technical aspect of engineering is no less relevant, and technical skills formation remains at the core of engineering.

One of the reviews of engineering education in Australia indicated that there are a variety of roles for professional engineers which need to be reflected in engineering curricula and these roles include:

(a) Generalist engineers with a broad technical base and the ability to work across specialist boundaries.

(b) Engineering managers, who speak all languages; leaders in business, industry, society.

(c) The technically brilliant: researchers, technological innovators, specialists in particular fields.

(d) System engineers: experts in major system specification and design and the integration of a variety of engineering and non-engineering specialties.

The challenges we face in transforming engineering education can be summarized by quoting from a bulletin for Princeton's program in engineering and applied science: "For too long traditional engineering education has been characterized by narrow, discipline-specific approaches and methods, an inflexible curriculum focused exclusively on educating engineers (as opposed to all students), an emphasis on individual effort rather than team projects, and little appreciation for technology's societal context. Engineering education has not generally emphaisized communication and leadership skills, often hampering engineers' effectiveness in applying solutions. Engineering is perceived by the larger community to be specialized and inaccessible, and engineers are often seen as a largely homogenous group, set apart from their classmates in the humanities, social sciences, and natural sciences. Given these perceptions, few women and minorities participate in engineering and non-engineering students are rarely drawn to engineering courses"

Most countries in the World are changing the requirements for accreditation of degree level engineering programs in the light of the changing requirements of engineering graduate abilities. More than 40 years ago, the German Engineering Association (VDI) recommended that at least 20% of the engineering curricula should be dedicated to soft skills. As a supplier of quality engineering manpower to the World, Indian Universities and Institutions must be aware of the output/outcome criteria for accreditation now prevailing in most countries and ensure that our engineering graduating students do not suffer in comparison with others.

1.5 FRAMEWORK OF STUDY

The framework for this study was the social cognitive development theories developed by Bandura (1986). According to Bandura's social cognitive theory, students' feelings regarding their ability to perform academic tasks predict their ability to achieve the tasks. Social cognitive theorist such as Bandura also asserted that both reinforcement and punishment influence learning and behavior in several ways. One of the ways is how "expectation about probable future consequences affects how people cognitively process new information" Ormrod (2003). According to this theory, "When we believe that we will be reinforced for learning something, we are more likely to pay attention to it and mentally process it in an effective fashion. When we don't expect to be reinforced for learning it, we are far less likely to think about or process it in any moderate way Ormrod (2003).

Bearing that theory in mind, it can be asserted that students learn many things that they never express because there is no reinforcement for expressing them. Reflecting on this theory, it could be argued that on one hand many of the employability skills that are not typical technical skills could be undermined by students if they are not directly tested or evaluated on those skills, if their grades are not affected by those skills (extrinsic reinforcement), and/or if they are not intrinsically motivated to master those skills for future

use. On the other hand, students could be very competent in performing some employability skills if they are tested or evaluated on those skills, if their grades are affected by those skills (extrinsic reinforcement), and/or if they are intrinsically motivated to master those skills for future use. Engineering students' perception on employability skills shall transform if it is reinforced extrinsically or motivated intrinsically to achieve the goal of attaining employability.

1.6 EMPLOYABILITY OPPORTUNITY FOR ENGINEERING STUDENTS IN INDIA

People often confuse between unemployability and unemployment. Unemployability arises when individuals have educational eligibility but lack in capability and suitability to execute a job related activities despite being the availability of employment opportunities. Unemployment is a state where individuals have educational eligibility, capability and suitability but dearth of employment opportunities.The current situation in India is more of unemployability rather than unemployment.

Studies reveal the issues related to employability skills of engineering graduates have been felt by most of the countries around the globe including USA, UK, European countries, Australia and Asian countries. However, the western countries have realized the gravity of the problem and have slowly institutionalized the need and are incorporating necessary corrective measures in the academic institutions by providing skill development programs so as to reduce gap between engineering graduate output and the input required for employability in the globally challenging industry.

In India, lot of study and research are carried out to realize the importance and need of employability skills amongst engineering graduates. However, there is no mechanism that exists in most of the engineering institutions and academia to appreciate the critical need of employability skills

and help engineering students acquire the very important survival skills in the highly competent and challenging industry. It will not be out of place to state that the fresh engineering graduates from majority of engineering institutions are ignorant about what defines employability skills and various competencies that covers them.

To further and strengthen the need for this research, survey carried out by Institute of Directors is illustrated. The Institute of Directors (2007) carried out asurvey on "Graduates' Employability Skills" from 500 Directors who are members of Institute of Directors(IOD) from various organization size, economic sector and geographical location. The survey was through a well structured and researched questionnaire, the results were alarming in which the Directors opined only 25% of young graduates were well prepared for employment and almost 40% were unprepared. The survey invited views on the desirability of 28 employability skills, incorporating basic skills, general employment skills, people and social skills, and personal qualities and skills. However, the top ten skills and qualities IOD members rated as being most important for recent graduates to possess were honesty and integrity, basic literacy skills, basic oral communication skills, reliability, hardworking and good work ethic, numeracy skills, positive attitude, punctuality, ability to meet deadlines, team working and co-operation skills.

1.7 EMPLOYABILITY SKILLS

Skill may be defined as goal-directed, well-organized behavior that is acquired through practice and performed with economy of effort. Employability skills are a blend of 'hard' and 'soft' skills. Employability skills are those basic skills necessary for getting, keeping, and doing well on a job. Unlike occupational or technical skills, employability skills are generic in nature rather than job specific and cut across all industry types, business sizes, and job levels from the entry-level worker to the senior-most position.

Hard (technical) skills are goal-directed behaviours that draw on well-established and clearly discernable rules and principles, they:

a) have technological or scientific bases.
b) involve the application of specific tools and techniques.
c) tend to be procedural and methodical.
d) aim towards outcomes that are relatively predicable.

Soft skills, on the other hand, are not necessarily founded on a widely accepted or formalized scientific basis (for example there is no generally accepted theory of leadership that can offer any definitive guide to leader behavior). Soft skills are:

a) hard to standardize or 'script' given the uncertainty and ambiguity of the situations in which they are likely to apply.
b) resistant to being reduced to formulaic rules and routines or procedures and prescriptions.
c) goal-directed but tend to involve judgments and ambiguities.
d) less replicable and/or predictable than their harder counterparts and may have multiple acceptable solutions.

In today's highly demanding and competitive World, the definition of engineering employability skills has transformed globally to meet the industry and business needs. Engineering employability skills is a package and all encompassing including overall personality development and soft skills, other than the core professional/technical skills. Engineering employability skills, also known as generic skills/soft skills are highly related to non-technical skills. It is sometimes referred to generic capabilities, transferable skills, basic skills, essential skills, soft skills, core skills, core competencies and enabling skills or even key skills.

Soft skills present significant challenges to practitioners, policy-makers and researchers alike because of a lack of precise definitions or a conceptual framework for understanding soft skills. To try and gain greater clarity and correct conceptual weaknesses, various definitions and descriptions of 'soft skills' were identified from a search and review of the skills literature are enumerated below.

"Soft skills refer to the cluster of personality traits, social graces, and facility with language, personal habits, friendliness, and optimism that mark people to varying degrees. Soft skills complement hard skills, which are the technical requirements of a job"(Wikipedia, 2007). 'Acquired through experience, are concerned with managing and working with people, ensuring customer satisfaction and creating a conducive environment for the team to deliver high quality products within budget and on time, and exceeding stakeholder expectations.'(Sukhoo et al 2005). 'Skills, abilities and traits that pertain to personality, attitude, and behavior rather than to formal technical knowledge.'(Moss and Tilly 1996).

'Skills related to critical thinking, oral communication, personal qualities, and interpersonal and/or teamwork….many of these skills are shaped by structural changes in the economy, technology and new forms of work organization' (Giloth 2000). 'The range of general education skills that are not domain-or practice-specific, which include communication and interpersonal skills, problem solving skills, conceptual/analytical and critical skills, visual, aural and oral skills, judgement and synthesis skills'(Boyce et al 2001). 'Goal-directed behaviours used in face-to-face interactions in order to bring about a desired state of affairs'(Hayes 2002).'Interpersonal skills, intrapersonal skills, stress management and thinking skills, communication skills; factors that provide indications of the potential suitability of candidates to work in the [accounting] firms' (Chia 2005)

‘[Trans-situational] intra-and inter-personal work skills that facilitate the application of technical skills and knowledge’(Kantrowitz 2005). ‘Non-technical traits and behaviours needed for successful career navigation, [which] allow you to more effectively use your technical abilities and knowledge’(Klaus et al 2007). ‘Cluster of personality traits, social graces, facility with language, personal habits, friendliness, and optimism that mark each of us to varying degrees’(Anju 2009).

‘[Soft skills] allow a person to better understand his or her own actions, how to work better with others, and most importantly, how to be more productive and successful’(Muzio and Fisher 2009). ‘Interpersonal skills are also referred to as “soft skills”, and discipline-specific technical skills as “hard” skills’(Skulmoski and Hartman 2010). ‘Hard skills are associated with the technical aspects of performing a job. These skills usually require the acquisition of knowledge, are primarily cognitive in nature and are influenced by an individual’s IQ source. Soft skills are defined as the interpersonal, human, people or behavioral skills needed to apply technical knowledge and skills in the workplace’(Weber et al 2009).

‘Soft knowledge is intangible knowledge, which is difficult to quantify, codify, store, and transmit because it relates to more personal characteristics and includes judgement and experience…internalized skills acquired with experience and practice’ (Kajnc and Svetlicic 2010).‘Employees, who can forge partnerships, build relationships, communicate effectively with the business, and find creative ways to manage costs are the most valuable to the organization’(Pratt et al 2010).

Some of the Soft Skills that are considered worldwide are Common Sense, Good Attitude, Communication skills. Group Discussion, Etiquette & Manners, Body Language, Cooperation & Team skills, Adaptability, Flexibility, Follow rules /Instructions, Initiative, Responsibility, Reliability, Honesty, Integrity, Dependability, Work ethics, Punctuality,Grooming,

Accountability, Interpersonal Skills, Intrapersonal Skills, Motivational Skills, Creative thinking skills, Problem solving Ability, Public Relations, Willingness to Learn, Time Management, Prioritizing Tasks, Performance Excellence, Commitment, Ability to meet deadlines, Listening Skills, Judgement, Leadership Skills, Decision Making, Self-directed/Motivated, Presentation Skills, Change Management, Project Management, Eye Contact, Self-Supervising, Personal energy, Personal hygiene, Intellectual ability, Sociability, Empathy, Business management, Negotiating skills and Cultural awareness. However, this is by far incomplete. More could be added and the list could go even longer. If we analyze these skills, we can clearly see that we have narrowed down on three categories of skills, namely:

a) Qualities that can be acquired like skills & knowledge.

b) Skills that relate between one individual to many.

c) Skills or qualities present within the individual.

Many people include certifications and scholarly achievements under Soft Skills. Such achievements cannot be included because those come under educational or technical qualification. A person can receive a certificate by doing a course in Soft Skills but no institution or individual can certify if a person really has Soft Skills because it has to be practiced and is intrinsic by nature. People can only feel the effect of Soft Skills which is put in practice by a person.

Recommendations of various accreditation agencies in US, UK, Singapore, Australia and Japan have already affected educational programs that include personality growth and soft skills, not only in their respective countries, but also in other countries, which constitutes employability skills. It is noted that there are great similarities in the competency set identified by these agencies and the following list puts these competencies as per the order of importance:

a) Ability to apply knowledge

b) Design skills

c) Problem solving skills

d) Technical competence

e) Ability to work in multidisciplinary teams

f) Communication skills

g) Sensitivity towards global, societal and environmental issues

h) Sensitivity towards ethical and professional issues

i) Readiness for life-long learning

It is prudent to acknowledge that most of Indian engineering institutes produce a very large number of engineering graduates without offering them enough opportunity and challenge for intellectual growth through their academic program. The following competencies are also identified as necessary either for engineer in general or specifically for engineers and professional in IT related disciplines by various agencies and researchers:

a) System-level perspective

b) Analytical skills(including investigative skills, critical thinking, numerical ability, attention to detail)

c) Creativity and idea initiation

d) Entrepreneurship, Decision-making, Project planning and adaptability

e) Persuasion skills, Mentoring skills

f) Ability to work in multicultural teams and Listening

g) Adaptability and ability to multi-task

h) Organisational skills

i) “Be the customer “ mentality

j) Project planning and management

k) Stress management

l) Conflict management

These soft skills are briefly covered in the succeeding paragraphs and they include Communication skills, Teamwork, Leadership, Creativity, Lifelong learning, Project management, Crisis management, Entrepreneurship, Emotional Intelligence, Problem solving skills, Decision making skills etc.

1.7.1 Communication skills

Communication skills are the ability to present ideas with confidence and effective through aural, oral and written modes, not only with engineers but also with the community at large. Communication skills consist of the following:

a) Ability to deliver idea clearly, effectively and with confidence either orally or in writing.
b) Ability to practice active listening skills and respond.
c) Ability to use technology clearly and confidently during presentation to the audience.

Communication skills are the one that haunts the most for the engineering graduates from Tier 2 and Tier 3 cities in India. According to a study carried out by Purpleleap, a entry level talent management group, 75% of engineering students from the country do not meet the qualifying criteria as far as communication skills. Most accreditation bodies across the globe and research work have endorsed communication skills as a critical competency and also acknowledge lack of communication skills among engineering graduates, which is an impediment in seeking employment. Proficiency in communication skills is considered by the industry as more of a 'qualifying criteria' than selection criteria for technical roles in the industry. Competence in oral communication – in speaking and listening – is prerequisite to students' academic, personal and professional success in life.

By far, the most critical and foremost skills among all soft skills that is recognized globally is communication skills. Moreover, it is this critical skill that haunts most of the engineering students, making it difficult for the fresh engineering graduates to get employability. The need of good communication skills goes beyond acquiring employability. Oral communication competence can contribute to individuals' social adjustment and participation in satisfying interpersonal relationships. Students with poor communication skills are sometimes viewed as less attractive by their peers and enjoy fewer friendships. Antisocial and violent behaviors often accompany or occur with underdeveloped social and conflict management skills. On the positive side, the ability to communicate orally supports sound psychological development. One's self concept is acquired through interaction with others. In psychological terms, achieving self-actualization involves communication activities such as making contributions in groups, exerting influence over others, and using socially acceptable behavior.

1.7.2 Team work

With the liberalization and globalization, boundary of businesses and industry has become porous. This has posed a bigger challenge to the global engineers who need to cut across boundaries, culture, environment, region, traditions, and values to work as a team in the highly demanding industry. The power of team work and the outcome of good team work are impressive.

A team may be defined as a group whose members have complementary skills and are committed to a common purpose or set of performance goals for which they hold themselves mutually accountable. Team work is, that contributes to productive working relationships and outcomes and the various elements of Team Work as defined in Employability skills for the Future (2002) are as follows:

a) Working across different ages irrespective of gender, race, religion or political persuasion.
b) Working as an individual and as a member of a team.
c) Knowing how to define a role as part of the team.
d) Applying team work to a range of situations ex. Future planning, crisis situation, problem solving.
e) Identifying the strengths of team members.
f) Coaching and mentoring skills including giving feedback.

1.7.3 Leadership Qualities

Leadership has been defined in many ways by various leaders from different background, environment and situation. However, the bottom line of leadership is that the leader has to influence the process and activities of an organized group in its efforts towards goal achievement. Young and fresh engineering graduates need to appreciate and understand, Good leaders are made not born. If you have the desire and willpower, you can become an effective leader. Good leaders develop through a never ending process of self-study, education, training and experience.

Any practicing engineer will argue that "an engineer is hired for her or his technical skills, fired for poor people skills, and promoted for leadership and management skills" Russell, J S, and J T P Yao (1997). Leadership must be key element advancing for the engineering profession to remain relevant and connected in an era of heightened outsourcing and global competition. Leadership for engineers is more complicated than most other sectors because, in addition to the traditional skills needed to excel, an additional dimension of technological leadership and governance is required John V. Farr and Donna M.Brazil (2009).

Formal education dominates the development of leadership skills early in a young engineer's career. Leadership development experiences during

baccalaureate engineering training must be reinforced by extensive practice in real-world settings early in a young engineer's career John V. Farr and Donna M.Brazil (2009).

The key to embedding leadership in the formal education process is to mirror the real world. Engineering as a profession plays a vital role in our society and therefore engineering education has a responsibility to ensure that engineers are well equipped to take up this role. The primary purpose of offering leadership programs within the engineering education domain is then to produce engineer leaders for the engineering community and society Harry Siu-lung Ku et al (2011).

1.7.4 Problem Solving Skills

Research and various studies have revealed the popular myth that engineering students are naturally good at problem solving. In one of the major study conducted in India by Purpleleap, an entry level talent management group, it was found one of the biggest skill gap that existed in the engineering students is in the area of problem solving. There is similarity between problem solving skills and creative thinking.

Problem solving skills is, that contributes to productive outcomes by analyzing facts and situations and applying creative thinking to develop appropriate solutions National Knowledge Commission (2008). Various elements of problem solving skills as defined by Employability skills for the Future (2002) are as follows:

a) Developing creative, innovative solutions.
b) Developing practical solutions.
c) Showing independence and initiative in identifying problems and solving them.
d) Solving problems in teams.
e) Applying a range of strategies to problem solving.

f) Using mathematics including budgeting and financial management to solve problems.
g) Applying problem solving strategies across a range of areas.
h) Testing assumptions taking the context of data and circumstances into account.
i) Resolving customer concerns in relation to complex projects issues.

1.7.5 Creativity Skills

Engineering graduates should be creative in their thinking to provide solutions and address issues differently in the ever growing technological World, where change and dynamism are the order of the world. Most researchers would agree that creativity involves the generation of creative idea, though it is not easy to give a universally acceptable definition of creativity Lawrence APervin and Oliver P John (2006). At least two prerequisites must be met for an idea to be deemed "creative". First, the idea must represent a relatively uncommon response. This is the criterion of originality. Second, to count as creative, an original idea must exhibit adaptiveness. That is, the idea must provide the solution to some significant problem or achieve some important goal. . Definition of creativity can be viewed as a process, product or person, which is closely interlinked. With these views definition of creativity is as follows:

a) Creativity is a mental process (or collection of processes) that results in the production of ideas simultaneously original and adaptive Smith S et al (1995).

b) Creativity is a characteristic of a product such as a discovery, invention, poem, painting, or composition. A product is deemed creative if it satisfies the combined criteria of originality and adaptiveness Martindale C (1990).

c) Creativity is a trait or personality profile that characterizes a person. Creativity may consist of some special combination of such individual-difference factors as intelligence ambition, determination,independence, openness, and originality Lawrence APervin and Oliver P John (2006).

1.7.6 Emotional Intelligence

Emotional intelligence (EI) is the ability to identify, assess, and control the emotions of oneself, of others, and of groups as described in Wikipedia. It refers to an assortment of noncognitive skills, capabilities, and competencies that influence a person's ability to succeed in coping with environmental demands and pressures Stephen P Robbins (2003). Emotional competency is composed of five dimensions D Goleman (1999) and its attributes are as follows:

a) Self awareness - Emotional awareness, accurate self-assessment and Self confidence.
b) Self-Regulation - Self control Trustworthiness, Conscientiousness, Adaptability and Innovation.
c) Self-motivation – Achievement drive, Commitment, Initiative and Optimism.
d) Empathy – Understanding others, Developing others, Service orientation, Leveraging diversity and Political awareness.
e) Social skills – Influence, Communication, Conflict Management, Leadership, Change catalyst, Building bonds, Collaboration, cooperation and Team capabilities.

Emotionally intelligent engineers have the opportunity to manifest future change and actively create the future Colin U. Chisholm (2010). EQ offers more than just learning tools for the engineering student, but also career skills for the engineering graduate. EI is not some stand alone fad, but rather

an element than can have a significant impact on a student's education and his/her future career Marc J Riemer (2003).

As present and future graduates increasingly operate in a global environment, Emotional Intelligence as a skill becomes an essential core to support the development of sustainable emotional competence in the context of a global information society, where social responsibility, social justice and ethics are key components needed to address the formation of the global professional engineer Colin U. Chisholm(2010).

The interesting fact about Emotional Intelligence is that it can be improved. In contrast to fixed aspects of personality, the premise is that EQ can be learned. This represents tremendous opportunity for improving work, school, and life outcomes because emotional intelligence is an important predictor of key success factors Joshua Freedman (et al 2006).

1.7.7 Decision Making Skills

The choices made from among two or more alternatives are decision. "Decision making is the study of identifying and choosing alternatives based on the values and preferences of the decision maker. Making a decision implies that there are alternative choices to be considered, and in such a case we want not only to identify as many of these alternatives as possible but to choose the one that best fits with our goals, objectives, desires, values, and so on" Harris R (1998).

Decision making occurs as a reaction to a problem and it is applicable in all walks of life. It is critical and important to make a right and realistic decision in every activity we deal with. However, in a business environment the decision making has to be rational, logical and to a large extent backed with correct interpretation and evaluation of information. Decision maker plays a very important role in decision making. A young engineering graduate has to provide engineering solutions to the problems in the work place, hence the

decision making ability and skills becomes important and critical. The perceptions, interpretations, experience, personality, background, intelligence, situational awareness, knowledge and inference of the decision maker will be the key to right decision making.

1.7.8 Project Management Skills

Projects are perceived to be a means through which modern societies achieve social and economic ends to generate new values Winch, G M (2010).A project can be considered to be the achievement of a specific objective, which involves a series of activities and tasks which consume resources. It has to be completed within a set specification, having definite start and end dates. Project Management (PM) can be defined as the process of controlling the achievement of the project objectives A K Munns and B F Bjeirmi(1996). The significance of good project management in delivering engineering projects to fulfill predetermined objectives has been well established. Because of the significance of Project Management, industrialists and engineering institutions have called for the inclusion of project management in higher education degree programs KriengsakPanuwatwanich et al (2011).

Most undergraduate curricula do not include a basic course on project management. However, project management skills are important to most successful engineering careers. It is well documented that engineers are expected to possess soft skills such as PM in addition to specific technical skills Pulko, S H & Parikh S (2003). Modern project management is a well understood discipline that can produce predictable, repeatable results. PM encompasses many different skills, such as understanding their interdependencies among people, technologies, budgets, expectations, planning the project to maximise productivity, motivating others to execute the plan, analysing the actual results and realities of what really happens as the project is executed ImanAttarzadeh and Siew Hock Ow (2008).

The need for appreciation of project management amongst engineers can never be under estimated. In many organizations it is engineers that find themselves identified as project managers, yet they do not always possess the right skills to perform effectively in the role. Project Management is nothing but application of management tools and techniques to achieve the Project objectives.

1.7.9 Entrepreneurship

The Oxford Dictionary describes an entrepreneur as one who 'organises, manages and assumes the risks and reaps the benefits of a new business enterprise or commercial venture'. Entrepreneurship is also believed to involve 'rethinking conventional paradigms, and discarding traditional ways of doing things Johan Esbach (2009).

India needs entrepreneurs in large numbers to capitalize on new opportunities and to create jobs. As per the estimates of Mckinsey and NASSCOM, by year 2015, 110-130 million Indians will be searching for jobs, including 80-100 million looking for their first jobs. The traditional large employers, including the Government and the old economy players may find it difficult to sustain this level of employment in the near future and the new generation entrepreneurs will have to create these new jobs and opportunities G S Popli and Rao D N (2010).

In the era of globalization, entrepreneurial development is assuming greater significance and to achieve faster economic development. Entrepreneurs are thus the catalysts of industrial development contributing to employment generation leading to enhancement of per capita income, revenue to the Government in the form of taxes and duties G S Popli and Rao D N (2010).

In order to contribute and compete in today's entrepreneurial economy, an engineering graduate need not be an entrepreneur in the sense of starting

one's one business. Possessing an entrepreneurial mindset is very beneficial whether one starts a business, excels in established corporations or joins a university on non-profit Jonathan Weaver and NassifRayess (2011).

1.7.10 Lifelong Learning Skills

'Lifelong Learning skills' refers not the specific information that students acquire during their formal education, but to how successfully they can continue to acquire information after their formal education has ended Weijie Dong (2004). The importance of lifelong learning for engineering professional has been reiterated in the National Academies report, The Engineer of 2020. It calls for engineers to be lifelong learners because their career trajectories will take on many more directions due to rapidly changing technologies. In the 21st century knowledge economy we are witnessing an ever increasing pace of knowledge creation in the sciences and engineering. Competing in this global economy requires a science and engineering workforce that is continually at the technological forefront.

Economic factors such as income and employment play an important part in lifelong learning. They can provide people with reasons for joining learning programmes, as well as featuring in policy decisions on financing provision. The direct economic effects of lifelong learning potentially include impacts on earnings, on employability, and on the wider economy. And since higher incomes or steady employment tend to have further effects on health, well-being and sociability, it also follows that the economic effects of learning have indirect outcomes John Field (2012).

1.7.11 Time Management

Time is an essential resource everyone possesses equally but fails to utilise at the same level due to a variety of reasons. The only asset that cannot be changed or purchased or stored is "time" itself. The secret to achieving success in life is effectively managing this resource that everyone possesses

equally and paying sufficient planning, Good time management is important for everybody in general, more so for engineering graduates, where time lines are steep, challenges to meet the deadline, critical and important. Hence learning good time management shall enhance the young engineering graduate to deal with work and have a better work-life balance, which will eventually help in improving the employability skills.

Good time management such as setting goals and priorities as well as monitoring the use of time can facilitate productivity and minimise stress, contributing to work effectiveness and maintaining balance. What people gain from time management, in essence, is not more time, but a better life Britton and Tesser (1991).

1.7.12 Conflict Management

Any two individuals with the sixth sense will have conflict, may be at different levels depending upon various factors and situations. Conflict is Universal and it is important for engineering graduates to realise and learn conflict management skill. In the fast-paced global work environment, engineers will face situations on a day-today at work place that has conflict and has to be managed appropriately for one's own survival and progress. In fact, it is virtually impossible for people with diverse background skills and norms to work together; make decisions,and try to meet project goals and objectives without conflict.

Conflict may be defined as struggle or contest between people with opposing needs, ideas, beliefs, values or goals. Conflict on teams is inevitable, however, the results of conflict are not predetermined. Conflict might escalate and lead to nonproductive results, or conflict can be beneficially resolved and lead to quality final products. Therefore, learning to manage conflict is integral to a high-performance team. Conflict is believed to result because of

miscommunication between people with regard to their needs, ideas, beliefs, goals, or values.

Conflict management is the principle that all conflicts cannot necessarily be resolved, but learning how to manage conflict can decrease the odds of nonproductive escalation. Conflict management involves acquiring skills related to conflict resolution, self-awareness about conflict modes, conflict communication skills, and establishing a structure for management of conflict in your environment. By learning conflict management skills, all people can benefit both personally and professionally. Different modes of handling conflict are Competing, Accommodating, Avoiding, Compromising and Collaborating.

1.7.13 Change Management

The only thing that is permanent in this world is "Change". From time immemorial, mankind has witnessed continuous change towards civilization and today's world is the reflection of the change. In today's highly competitive and challenging global business environment added to the ever improving technology, it is the question of survival for today's engineer to "manage the change" or "perish at one's will". Today's fresh engineering graduates are faced with challenges and complexities that is changing the way businesses are carried out and hence it is paramount for the engineering students to appreciate the importance of change management and prepare oneself in acknowledging this skill that shall harness his ability and prove his capability in the workplace and embrace the challenges of Change.

The objective or goal of "Change" in today's fast paced business environment is largely to improve the organisation in some fashion – for instance reducing costs, improving revenues, solving problems, seizing opportunities, aligning work and strategy, streamlining information flow within the organisation. Change Management is the application of processes and tools

through a systematic approach to manage the people side of change from a current state to a new future state such that desired results of the change (and expected return of investment) are achieved. Change Management enables employees to adopt a change so that business objectives are realized. It is the bridge between solutions and results, and it is fundamentally about people, and our collective role of transforming change into successful outcomes for our organisations. A fundamental assumption of change is that something different is possible and most importantly, there is a chance to improve performance in a meaningful way. Prosci, leading provider of change management training across the globe states Change Management is necessary because:

a) We change for reason.
b) Organizational change requires individual change.
c) Organizational outcomes are the collective result of individual change.
d) Change management is an enabling framework for managing the people side of change.
e) We apply change management to realize the benefits and desired outcomes of change.

1.7.14 Other Competencies

Employability skills also known as soft skills, non-technical skills, personality development refers largely to the similar competencies and traits. The major competencies such as communication skills, team work, project management, decision making, critical thinking, emotional intelligence, leadership, lifelong learning, and time management are mandatory need for engineering graduates for employability. Various other competencies and skills that is encompassing the major competencies such as cultural awareness, empathy, attitude, conflict management, good manners, etiquettes, integrity, honesty, courtesy, sociability will shape up the personality of the engineering

graduate and prepare him/her to survive in the highly demanding and challenging global industry.

Employability skills are all encompassing and each competency is related and merges with each other. For example, A leader should have good communication skills, good decision making capability, be updated and knowledgeable, have good emotional intelligence, think critically, sense of responsibility, etc.

1.8 STATEMENT OF THE PROBLEM

Engineering today is more than an academic or technical discipline, not just applied science. It is a 'mindset' required for evolving solutions to complex needs of the rapidly growing world. The engineering professions have to deal with 'scientific and technological matters, but increasingly also with economical and political matters as well as with ethical, societal and environmental aspects. Engineers today need to be able to work in ever-changing technological, social and working environments and therefore must be educated and groomed with this in mind.

Though the studies reveal that the quality of engineering graduates churned out in mass production from various engineering institutions is questionable, the research presumes that the technical knowledge is fundamental and its importance cannot be disputed, as this forms the general basis from which engineers work. However, technical knowledge alone does not distinguish the best engineering graduate from the rest as expressed by Rosetta Ziegler (2007).

1.9 NEED FOR THE STUDY

The role of engineers today has evolved from an independent, self sufficient and self motivated individual to an interdependent team member of the corporate world. It is therefore no longer adequate for engineering student

to graduate with strong technical skills but also need to possess broad range of knowledge and social behavioral skills.

The biggest challenge and the questions that need to be answered "Are our fresh engineering graduates adequately qualified with the right competencies to meet the demands of industry? It is a paradox. On one side, India is proud to generate and churn out more and more fresh engineering graduates, on the other side, industry opines there are not enough engineering graduates available who are employable. It is time for fresh engineering graduates and academia to appreciate and realize the huge gap that exist between fresh engineering graduates who are churned out in mass and the need of global industry.

1.10 SCOPE OF THE STUDY

The study intends to understand the perceptions of engineering students from various back ground towards employability skills and bring awareness towards this much eluded skills and take necessary measures to bring awareness and measures to impart the much needed engineering employability skills to the undergraduate engineering students that shall help in enhancing the employability skills in the highly competitive global industry. To take necessary measures by the university/colleges and bring accountability to impart the much needed employability skills to the engineering students and help the society at large.

1.11 OBJECTIVE OF THE STUDY

There are enough study and survey carried by scholars across the globe at different levels to identify the various employability skills that are required by the engineering graduate as perceived by the employer and the industry. However, there are few study attempted to know how the engineering student perceives about his employability skills. In this regard the institute/universities have to take the responsibilities in shaping up and transform the belief system

of engineering students about employability skills. According to this need, the research aims to:

a) To identify their present level of employability skills as perceived by the engineering students.
b) To identify the possession of employability skills of the engineering students that is motivated by the engineering institute/university.
c) To identify any organized support/facilities provided by the engineering institute/university to enhance the employability skills of the engineering students.
d) To identify the level of expectation to enhance their own employability skills.

1.12 LIMITATIONS OF THE STUDY

The study is a sample based study and the inferences derived from the analysis and interpretation are expected to be representative of the total population However the study is subject to following limitations:

a) The area of the study is limited to city of Chennai, State of Tamilnadu, India. Hence the sample may have the limitations pertaining to the area, tradition, custom and culture of the people in that place.
b) The respondents belong to the engineering colleges taken for study, hence the data may represent only to the general to the engineering institutions not to the specific institution.
c) The survey was conducted during the period of 2011-2014 in which the inference also based on the period only not able to implement in future engineering institutions.
d) The sample size of this study and area is also limited hence the result may bias when it is implement in huge population and also other than Chennai.

1.13 SIGNIFICANCE OF THE STUDY

According to the report of working group of engineering education of National Knowledge Commission, "Engineering institutions in India currently account for intake of more than 5,00,000 in Bachelor's program and the number is rapidly increasing, mostly in the private sector. This rapid expansion and mushrooming has raised serious concerns about the quality of engineering education in these institutions. Currently, most graduates do not possess the skills needed to compete in the global economy, and the industries have been facing a consistent skills deficit" National Knowledge Commission India (2008).

Till such time, the academicians and the industry understand and appreciate that "Engineering today is more than an academic or technical discipline", the downward trend and the quality of engineering graduates that are produced will continue. Though it is the student who directly bears the brunt for not having acquired the employability skills, the ramifications and repercussions on the society and the country's progress is larger in the field of engineering and technology. It is a collective responsibility of the student, parents, academic institutions, industry, employers, academic policy makers and the auditors to bring sanity to the education system.

The studies and survey carried out by researchers reveal and highlight graduates' struggle in the work place. It also reveals significant conflict between students' self-perceptions and the extent to which employers believe they are prepared for work. The lack of awareness of engineering students on the employability skills that are required to get employed added to the casual approach by the engineering institutes in administering these life skills have only compounded the problem and perceptions of engineering students towards understanding the need of employability skills.

The significance of the study is to bring awareness to engineering student fraternity and the academic institutions to change the perception on what constitute the employability skills and to re-iterate that technical skills alone shall not be the competencies that are required to get employed. The perception based on their belief and little experience of life about employability skills without any timely supporting mechanism to correct and guide them in the direction of desired goal lives them unemployed. It is saddening to note India generates maximum engineering graduates in the world, only second to China, but the employability of these fresh engineering graduates is awfully poor.

1.11 CHAPTERISATION

A brief outline of the various chapters of the thesis is as follows.

Chapter 1: The first chapter introduces the study. It begins with an introduction by attempting to define, Who is an engineer and What is engineering?, the need for the study, the importance of perception about engineering employability skills, significance of the study, definition of employability skills and the attributes that constitute employability skills, theoretical framework of the study, evolution of the engineering education, problem statement, Objectives of the study and recommendations.

Chapter 2: The second chapter reviews the related literature about engineering employability skills, the necessity and measures adopted by few agencies to help acquire these much elusive and wanted skills for an engineering graduate.

Chapter 3: The third chapter deals with the research methodology and the application of various statistical tools towards the study carried out.

Chapter 4: The fourth chapter explains the results of the analysis of the collected primary data from respondents, testing of hypothesis and discussion.

Chapter 5: The fifth chapter portrays summary of the results, recommendations, future area of research and conclusion.

CHAPTER 2

REVIEW OF LITERATURE

Review of literature is an important aspect of any research. With the present depressing level of employability amongst fresh engineering graduates in India and the lack of employability skills, the literature review and the study shall attain significance.

Nguyen (1998) in his research work, makes comparative study of academics, industry personnel and engineering students and presents the results of a survey administered with the objective of eliciting their views on what the essential generic and specialist skills and attributes are for a modern engineer. It is re-iterated that exposing engineering students to non-technical study areas will broaden their skills and knowledge. A survey questionnaire was developed to include seven generic skills and attributes, and several sub-groups within each generic group, from which respondents could make a selection. The paper sums up by mentioning the ideal engineer is expected to possess a diversity of skills and attributes, with technical competency balanced by non-technical competency with right attitude.

SherwynP.Morreale et al (2000) re-inforces the importance of the ability to communicate competently and effectively. To provide credence for this argument, the author has made a conscious attempt to provide description of nearly one hundred articles, commentaries, and publications, which emphasize the importance of communication and the role of the study of communication in contemporary life. With the materials collected the author has developed five major themes supported by sub-themes. These include the vitality and role of communication education in developing the whole person, in improving the work of education, in advancing the interests of society and in bridging cultural differences, and in advancing careers and the business enterprise.

Paul Humphreys et al (2001) having acknowledged the necessity and importance of acquiring soft skills by engineering students such as communication and presentation skills, problem-solving and organizational skills, team-work and leadership skills, makes an attempt to develop a methodology for enhancing transferable skills and to encouraging students to take a more proactive role in assessing their performance. The author developed an Integrative Studies (IS) module at the University of Honk Kong and applied to students for enhancing the transferable skills. The paper suggests curriculum development must focus on utilizing appropriate pedagogic techniques which enhance learning and develop leadership and interpersonal skills.

Derek Glover et al (2002) in its work give a different perspective, while graduateness may be seen as a statement of a level of knowledge, skills and understanding, employability is concerned with the way in which those who have completed university course can be assimilated into national and international employment. This requires command of certain basic skills that may, or may not, have been developed during the graduate course. It re-iterates graduateness alone is not seen as a sufficient basis for continued personal and institutional success in a highly competitive, flexible and globally responsive, environment.

GeorgieWhitton (2002) brings out the economics and education literature on the impact on employability of some of those capacities which have been perceived as 'unobservables'. It argues that by nature, individuals are heterogeneous. Hence, within the same formal education cohort they develop different degrees of competencies. These factors, while essentially unobservable, help to explain the differential job outcomes achieved across occupations and within similar skill and education levels. It remarks that these need to be understood by providers of education, who in turn, need to develop pedagogical solutions and curriculum design to support their development.

Marc J Reimer (2003) conveys that engineering educators should seriously consider integrating the facilitation of Emotional Quotient (EQ) skills in the engineering curricula. In this paper, He recommends how EQ can be incorporated into engineering education. He warns that declining EQ skills in students affect their performance and may lead to higher drop our rates, in turn; this affects the caliber of the engineering graduate in the workplace. The paper clarifies that EQ is very different from IQ. It defends that an engineer with a low EQ will not be of much benefit to anyone, no matter what the level of IQ. It brings out the benefits of high EQ regarding communication skills, time management, teamwork, leadership skills and business acumen.

Nihat M. Gurmen et al (2003) opines it is becoming increasingly important to demonstrate one's critical thinking and creative problem solving skills in addition to the traditional engineering knowledge. It brings out one effective method for improving these skills is the use of interactive computer modules. This can greatly facilitate the learning of trouble shooting skills because of the rapid feedback, the alternate pathways the student may progress and the multiple solutions they can generate. To corroborate the importance of critical thinking and creative problem solving skills, an interactive computer module was developed to troubleshoot the faulty operation of a Plant. The program was designed to encourage the student to troubleshoot the plant with critical thinking skills in situation and decision analysis.

Justo N Hidalgo et al (2004) suggests engineers should be taught peripheral knowledge such as emotional intelligence, economies, or managing abilities in relation to the type of work they have to successfully apply in the future. The paper proposed the use of emotional intelligence as a tool for the teacher to use and to achieve the goal by applying emotional intelligence skills when explaining the technical subjects and focused on software engineering students. It defends that software engineering practitioners face many challenges in their professional daily that are not solved just by applying

technical knowledge and are governed on mathematical, logic, human related laws that is uncertain and stressful. It suggests application of integrated approach through case study based on real project.

April Kedrowicz et al (2006) highlight a unique approach in infusing formal training and practice in oral and written communication and teamwork development. The paper brings out the integration does more than teach students about communication, it teaches students through and about communication enhances students understanding of coursework, and begins to socialize them into the culture of professional engineering. The researcher created an interdisciplinary collaboration between Humanities and Engineering College of the University that fosters active learning of engineering material through speaking, writing, and teaming that turned out to be unique and innovative program that could infuse the communication and teamwork skills.

Sanjay Goel (2006) brings out nearly one third of fresh Indian engineering graduates join the IT industry irrespective of their specialization, but sadly even NASSCOM has underrated some skills such as spoken English, creativity and team working. It makes a comparison between National Academy of Engineers (NAE) of US and NBA of India. The NAE remarks that if engineering faculty, as a group, are to adequately prepare students for practice, then some population within that group must have credible experience in the world of non-academic practice. However, the NBA criterion related to faculty competence does not make any specific mention of such a requirement. This creates a serious disconnect between industrial requirements and engineering education. It deliberates on the suggestions made by The NAE and brings out the essence of engineering and proposed the necessary skills for engineers.

Rosetta Ziegler (2007) convincingly brings out the need and advantages of soft skills and how it compliments along with the fundamental technical skill. The paper explores the notion of “soft skills” in a mechanical engineering

education environment, with particular focus on South African Engineering students views on the role and value of these skills. Majority of the students identified a range of specific soft skills that they need but lack are communication skills, presentation skills, creativity, people skills/interpersonal, project management skills, problem-solving skills, flexibility for teamwork and individual work. The main issue the paper brings out is that students believe that industry expectations are very different compared to those of the university engineering programme.

Robinson and Garton (2007) brings out that students do not realise the importance of possessing transferable skills, and they assume that mastery of skills within their discipline is enough to get that all-important employment. People graduating from colleges and universities often lack the skills needed in the world of work. It brings out the lack of preparation may be the result of three factors including not listening to professors and advisors, lack of participation in class exercises, and an inability to transfer meaning from their experiences into choices that will impact their future.

ArunPatil et al (2008) in his paper has proposed a global engineering accreditation model to achieve global engineering competencies that shall assure uniformity in the engineering accreditation process with a systematic and scientific application of accreditation criteria and assessment for undergraduate engineering progammes. He administered a set of 23 attributes that are found essential to more than 100 employers that has employed engineering graduates. The result brings out the there is a significant gap in many attributes between the expectations of industry to what graduates bring to the work place. The top attributes that had the greatest differences of employer's expectations are Communication skills, Interpersonal skills, Problem solving, Creativity, Time management skills, Team work, Stress management skills and Capacity to learn new skills.

AzamiZaharim et al (2008) believes in Malaysia, engineering graduates have good basic engineering knowledge, however concedes that the local engineering graduates lack oral and written communication skills. He brings out the employability skills framework are based on criteria emphasized for professional skills from the Accreditation of Engineering Programmes (EAC) Manual. He brings out, in Japan, there exist a industrialized curriculum in engineering that is engaged to the Japan Accreditation Board for Engineering Education (JABEE) guideline to integrate employable personal qualities and requirements into the academic curriculum in order to generate skilled engineers. However, it is found that Japanese graduates lack the initiative and problem-solving skills along with communication capability.

AzamiZaharim et al (2008) brings out the existing employability skill development program existing in Singapore.Singapore Workforce DevelopmentAgency (WDA) introduced the Singapore Employability Skills System(ESS) in 2004. The system consists of a set of generic employability skills that is applicable to all industries. It has been identified to increase the worker's effectiveness such as Workplace literacy & numeracy, Information & Communications, Problem solving & decision making, Initiative & response, Communication & relationship management, Lifelong learning, Global mindset, Self-management, Workplace-related life skills and Health & workplace safety.

GurvinderKaurGurcharan Singh and **SharanKaurGarib Singh (2008)** in this study brings out the graduates' perception of the employability skills that they currently possessed and the perception of employers concerning the employability skills needed in the job market in Malaysia. Two set of questionnaire with eleven variables like communication skills, English proficiency, interpersonal skills etc using five point Likert scale which make up employability skills were administered to gauge the employers' and graduates' perceptions. The study reveals the graduates rated their employability skills

on each of the variable as being relatively high compared to the perception of the employers.

National Knowledge Commission India (2008) acknowledges that the exponential increase of private engineering institutions with dwindling quality is a cause of concern. It states that currently, most graduates do not possess the skills needed to compete in the global economy, and the industries have been facing a consistent skills deficit. The report mentions that in the fast evolving industry, requirement regarding generic skills, so necessary for gainful employment, academic institutions must consider an inclusive approach to integrate those skills such as problem solving and logical reasoning (Analytical ability), process orientation, learning ability, english communication and programming fundamentals, but concedes, the present system is devoid of such programmes.

Michael Tomlinson (2008) in his paper brings out the UK government continues to emphasize on the importance of higher education credentials, at both a social and individual level. Along with the hard credentials, soft credentials are gaining importance and are seen as an important issue of their employability in the labour market. The soft credentials consisting of more personal, social and behavior aspects were seen as being particularly important in the recruitment stage where employers would be assessing graduates' 'live attributes'.

Sam Pitroda (2008) brings out the engineering education is among the key enablers of growth for transforming India's economy. He brings out that several recent studies have flagged the problem of unemployability of engineering graduates, largely because curriculum and syllabi are not quite compatible with industry requirements and the need to address them by reforming the regulatory framework, improving governance of institutions, attracting and retaining faculty, curriculum reform, integrating science and engineering education, encouraging research, industry-academia interaction,

improve access and mentoring. He re-iterates the teaching/learning process should be on integrating skills such as problem solving, logical reasoning, process orientation and english communication encouraged with industry participation.

YuzaineeMdYusoff et al (2008) in his theoretical study observes the need to examine the various engineering employability skills that have been identified by several countries in Asia such as Malaysia, Japan, Singapore and Hong Kong. He also attempts to compare the existing similarities and difference of engineering employability skills needed by employers in these four different countries. It is interesting to note the perception and frame work of employability skills within the neighbouring countries that has different culture, ethics, economical condition and value system. It is brought out that employer's expectation and perception play an important role in determining the essential skills needed.

Chung-Khain Wye and **Yet-Mee Lim (2009)** attempts to investigate if the undergraduates' core competencies are able to meet with the requirements set by the employers and to analyse the effectiveness of personal qualities and skills development. The author brings out the wrong perception and mind set, that a remarkably outstanding CGPA obtained is a key for seeking employment. A survey was conducted on two different samples, namely employers and undergraduates. The result brings out the mismatch of different personal qualities and skills. The paper suggests the universities should develop their courses of study for the undergraduates program that shall change their attitude and perception with a view of employers' dimension about employability skills.

Johan Esbach (2009) in his research examines the concept 'Engineering Entrepreneurship', looking at the contribution that engineers make towards a rapid changing technological environment that support the growth of South African economy. The paper brings out though

Entrepreneurship is relevant in a changing society and engineers have a role to play in job creation and developing sustainable endeavours, engineering education system at South Africa does not encourage entrepreneurship as a career influence. It re-iterates that the entrepreneurship is the technological, career and innovative arm of engineering and is convincing to accept entrepreneurial firms are synonymous with job creation and entrepreneurship is an important alternative employment mechanism.

John V. Farr and **Donna M.Brazil (2009)** explore the changing nature of engineering in a globally competitive environment and address why leadership must become a key issue in the career progression of engineers. It brings out that Leadership for engineers is more complicated than most other sectors because, in addition to the traditional skills needed to excel, an additional dimension of technological leadership and governance is required. It suggests the Leadership development experiences during engineering graduate training must be reinforced. The paper re-iterates giving exposure at the undergraduate level may offer the impetus for young engineers to understand the importance of leadership skills.

Ruth Bridgstock (2009) argues that in the context of a rapidly changing information and knowledge-intensive economy, employability involves far more than possession of the generic skills listed by graduate employers. He suggests, for optimal economic and social outcomes, graduates must be able to proactively navigate the world of work and self-manage the career building process. He suggests the importance of self-management and career building skills to lifelong career management and enhanced employability throughout the career. Though the paper predominantly refers to the enhanced graduate employability skills through career management skills in Australia, Canada and U.K., it has relevance to our Indian system.

Saravanan (2009) aims at exploring the skills set required for sustainable employability of engineering graduates in India. He suggests two different models that facilitate learning related to soft skills. The first one is 'Stand Alone Subject Model' in which the students are encouraged to make additional courses, which are in no way related to the main courses. The second one is 'Embedded Model' that incorporates the soft skills in the teaching and learning activities across the curriculum. This model is based on student centered learning and it focuses on problem based learning.

Weligamage (2009) brings out enhancing graduate employability skills is considered as an important task within the Sri Lankan university community. The paper makes a comparative study on the employability skills within Sri Lanka and other countries. It gives a new concept in which the higher education institutions (HEIs) should consider both students and employers as customers in higher education. The paper addressees changing business environment and emphasize the importance of education for employability, focusing on the development of key skills. The paper brings out that the Universities have taken action in this issue and it emphasizes the HEIs need to identify the skill sets that will best serve the future labour market and ensure those skills are taught as part of their curriculum.

ZaidatolPihie (2009) conducted a study to determine university students' perceptions on entrepreneurial self-efficacy and entrepreneurial intention. He brings out the qualities of self-efficacy and personal self belief is an important factor that motivates individuals to demonstrate entrepreneurial behavior. It convincingly brings out the purposeful education enhances students' entrepreneurial efficacy through providing them attitudes, knowledge and skills to cope with the complexities embedded in entrepreneurial tasks. The findings suggests that to improve university students' entrepreneurial intention and self-efficacy, certain teaching strategies need to be conducted in addition to

the traditional ones, since these are beneficial to both a self-employment and employment career path.

ZakiShkairSeddigi (2009) brings out the need to understand the personality characteristics of engineering student when teaching strategies for the class are worked out. The study compared the personality of Saudi and Canadian Engineering students and realized that the personality differences of the students made it necessary for instructors to diversify those teaching strategies. It brings out that as the engineering attracts broader cross-section of personality types of students, it is imperative the educators understand this psychological factor in adopting the teaching style.

AzamiZaharim et al (2010)focussed on an acceptable and practical framework of engineering employability for Malaysian engineering graduates that are firmly based on requirement by accrediting bodies and professional bodies and existing research findings in employability skills. The author attempts to create a frame work to test the skills which is theoretical and needs to be validated. The author suggests, once framework is validated with research methodology, it shall be a useful tool to develop a model and measure engineering employability skills. It further states the usefulness of the tool for lecturers, career advisors, trainers, employers and any other practitioners involved in employability skills.

AzamiZaharim et al (2010) in the paper on "The comparison on priority engineering employability skills" gives an interesting insight of employability skills as perceived and defined by several countries such as United Kingdom, Australia, United States, Canada, Japan, Europe and Malaysia. All these countries has identified the employability skills and developed a national framework with common features to clarify the specific needs of these skills. Though the frame work identified by these countries show a number of similarities needed in entry-level engineering graduates, interestingly they have agreed that there are five most important employability

skills for engineers –Communication skills, Teamwork, , Problem solving Professionalism and Lifelong learning.

Colin U. Chisholm (2010) acknowledges Emotional Competence (EC), based on the components of Emotional Intelligence (EI) is now emerging as a core set of skills, which needs to be included in the future engineering curriculum. Towards this, a study on EI was carried out in which the students were drawn from three distinct areas of engineering, humanities and business management to facilitate observation of similarities and differences in EI levels. The result pronounces the engineering students were relatively low on Emotional Understanding scale. The reason attributed is that the engineering courses are less reflective in nature and have less open ended discussions. The study suggests that the current instructional delivery methods need to be reviewed with a view to improve opportunities to integrate the development of various EI components.

GautamBiswas et al (2010) aim at developing a comprehensive assessment of the status of engineering education in India in the light of the increased global expectations from the engineering graduates. The study targets examining challenges being faced in terms of access, equity, regional imbalance and quality. It also aims at analyzing the weaknesses of the present system and identifying the requirements of modern teaching learning process and suggests measures for improvement in faculty qualification and competency.

G.S.Popli and **Rao,D.N (2010)** aimed at studying the entrepreneurial orientation and inclination of final year engineering students of Delhi region and make suggestions for fostering entrepreneurship among engineering graduates. In the study conducted, in a sample size of 200, 68% of the engineering students would like to start business but lacked confidence in themselves due to lack of entrepreneurship skills. Almost 80% of young engineering students want change in course contents with entrepreneurship as a

main subject. The paper suggests, both engineering education and industry have to play a very active and vigilant role in making engineering entrepreneurship more attractive.

Jenna Tudor et al (2010) highlight the importance of considering students' perceptions and approaches to undergraduate engineering education. The author brings out it is essential to understand how students perceive their learning contexts at university and how these perceptions influence students' approaches to their studies. It brings out Engineers today need to be able to work in ever-changing technological, social and working environments and therefore must be educated and groomed with this in mind and this is also significant in a developed country like US. It also argues that being aware of students' perceptions of identity and the factors causing barriers to developing professional engineering identities should be investigated to develop strategies within higher education settings.

Venetia Saunders and **Katherine Zuzel (2010)** have evaluated the employability skills from the perspective of students and graduates in bio molecular science, and their employers. It describes the procedures used to identify and prioritise the specific employability skills required by potential employers of bio scientists. An 'employability skills' questionnaire was designed for employers and students. The skills were differentiated into three categories as personal qualities, core skills and subject knowledge and were asked to prioritise based on importance. It was revealing that the employers ranked personal attributes and core skills more highly than technical and subject-specific skills. Though there was strong convergence on the perceptions of the relative importance of the different skills, students rated technical skills more highly than the employers.

Andreas Blom and **Hiroshi Saeki (2011)**re-iterates insufficient supply of quality skills is one of the main impediments to further economic growth in India. The paper attempts to seek answers on skills considered important by

employers when hiring new engineering graduates, are the employers satisfied with the skill sets possesses by engineering graduates and the skills that engineers are falling short. One of the interesting fact the study brings out is the soft skills developed by engineering graduates are influenced by the family settings, schooling environment and economical condition of the student. The paper identifies that the skills set of engineers can be characterized by three overall skill factors as core employability skills, communication skills and professional skills.

AneteMezote (2011) of Latvia brings out besides specific profession-related skills, it is also necessary for an engineering graduate to have good cross-cultural communication skills in order to ensure successful business co-operation with international partners, in today's business. It re-iterates in the global and modern world, it is necessary to cooperate and understand culture of other members, therefore the cross-cultural competence has to be promoted during the university education. In the survey carried out as a part of the research, it confirms majority of the surveyed graduates of engineering lack cross-communication skills resulting in lack of cross-cultural competence. It recommends integrating development of cross-cultural competence into the curricula of the engineering at the Latvia University.

Chandrasekar (2011) tries to probe the various employability skills that employers demand from job-aspirants while hiring students and the reasons for low level of employability skills among students. He has been critical that there is a wide gap between what the educational institutions are churning out and what the industry expects. Certain qualities such as communication skills, interpersonal skills, integrity, right attitude, problem solving, decision making and team building skills can be taken as a few common skills vital to the job. He stresses that the reasons for low employability skills among students are non availability of qualified faculty, outdated curriculum not industry specific, teaching learning process is in

mother language or local language, mushrooming growth of institutions and there is no connect between the industry(consumer) and the academic institutions(supplier).

Eszter Andrea Rady (2011) in this paper reveals the necessity of University of Debrecen in Hungary to realize the quality of engineering training, as well as the competence of engineering students will greatly influence the future and the method adopted by them for improving the interpersonal competence of both Hungary and the rest of the world, and people's quality of life. It is this realization, considerations as well as the growth of the nation was at stake that demanded the University to implement two elective subjects entitled "Self-knowledge" and "Personality Development".

Harry Siu-lung Ku et al (2011) indirectly conveys the hard and bitter truth of engineering leadership program in India. It brings out that 80-90% of the engineering leadership programs offered explicitly across the globe were based in the United States of America and mentions there is a noticeable lack of this program in Europe and Australia, particularly in engineering undergraduate curriculum. It states the primary purpose of offering leadership programs within the engineering education domain is to produce engineer leaders for the engineering community and society and interestingly communication and teamwork skills are most important components of any engineering leadership program. It brings out 90% of the leadership programs studies had made use of professional industrial partnerships.

Kanagaluru (2011), though does not research on employability skills, makes a qualitative study to ascertain the expectations and perceptions of students in engineering education in private engineering colleges that leads to satisfaction. The questionnaire was designed with the help of 4-point Likert's scale with 33 different statements and the various dimensions that are considered for the study include placement, infrastructure, extracurricular

activities, education, students' development, educational material and college environment in India. The study reveals that the highest gap between the expectations and perceptions of the students was found in the education dimension and the students were not happy about the education they are getting for completion of engineering course.

Kay A. Hodge and **Janet L. Lear (2011)** makes a comparison of perceptions of college business faculty and students regarding the business competencies to get a job after graduation. The analysis showed significant differences between faculty members and U.S. students in areas of management, time management, personal management, critical thinking, problem solving, writing, speaking and leadership and between faculty members and international students in the areas of time management, personal management, critical thinking, writing, speaking, listening, ethics and the value of a 2nd language. This study has a lot of relevance to my research work.

KriengsakPanuwatwanich et al (2011) stresses that projects play an important part in all engineering sectors and successful projects require effective project management (PM). It aims to identify essential PM knowledge areas that engineering graduates require in their early career, with the outcomes expected to provide implications on the design of engineering PM. The study utilised an online survey research method to seek opinions regarding the PM skills required of engineering graduates from professionals employed in Australian engineering organizations. The study reveals that the perceived PM skills are lower than their perceived importance and the three most important project knowledge areas are Scope, Time and Cost Management.

Kevin Lowden et al (2011) towards his research work for University of Glasgow brings out employers expect graduates to demonstrate a range of skills and attributes that include team working, communication, leadership, critical thinking, problem solving and often managerial abilities or potential.

The paper brings out that there is a lack of systematic practice to promote employability across higher education institutions (HEI). The paper re-emphasizes the design of degree courses and student experience in general should articulate with the needs of business and emerge from a strong working partnership with employer organizations. While reflecting wider economic needs in HEI courses, it re-iterates those responsible for higher education provision should take into account students' employment needs.

Lord Baker of Dorking (2011) in his foreword for the paper by Kevin Lowden et al (2011) lucidly comments "There are many reasons for going to university including –naturally, a love of the subject to be studied, and the opportunity to experience a different way of life. Higher education is much more than production line for work-ready graduates. Nevertheless, there is no denying that people see higher education as a stepping stone to a good job. In 2010, 73% of the students who took part in the Sodexo University Lifestyle survey said they went to university to improve their job opportunities".

NizoroyaniSaibani et al (2011) acknowledge the need to recognize Emotional intelligence (EQ) as a counterpart to Intelligence Quotient (IQ) to achieve high academic excellence and career development for engineering graduates. The study concentrated on the use of Malaysian EQ Inventory (MEQI) test to look at the relationship of the domains (Self-awareness, Self-regulation, Self-motivation, Empathy, Social skill, Spirituality and Maturity) encapsulated in the EQ model in measuring EQ level. The paper asserts that even though these EQ domain skills can be considered secondary to the primary objective of any tertiary education, it is vital for the students to develop high EQ level as they are more desirable in the job market as they would project leadership and managerial skills.

Lather Anusingh and **Khatri Puja (2011)** have expressed that private participation in professional education has brought changes in the perception of the society and students, from such education being a welfare activity to a

business activity. It explores the expectation and perception of management students regarding quality and support services in their institute. It defends that the private participation in professional education is a business and the self financing institutions comprise of an industry with students entering them as consumers and coming out after skill developments as products. It brings out the individual characteristics of human beings is believed to have an impact on behavior and hence it is pertinent to study the effect of these characteristics of students on their perception of cost, quality, and support services available in an institute.

Veeranna et al (2011), addresses the quality issues in engineering education with an Indian perspective. It brings out the various issues with a quality perspective such as Relevance of curriculum, Leadership and team works, management responsiveness, Human value and ethics, Effective curriculum implementation strategies, Improving institutional academic climate, Attitudinal change for achieving excellence, Industry and other institutions interaction, Self learning and self paced learning, Effective evaluation system, Contribution to multi lingual and multi cultural, Government funding and regulation etc. The paper brings out different quality indicators for students, faculty and the institution that shall bring quality consciousness in the engineering education system.

Danielle George and **Paul Rawlinson (2012)** aims to explore how engineering graduates perceive, invest in, manage, and develop their employability. It attempts to address improving the employability prospects of engineering graduates, looking at both the academic and the industrial perspectives. The paper brings out the employability prospects with the university perspective and states it is no longer good enough for top class universities to educate students in a chosen subject discipline, but also in the softer skills. The paper convincingly brings out the need for addressing the

employability at university level. Graduates from universities who do not address this may find it increasingly more difficult to secure employment.

Stringer, K, et al (2011) in his study brings out preparing for an adult career through careful planning, choosing a career, and gaining confidence to achieve career goals is a primary task during adolescence and early adulthood.The study bridged identity process literature and career construction theory by examining the commitment component of career adaptability, career preparation (i.e., career planning, career decision-making, and career confidence), from an identity process perspective. This study further strengthens my research on the importance of formation of a perception in early childhood and in the adolescent age towards career building.

Edmond Byrne (2012) reflects the UK's policy on Higher Education on different aspects of employability skills to assist from the point of view of employability. The paper argues that while the development of generic skills is a vital trait along with the explicitly stated technical skill, it is critical that graduates are equipped with the necessary attributes and vision. The paper emphasizes that the ability to meet and embrace uncertainty, complexity and exhibit new entrepreneurship skills is a feature which may also help satisfy their less obvious long term interest of sustainability and survival. The author devised a model aimed at understanding of the context, nature and prevalence of uncertainty and complexity as these relate to engineer/engineering practice.

Gaby Atfield and **Kate Purcell (2012)** in its work bring out various attempts made to establish which skills are most sought-after by employers and the most useful for graduates. The paper tries to make a fit between graduate labour market supply and demand. It studies the third year UK undergraduate degree final year students' perceptions of the skills they have to offer and the skills employers seek. The perceived skill level of undergraduate students vary with gender, background, reputation of institutes, vocational courses undergone, subjects chosen during the course. The students studying numerate

subjects like mathematics, engineering, technology and science believe that their subject was greater advantage than the skill sets.

InayatullahKakepoto et al (2012) in his study express the importance of oral communication for engineers at workplace. A sample of 32 engineers were administered the designed questionnaire that used a 5-point Likert scale on various facets of communication skills. The results indicated that oral communication skills such as oral presentation, participation in meetings, conversation, discussion and negotiation skills play significant role for engineers at workplace. The paper brings out that engineers spend 60% of time communicating with people at workplace, hence these increased communications demand effective oral communication skills of engineering graduates to perform workplace jobs successfully and productively.

KesavaRao (2012) aims at suggesting some engaging methods and sources of teaching the soft skills, particularly in the communications domain, that is glaringly lacking amid Indian engineering students. The attempt is to reduce the yawning gap between industry requirements and the present inadequate skill levels of students and enhance their employability and job-readiness. It suggests that classroom simulation is one effective method to really create a workplace ambience and would teach workplace culture effectively and take learners closer to the life roles. It suggests a range of new material like cartoons, fantasy stories, anecdotes and poems on cricket, advertisements, sports commentaries, episode from films, and newspapers would involve learners directly in the learning process.

Lewis Barber (2012) undertook a project for University of Gloucestershire on graduate employability and sustainability to investigate its external trends and students views. A survey was administered and the questionnaire was framed to find out the steps to be taken that is important to improve employability and work-focused learning. Some interesting findings are that students are proactive in pursuit for employment related learning.

Creative problem-solving, innovation and teamwork were rated as the top three skills for building sustainable societies. The study reveals majority of students seem to be unaware of the value of sustainability skills of employment. The key issues that the project brings out the University are to look at ways to refine its employability and sustainability activity.

MohdSahandri et al (2012) in their study reflect the experience of recruitment graduate engineers. The author discovers the suitable aspects that can be combined to fulfill the employers' requirement and modeled it as APEC (Academic, Personal, Exploratory and Connectivity) model for employability profiles. The author uses the Gap analysis tool to determine the gap in terms of employability skills which are crucial for the employee recruitment process. One interesting finding is the variables including connectivity skills and exploration skills contribute and give great effect to the academic and personal management skills. The findings show that all the elements of APEC model have mutual-relationship in order to build a perfect model for graduates' employability profiles.

Monika Aring (2012) in its report on skills gap in India clearly brings out the rigorous analysis done by the World Bank that finds serious skills gaps among India's engineers, who according to employers, lack, all important soft skills and higher thinking skills. Interestingly, the report brings out though efforts are been made by Federation of Industries and Employers in identifying the skills gap and attempting to bridge the university and industry needs, there is no effort to link the secondary schools, vocational schools and industry. This reconfirms that perceptions of the young and adolescent towards employability skills is not appreciated and corrected appropriately.

Padmini (2012) opines, employability skills were considered to be primarily of a vocational or job-specific nature, they were not thought to include the academic skills most commonly taught in the schools. However, it elaborates the current thinking has broadened the definition of employability

skills and has included not only many foundational academic skills, but also a variety of attitudes and habits. In today's highly demanding and competitive World, the definition of engineering employability skills has transformed globally to meet the industry and business needs.

Padmini (2012) addresses the gap between the education and employability among the engineering and management graduates from Andhra Pradesh. It identifies the employability skills required by young graduates and assess how there can be a value creation through effective knowledge management in terms of pedagogy, evaluation process and feedback mechanisms. The issues brought out that are grave and plagued are curriculum, lack of quality faculty, and poor quality of content and not-so-effective examination system. It bring out a possible reason for higher education institutions failing to address the employability skills of its students could be because college faculty do not understand what the lacking skills are and do not possess the necessary resources to teach them.

Dharmarajan, P.V., et al (2012) in his research article has carried out an investigation on the impact that the soft skills have on the life of a student in his student life as well as the impact they have on his life thereafter when he becomes a professional. This paper explores why Soft Skills are essential and compulsory andcomplement hard skills, which are called technical requirements of a professional for which a student undergoes rigorous training in college. This paper urges teachers, faculties and trainers to take individual responsibility in the aspect of training students in Soft Skills, Faculties, who teach / train them have a great influence over them because they spend most of their time with them.

TiwariAnoop Kumar (2012) brings in a different perspective to soft skills, though the paper acknowledges the soft skills, it adds a new dimension called Cognizable soft skills. It opines there are innumerable skills which compliment a hard skill but if they can be quantified in regard of their role and

application they are called cognizable soft skills. The author opines that the perception differs from context to context. A field is a soft skill in one area, and is hard skill in another and also the understanding what should be recognised as soft skills varies. It re-iterates communication skill is an important cognizable soft skill and an understanding and command over the English language is a most important determinant of access to higher education, employment possibilities and social opportunities.

Sukhwinder Singh Jolly (2012) views engineering graduates are expected to be employable and be ready for the workplace when they complete their studies. It is expected that graduates should be equipped with a balance of technical knowledge in addition to the relevant soft skills required in the workplace. It suggests soft skills training should be a part of curriculum and recommends orientation program, personality development program, soft skills development program and special program on Group Discussion, debate and interview skills need to be arranged methodically during the engineering education.

YuzaineeMdYusoff et al (2012) presents a method to evaluate the performance score based on employability skills for new engineers using Normalised Skill Weight and suggests employers and undergraduates to calculate the skill level by this method. The finding shows there is a huge weight difference among the skills required by the industry and level of skills shown by the undergraduates. It recommends the employers, who need to evaluate the quality of engineering graduates during interviews might find this approach more effective in selecting new engineers.

Balaji Reddy et al (2013) tries to focus on why effective communication skills are incredibly important and analyses the problem amongst engineering students and attempts few suggestions that are highly beneficial in overcoming the most common communicative problems of engineering students. The paper re-iterates the facets of good communication

skill are speaking skills, listening skills, writing skills, reading skills and body language. The author shares their experience through interaction from engineering students and few of the problems faced are Lack of confidence, Psychological pressure, Lack of exposure to English speaking, Fear, shyness and Inadequate practice.

Chithra R (2013) aims to identify the skill gap of engineering graduates who wish to join the Software industry. It intends to study the perception of employers as well as employees towards employability skills required for Entry level engineering graduates in multinational software companies. The paper cites that the shift from production oriented engineering jobs to service oriented engineering jobs demands professionals with both sound technical and behavioural skills to attain and retain the job. Through an exploratory study, it brings out the employers gave due importance to behavioural skills whereas students gave importance to technical skills. This difference in the perception points out there is a strong need for creating awareness among the students about engineering employability skills through specific training.

DeepshikhaMehra and **Vinita Virgandham (2013)** ascertain the global viewpoint as well as the Indian perspective on the specific types of communication skills required by engineers in order to become employable as well as successful at workplace. The paper cites various parameters and measures adopted by different institutions/university globally to acknowledge the importance of communication skills for young engineering graduate to be employable in the global business environment. It brings out the ill effect of lack of communication skills includes lack of organizational skills, unclear expression of ideas, poor verbal skills, difficulty with writing introductions and conclusions with weak logic. It suggests an integration of communication and adaptive skills would help engineers learn the functional aspects of the English language better.

Mohammed Shamsuri et al (2013) in this study seeks to explore the employers' perceptions of the employability skills that technical students need to possess, as well as assessing the employers' level of satisfaction with the students' employability skills. The finding acknowledge the employers' perception of the importance of employability skills and ranks the ability to undertake problem identification, apply problem-solving, formulations and solutions as high priority whereas having basic entrepreneurial skills and competency in theoretical and research engineering as the least priority. The paper recommends that the University could take up to equip the students with the skills identified by the employers and to implement techniques and methods of problem identification and problem-solving.

Jackson D (2013) has undertaken the study to emphasize that developing employability skill in business undergraduate programs will enhance graduate work readiness. The study was carried out in a West Australian university that has students from different demographic and background. It is found the students' perception on various attributes varies based on demographical background. It reveals that the self-awareness is more important to those for whom English is not their first language. Problem solving is more important to international students, more specifically those born in Asia, and for those whom English is not their first language. The results indicate students assign greatest importance to working effectively with others and communicating effectively and least importance to analyzing data and using technology and developing initiative and enterprise.

JainabZareena and **YasmeenHaider(2013)** bring out a new dimension to the self perceived attributes for employment. The study investigates the strong correlation that exist between independent variables such as knowledge, skills and ability and dependent variable that is confidence level of students in getting recruited. It brings out that irrespective of the type of institutions, students with better knowledge, skills and ability are highly confident of

getting employed as compared to those graduates who are low on these attributes, as they will automatically instill a sense of confidence in getting recruited.

SateeshHegde (2013) looks into student's understanding of employability skills and looks into initial findings of qualitative data of students interviews. It brings the program run by the government on skill development, unfortunately the opinion of the students is not considered to a large extent. The study is based on the opinion of final year students at government degree colleges in Karnataka. They considered communication, team work, computer internet skills, attitude are the important employability skills. It suggests that the students must be made aware to use opportunities in the college to acquire these skills.

ShikhaSeetha (2013) attempts to emphasise the necessity of incorporating soft skills training programs in curriculum, highlighting the objectives of soft skills and various teaching methods to be applied. It suggests personality development through soft skills training should be conducted in three modules such as Business communication, Behavioural skills and Personal Interview. It suggests the teaching methods in the soft skills training should include lectures, projects, role plays, quizzes, and various other participatory sessions that should be interactive in nature. To make the soft skills program more and accountable and credible, the author proposes the method of evaluation on soft skills program has to be credit based and the evaluation of the students has to take place on a continous basis.

SwarnaLatha (2013) comments it's a very paradoxical situation, though there are enormous job opportunities and abnormal growth in producing engineering graduates and management graduates in India by professional colleges, there is severe dearth of employable graduates. One of the reasons for such a precarious situation is the young graduates lack soft skills, leaving a serious threat to the economic boom thus affecting the effectiveness and

growth of Indian talent pool. Main reason for this lacuna is lack of awareness and little scope for the engineering undergraduates to approach any workplace during the period of their study. The paper brings out the five behavioral soft skills one need to acquire prior to their entry into MNCs are Effective Communication, Presentation skills, Attitude/Personality, Decision Making and Motivation skills.

VarshaGoyal (2013) brings out the importance of interpersonal skills at workplace as the workforce is continuously facing challenges from pressure of workload, working with groups/teams/stakeholders and changing workplace environment. The study brings out the interpersonal skills as one of the most importance soft skills that need to be acquired by the engineering graduates as it fosters effective communication at the workplace and for achieving business performance.

VenkateshBelagodu (2013) attempts to focus on the perception of the final year engineering students on the skills required for being employable. He emphasizes it is the responsibility and inevitable for the fresh engineers to realize what they know and what they should be equipped with to obtain and sustain a gainful employment in today's dynamically competitive world. He conducted a survey of final year engineering students through a questionnaire designed to address different aspects of employability. Though communication skills followed by positive attitude have been identified as the most required under soft skills by the students, it is alarming to note that there is poor perception of skills perceived by students as required by industry for employability.

Vijayakumar.M and **Ramalingam. S (2013)** intends to enable the right production of future engineers as per the recruiters' expectations. They developed an instrument consisting of skills like Core employability skills, Communication skills, Professional skills and circulated it among the top 5 companies. In the rank analysis carried out Core skills ranked first (57%) way

ahead of Professional Skills ranked second (27 %) and Communication Skills ranked third (15%). The paper re-iterates that though communication skills appear to be less important but it is the main factor considered while selecting a candidate in the interview process. The other attitudinal and affective skills that were rated high and preferred are flexibility, Willingness to learn, Emotional stability and Empathy.

Vijaya K.R (2013) compares teaching soft skills to technical professionals through technology versus Practical intelligence. The paper argues though there is a growing awareness that technical skills alone are insufficient for success in companies, resulting in trainers of soft skills using web technology and extensive use of e-learning in classrooms, but warns the positive impact of this use of technology is questionable, since they lack practical intelligence. The paper convinces E-learning technology is eminently suited for basic technical skills training but sometimes do not meet the needs of future professionals. The paper summarises soft skills have to be learnt through practical intelligence through a trainer that will bring self-awareness, social awareness, communication skills, interpersonal skills, team work, entrepreneur skills and various other skills.

GisellRampersad and **Fay Patel (2014)** presents an exploratory discussion framed around a study that examines student and employer perceptions on how creativity in leadership can be developed through a work-integrated learning approach for innovation and enterprise students in a science and engineering program.The qualitative results reflected the trend of conceptualization of creativity as a learnable and teachable process. Results confirmed the importance of creativity as a desirable graduate attribute with important implications for employability and improve level of confidence in one's ability to undertake work. The paper suggests the higher education institutes must step up to the challenge of inspiring tomorrow's leaders to

demonstrate creativity in leadership through an authentic curriculum design for employability.

Muhammad K. Al-Alawneh (2014) measured students employability skills as they are perceived at Yarmouk University. It interestingly brings out the students who got enrolled for the life skill program, a elective subject in the colleges had a clear edge on domains like coping with stress, empathy and interpersonal relationship. It suggested that the perceptions will change on employability skills, if this elective is made compulsory for all the courses and should have more levels of life skill development programs that focuses on communication skills, team work, interpersonal skills, empathy, coping with stress which will prepare the students to get prepared for the job opportunity and employment.

Soumen Mukherjee and **Lesile Ramos-Salazar (2014)** provide a constructive evaluation and analysis of the role of business etiquette for managers in an international arena, within the context of cross-cultural communication. It submits that in the era of globalization, the influence of culture on business is noticeable and significant. He strongly opines and intends to explore the role of business etiquette in today's organizations across various cultures and to appreciate the values and expectations of different cultures. It re-iterates that inter-cultural communication in global economy provides pragmatic tools about how to define a communication strategy, train people and conduct business talks in order to achieve success.

Sunitha .G (2014) had conducted a study on the importance of etiquettes for a professional and it emphasizes that every employee should know about his behavior and its result. As the paper brings out various issues relevant to etiquettes, it also covers business etiquettes such as dressing etiquette, resume etiquette, interview etiquette, workplace etiquette, eating etiquette and e-mail etiquette. It re-iterates the way to build positive

relationships in the business world is by exercising good etiquette, specifically by exhibiting top-notch communication skills.

TaheraMannan (2014) in this paper highlights and discusses the importance of soft skills in ensuring the success of careers in engineering, the need to understand the non-technical skills and corporate dynamics. It also throws light on how soft skills are directly proportional to one's personality. It also shares what the company looks for in new engineers and gives an insight on how to handle interviews.

Olaitan, Olawale.O and **Ikeh, Joshua. O (2015)** through this study brings out the importance of entrepreneurial skills are important attributes and form part of employability skills. It reflects that the small scale industry and its development plays a important role in the developing countries, whereas the skill set required are far from desired. The study is on the setting up of small scale automobile workshop in Nigeria, it was found that good personal presentation,commitmenttowork,teamwork,problemsolving, communicationskills decision making, co-ordinating and directing should be possessed by any individual aspiring to set up the business should possess. The population for this study is 1,500 registered automobile engineers operating small scale auto mobile workshop in Nsukka urban, Nigeria.

There are enough study and survey carried by scholars across the globe at different levels to identify the various employability skills that are required by the engineering graduate as perceived by the employer and the industry. However, there are few study attempted to know how the engineering student perceives about his employability skills. The study shall given a new dimension about the perception and its relevance towards the employability skills and the role of various stake holders including the students, parents, society, teachers and the Universities/Institutions.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter deals with the research framework and the hypotheses of the present study. Primary and Secondary Data were collected for the study. Primary Data is collected from respondents, the respondents studying in engineering institutions have expressed their views regarding their present employability skills, expectations, support given by the institutions and satisfaction level towards employability skills in engineering institutions were discussed. The Secondary Data was collected from refereed journals, magazines, newspapers and websites. An overview of the research design, sample design, calculation of sample size, details of pilot study and statistical tools used for analysis is included in this chapter.

3.2 RESEARCH METHODOLOGY

Research methodology is a way to systematically solve the research problem. It may be understood as a science of studying how research is done. In it, we study the various steps that are generally adopted by a researcher in studying his research problem along with the logic behind them. It is necessary for the researcher to know not only the research methods/techniques but also the methodology. It is necessary for the researcher to design his methodology for his problem as the same may be different from problem to problem. From this, we can conclude that research methodology has many dimensions and research methods do constitute a part of the research methodology.

3.3 RESEARCH DESIGN

The formidable problem that follows the task of defining the research problem is the preparation of the design of the research project, popularly

known as the “research design”. Decisions regarding what, where, when, how much, by what means concerning an inquiry or a research study constitute a research design. “A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure”.

The research design is the conceptual structure within which research is conducted; it constitutes the blue print for the collection, measurement and analysis of data. The design includes an outline of what the researcher will do from writing the hypothesis and its operational implications to the final analysis of data.

The overall research design can be divided into the following parts:

a) The sampling design which deals with the methods of selecting items to be observed for the given study.
b) The statistical design which deals with the question of how many items are to be observed and how the information and data gathered are to be analyzed and
c) The operational design which deals with the technique by which the procedure specified in the sampling, statistical and observational design can be carried out.

3.3.1 Sources of data

The task of data collection starts after a research problem has been defined and the research design chalked out. There are two types of data.

a) ***Primary data*** are those which are collected afresh for the first time and are original in character. The primary data was collected with the help of a questionnaire consisting of 29 attributes.

b) ***Secondary data*** are those which have already been collected. It can be obtained and compiled from journals, magazines, doctoral thesis, working papers, newspapers and websites.

3.4 SAMPLING DESIGN

A sampling design is a definite plan for obtaining a sample from a given population. It refers to the technique or the procedure that the researcher would adopt in selecting items for the sample. Sampling design is to be decided in advance before taking up data collection work. The sampling design should be reliable and appropriate for the research study. The sample chosen for this study represents the characteristics of the population in terms of family background, branch of engineering, sex, colleges, etc.

3.4.1 Sampling Methods

There are many methods of sampling when doing research. The various methods available are broadly divided as probability and non probability sampling methods are as brought out. Though, in general, researchers prefer probability sampling method, however, research involving applied social science, there may be circumstances where it is not feasible or theoretically sensible to approach probability method. The research work undertaken by the researcher has adopted the convenience method under non-probability sampling method. The brief introduction on each method is brought out in the subsequent paragraphs.

a) Probability sampling

1. **Simple Random Sampling**

Simple Random Sampling refers to that sampling procedure in which each and every unit of the population has an equal opportunity of being selected. To ensure randomness, the lottery method or table of random number is used.

2. **Stratified random sampling**

The population from which the sample has to be selected is stratified into mutually exclusive groups. A sample random sample is chosen from each group systematic sampling:

3. **Systematic sampling**

A systematic sample is obtained by selecting one unit at random and then selecting additional units, at evenly spaced intervals.

4. **Cluster sampling**

The random selection is made of primary, intermediate and final units, from a given population.

b) Non-probability sampling

1. **Judgment /purposive sampling**The choice of the sample depends exclusively on the judgment of the researcher.
2. **Quota sampling** is a form of convenience sampling involving selection of quota groups of accessible sampling units by traits such as sex, age, religion and social class.
3. **Convenience sampling:** Convenience sampling means selecting sampling units which are conveniently available to the researcher. When a population cannot be defined, there is no other alternative but to use convenience sampling. This research study uses **convenience** sampling.

3.4.2 Sampling Frame

A set of information used to identify a sample population for statistical treatment. The frame represents a list of the target population from which the sample is selected and ideally should contain all elements of the population. In the study carried out, the sample of engineering students and colleges chosen represent the larger population with similar characteristics.

3.5 RESPONDENTS

Research respondents are people who agree to take part in a research project such as survey, filling questionnaire etc. In this research work, the

respondents chosen were the students from the engineering colleges/ institutions from Chennai.

3.5.1 Research Instrument

Research instrument is the generic term that researchers use for a measurement device (survey, test, questionnaire, etc). Instruments fall into two broad categories, researcher-completed and subject-completed filled by participants. The researcher-completed instruments include rating scales, interview schedules/guides, tally sheets, flowcharts, performance checklist, etc. The subject-completed instruments include questionnaires, self-checklists, attitude scales, personality inventories, aptitude tests, etc.

The instrument adopted by the researcher in carrying out the work is questionnaire based that falls under subject-completed instrument and rating scales that falls under researcher-completed instruments.

3.5.2 Questionnaire

The questionnaire is popular with individual researcher's, public and private organizations. A number of questions are printed in a definite order. It is handed over, posted or e-mailed to the respondents, they have to read the questions and write the answers in the space provided in the questionnaire itself. The questionnaire is a low cost tool when the sample size is large. It is free from interviewer bias and respondents have adequate time to think and fill it up. This method has a low rate of return, questionnaires may be lost some of them may be filled up in a careless manner and may have to be rejected.

3.5.3 Scaling techniques

The respondent using the rating scale judges properties of an object without reference to other similar objects. The ratings may be like "like – dislike", "excellent- good", "average-below average-poor". Three to five point scales are generally used as more points on the scale provide an opportunity for

greater sensitivity of measurement. The graphic rating scale is quite simple and commonly used. Various points are put along a line to form a continuum and the respondent indicates her rating by putting a mark at the appropriate on the line running from one extreme to another.

a) **Itemised rating scale** :This presents a series of statements from which the respondent selects one as best reflecting her attitude or opinion.

b) **Ranking Scales:**The respondents make relative judgments against other similar objects. In social science research, while measuring the attitudes of the respondents the technique of preparing the attitude scale is such that the score of the individual's responses assigns her a place on a scale.

c) **Arbitrary Scale:**These are developed on an ad-hoc basis and are designed through the researcher's subjective selection of items.

d) **Differential Scales:**These (Thurstone type scales) scales are used for measuring attitude towards issues like war, taxes, religions and so on. A lot of time and effort is required to develop them.

e) **Summated Scales (Likert-type scales):**Likert-type scales are developed by using the item analysis approach wherein a particular item is evaluated on the basis of how well it discriminates between those persons whose total score is high and whose score is low. The respondent indicates her agreement or disagreement with each statement in the instrument. Each response is given a numerical score indicating the favourableness or unfavourableness and the scores are totaled to measure the respondent's attitude. In a Likert- type scale the respondent is asked to respond to each of the statement in terms of several degrees, usually five degrees of agreement or disagreement. This research study uses the Likert scale for the questionnaire. The respondents are asked to respond to each statement in terms of five degrees. E,g. Do you feel that you are not able to attend to your family and personal responsibilities due to pressure of work. (Please tick in suitable box).

1. Strongly Disagree	☐	4. Agree	☐
2. Disagree	☐	5. Strongly Agree	☐
3. Neither Disagreenor Agree	☐		

The researcher uses the survey instrument consisting of both questionnaire and rating scales. The survey questionnaire designed is placed as **Appendix**. The questionnaire consists of two sections. The first section relates to personal data of the individual such as age, place of education, parents' education, background, college/institute studying, etc. The second section consists of 12 questions, the first four consist of 29 attributes each that reflects the employability skills perceived by the engineering student and has to be answered using Likert's 5-point scale. Remaining 08 questions are answered using the rating scale.

3.6 SAMPLE SIZE

The sample size was calculated by using the following formula.

$$n = \left(\frac{ZS}{E}\right)^2$$

Where Z = standardized value at 5% level from statistical table.

= 1.96

S = Sample SD (from pilot)

= 0.69

E = Expected Sampling error

= 0.05 (5%)

$$Ln = \left(\frac{ZS}{E}\right)^2 = \left[\frac{(1.96)\ \ (0.69)}{0.05}\right]^2$$

= 731.59

~ 732

Well structured questionnaires were circulated to 732 respondents. 711 respondents have returned the questionnaires after filling it; however 11 questionnaires were rejected due to inadequate data. Hence the sample size chosen for the study is 700.

3.6.1 Pilot Study

A pilot study was conducted. A sample size of 50 respondents was taken to test the validity and the reliability of the parameters taken for the study. As the respondents has understood and filled in the questionnaire, no major modifications were made to the original questionnaire.

3.6.2 Cronbach's Alpha and Test of Reliability

Alpha was developed to provide a measure of the internal consistency (measure of reliability) of a test or scale, expressed as a number between 0 and 1. Higher values of alpha are more desirable.

The standardized Cronbach's alpha can be defined as a

$$\text{Standardized} = \frac{K.r}{1 + (K-1)r}$$

Where 'K' is the number of items, which is 29 attributes in this research work and 'r', the mean of the two non-redundant correlation co-efficient, (i.e. the mean of an upper triangular correlation matrix). Cronbach'salpha is related conceptually to the Spearman- Brown prediction formula. Both arise from the basic classical test theory result that the reliability of test scores can be expressed as the ratio of the true score and total score (Error plus true score) variances. Alpha can take on any values less than or equal to 1 including negative values, although only positive values make sense.

3.6.3 Reliability Test

a) ***Reliability***. Reliability of an instrument refers to the degree of consistency between multiple measurements of variables. It is extent to which an experiment tests or any measuring procedures yield, the same result on repeated attempts. Reliability was estimated through internal consistency method which is applied to measure the consistency among the variables in a summated scale. In the present study, the Cronbach's Alpha co-efficient of reliability was found based on primary data of the present study and the details are as shown in Table 3.1.

Table 3.1 Reliability measures for the study

No.		No. of items	Alpha
1	Opinion	29	0.84
	Basic academic skills	7	0.85
	Self management	5	0.82
	Higher order thinking skills	5	0.91
	Entrepreneurial skills	5	0.83
	Problem solving skills	4	0.86
	Team skills	3	0.84
2	Expectation	29	0.83
3	Support given by the institutions	29	0.91
4	Satisfaction	29	0.87
	Overall reliability of the study	116	0.85

Source: primary data

b) **Validity.** Validity pertains to the extent to which test measures what it claims to measure. It is vital for a test to be valid in order for the results to be accurately applied and interpreted. Both Face and Content validities were established in the study. The face validity was done by the investigator and the content validity was established by the experts

in the field of investigation. Face validity, it appears to measure whatever the author had in mind, namely, what he thought he was measuring. The rationale behind content validity is that to examine the extent to which a measuring instrument provides adequate coverage of the topic under study.

3.6.4 Tools Used For Data Analysis

The following tools have been applied to arrive at meaningful conclusions for the study, Percentage analysis, Descriptive analysis, One-sample t-test, Independent samples t-test, One way ANOVA, Factor analysis, Chi-square analysis, Bi- variate correlation, Multiple regression analysis, Discriminant analysis, Structural equation modeling.

a) **ANOVA** Analysis of variance (abbreviated as ANOVA) is an extremely useful technique in the fields of economics, psychology, sociology and business research. It works by measuring the variance of the population in two different ways first, by noting the spread of values within the sample the second by the spread out of the same means. If the samples are from identical populations, these methods will give identical results.

b) **Chi-Square Test** It is a non-parametric test used to check the goodness of fit for large samples and to establish an association between two categorical variables. It is used to judge the significance of population variance. The test is also used to compare the observed frequencies of an assumed theoretical distribution to draw conclusions about whether or not the given data follows the assumed distribution.

c) **Structural Equation Modeling** Structural equation modeling is a statistical technique for testing and estimating Causal relations using a combination of statistical data and qualitative causal assumptions. Structural Equation Models allow both confirmatory and exploratory modeling, meaning they are suited to both theory testing and theory development confirmatory. Modeling usually starts out with a

hypothesis that gets represented in a Causal Model. The concepts used in the model must then be operationalized to allow testing of the relationships between the concepts in the model. The model is tested against the obtained measurement data to determine how the model will fit the data.

3.7 CONCLUSION

A research analysis requires a good research design to arrive at desired results. Since the survey method needs a good sampling technique together with proper selection of sampling area and sample size to effectively study the population, appropriate steps were taken to ensure that a proper research design is drawn with statistically reliable sampling with tested questionnaire. The requisite variables were chosen for study, relevant hypotheses were set and specific statistical tools were applied for arriving at inferences on the data.

CHAPTER 4

DAT ANALYSIS AND INTERPRETATION

This chapter provides data analysis and interpretation. It provides the back ground of selected students studying in Engineering colleges and Universities. Opinion towards employability skills is measured and their factors were determined. Expectations, support given by the institutions and satisfaction level of the students towards employability were also measured and assessed. Influences of employees' demographics on factors of employability skills were discussed. Comparison between Engineering colleges and Universities were made in terms of students' opinion, expectations, support they got from their institutions and satisfaction towards employability skills are also enumerated. Predictor variables for students' satisfaction towards employability skills were found by multiple regression. Discriminant analysis is performed for group predictability of training program organized by the placement cells. Final section is dealt with a proposed model for perception of employability skills in engineering institutions. The information about the background of 700 engineering students is explored. Well structured questionnaire is prepared to collect the relevant responses. This chapter explores with the analysis and interpretation in the subsequent paragraphs.

4.1 PROFILE OF ENGINEERING STUDENTS

4.1.1 Personal information of engineering students

Respondents studying in engineering institutions both Universities and Colleges were selected for the study. Engineering students have given their personal information regarding them. Table 4.1 displays the personal information of selected respondents studying in engineering institutions.

Table 4.1 Personal information of engineering students

Particulars	Classification	Number of engineering students	Percentage
Gender	Male	484	69.10
	Female	216	30.90
Community	OC	244	34.90
	BC	208	29.70
	MBC	152	21.70
	SC/ST	96	13.70
Institution	Engineering college	312	44.60
	University	388	55.40
Branch	Mechanical Engineering	116	16.60
	Electronic Communication	324	46.30
	Electrical & Electronics	132	18.90
	Computer Science	128	18.30
Native area	Urban	240	34.30
	Sub-urban	280	40.00
	Rural	180	25.70
Type of Family	Joint Family	293	41.90
	Nuclear Family	407	58.10

Source: primary data

It is observed from the table 4.1 that 69.10% of the selected students are males and the remaining 30.90% of the selected students are females. This shows that majority of the selected students (69.10%) studying in engineering institutions are men.

It is inferred from the table 4.1, 34.90% of them belongs to OC community, 29.70% of them are from Backward class, 21.70% of them belongs to Most backward class and 13.70% of them belongs to SC/ST. It is observed

that most of the students (34.90%) studying in engineering institutions belongs to OC.

Table 4.1 explores that 55.40% of the selected students are studying in Universities and the remaining 44.60% of the students are studying in Engineering Colleges. It is observed that majority of the selected students (55.40%) are studying in Universities.

It is observed from the table 4.1, 46.30% of the selected students are studying the courses in Electronic Communication, 18.90% of the selected students have opted their courses in Electrical and Electronics, 18.30% of the selected students are studying the courses in Computer science and 16.60% of the selected students are studying the courses in Mechanical Engineering. It is observed that majority of the students (46.30%) studying in engineering institutions belongs to the Electronic Communication branch.

It is observed from the table 4.1, 40.00% of the selected students are from sub-urban area, 34.30% of the selected students are from urban background and 25.70% of the selected students are from rural area. It is observed that majority of the students (40.00%) studying in engineering institutions is from sub-urban background.

Table 4.1 explores that, 58.10% of the students are living in nuclear family and the remaining 41.90% of the students are living in joint family. It is observed that majority of the students (58.10%) studying in engineering institutions is living in nuclear family.

4.1.2 Existence of institution

Respondents studying in engineering institutions were selected for the study. Engineering students have given the information regarding the number of years of existence of the institutions. Table 4.2 displays the information regarding the existence of the engineering institutions.

Table 4.2 Existence of institution

	Number of Engineering students	Percentage
Less than 10 years	120	17.14
10-15 years	168	24.00
Above 15 years	412	58.86
Total	**700**	**100**

Source: primary data

Table 4.2 explores the number of years of the existence of the institutions. 58.86% of the students expressed that their institution are existing for more than 15 years, 24.00% of the students expressed that their institution are existing for 10-15 years and 17.14% of the students expressed that their institution are existing for less than 5 years. It is observed that most of the students (58.86%) expressed that their institutions are existing for more than 15 years.

4.1.3 Father's employment

Respondents studying in engineering institutions were selected for the study. Engineering students have given the information regarding their father's employment. Table 4.3 shows the information regarding the father's employment.

Table 4.3 Father's employment

	Number of Engineering students	Percentage
Government	156	22.30
Private	296	42.30
Business	136	19.40
Self employed	112	16.00
Total	**700**	**100**

Source: primary data

Table 4.3 explores the father's employment. 42.30% of the student's father are working in private organization, 22.30% of the student's father are working as Government employees, 19.40% of the student's fathers are running their own business and the remaining 16.00% of the student's fathers are self employed. It is observed that most of the student's fathers (42.30%) are employed with private organizations.

4.1.4 Mother's employment

Respondents studying in engineering institutions were selected for the study. Engineering students have given the information regarding their mother's employment. Table 4.4 shows the information regarding the mother's employment.

Table 4.4 Mother's employment

	Number ofEngineering students	**Percentage**
Government	68	9.70
Private	188	26.90
Business	64	9.10
Self-Employed	136	19.40
House wife	244	34.90
Total	**700**	**100**

Source: primary data

Table 4.4 explores the mother's employment. 34.90% of the student's mothers are House wives, 26.90% of the student's mothers are working in private organisations, 19.40% of the student's mothers are self employed, 9.70% of the student's mothers are working in Government sector and the remaining 9.10% of the student's mother are running their own business. It is observed that most of the student's mothers (34.90%) are House wives.

4.2 INFORMATION PERTAINING TO EMPLOYABILITY SKILLS

4.2.1 Confidence to get placement during course period

Respondents studying in engineering institutions were selected for the study. Engineering students have given their opinion towards their confidence to get placement during course period. Table 4.5 displays the information regarding confidence to get placement during course period.

Table 4.5 Confidence to get placement during course period

	Number of Engineering students	**Percentage**
Yes	452	64.57
No	248	35.43
Total	**700**	**100**

Source: primary data

Table 4.5 depicts the information regarding their confidence to get placement during course period. Out of 700 engineering students, 64.57% of the students agreed that they are confident of getting placed during the course period. 35.43% of the students accepted that they are having less confidence of getting placed during the course period. It is observed that most of the students (64.57%) agreed that they are confident of getting placed during the course period.

4.2.2 Skills need to be possessed and updated

Respondents studying in engineering institutions were selected for the study. They have expressed their opinion regarding skills need to be possessed and updated. Table 4.6 displays the institution wise opinion of engineering students towards skills need to be possessed and updated.

Table 4.6 Skills need to be possessed and updated

			Institution		Total
			Engineering college	University	
Skills need to be possessed and updated	Technical skills	N	28	30	58
		%	23.3%	23.4%	23.4%
	Soft skills	N	30	36	66
		%	25.0%	5.1%	26.6%
	Both	N	62	62	124
		%	51.7%	8.9%	50.0%
Total		N	120	128	248
		%	100.0%	100.0%	100.0%

Source: primary data

Table 4.6 reveals the opinion of engineering students towards skills needs to be possessed and updated. Out of 120 students studying in engineering colleges, 23.3% agreed that technical skills need to be possessed and updated, 25.0% agreed that soft skills need to be possessed and updated and 51.7% agreed that both technical and soft skills need to be possessed and updated. Out of 239 students studying in Universities, 23.4% agreed that technical skills need to be possessed and updated, 5.1% agreed that soft skills need to be possessed and updated and 8.9% agreed that both technical and soft skills need to be possessed and updated. This shows that most of the students (50%) who felt that their skills need to be possessed and updated are intended to improve both technical as well as soft skills.

4.2.3 Institution facilitate more campus recruitment

Respondents studying in engineering institutions were selected for the study. Engineering students have given the information towards their institution facilitates more campus recruitment. Table 4.7 displays the information regarding institution facilitates more campus recruitment.

Table 4.7 Institution facilitate more campus recruitment

	Number of Engineering students	Percentage
Yes	420	60.00
No	280	40.00
Total	**700**	**100**

Source: primary data

Table 4.7 depicts the information regarding institution facilitates more campus recruitment. Out of 700 engineering students, 60.0% of the students agreed that their institution facilitates more campus recruitments and 40.0% of the students accepted that their institutions are not facilitating more campus recruitments. It is observed that most of the students (60.0%) agreed that their institution facilitates more campus recruitments.

4.2.4 Level of facilitation of campus recruitment

Respondents studying in engineering institutions were selected for the study. They have expressed their opinion regarding the level of facilitation of campus recruitment. Table 4.8 displays the institution wise opinion of engineering students towards the Level of facilitation of campus recruitment.

Table 4.8 Level of facilitation of campus recruitment

			Institution		Total
			Engineering college	University	
Level of facilitation	Very good	N	4	8	12
		%	2.4%	3.3%	2.9%
	Good	N	56	126	182
		%	31.8%	51.6%	43.3%
	Neither good nor bad	N	84	82	166
		%	47.7%	33.6%	39.5%
	Bad	N	24	28	52
		%	13.6%	11.5%	12.4%
	Very bad	N	8	0	8
		%	4.5%	-	1.9%
Total		N	176	244	420
		%	100.0%	100.0%	100.0%

Source: primary data

Table 4.8 depicts the opinion of engineering students towards level of facilitation of campus recruitment. Out of 176 students studying in engineering colleges, 2.4% agreed that the level of facilitation of campus recruitment is very good, 31.8% agreed that the level of facilitation of campus recruitment is good, 47.7% agreed that the level of facilitation of campus recruitment is neither good nor bad, 13.6% agreed that the level of facilitation of campus recruitment is bad and 4.5% agreed that the level of facilitation of campus recruitment is very bad. Out of 244 students studying in Universities, 3.3% agreed that the level of facilitation of campus recruitment is very good, 51.6% agreed that the level of facilitation of campus recruitment is good, 33.6% agreed that the level of facilitation of campus recruitment is neither good nor bad and 11.5% agreed that the level of facilitation of campus recruitment is bad. This shows that more than 45% of the engineering students accepted that the level of facilitation of campus recruitment in their institutions is good.

4.2.5 Institution facilitates and involve in developing soft skills

Respondents studying in engineering institutions were selected for the study. Engineering students have given the information their institution facilitates and involves in developing soft skills. Table 4.9 displays the information regarding their institution facilitates and involves in developing soft skills.

Table 4.9 Institution facilitates and involve in developing soft skills

	Number of Engineering students	**Percentage**
Yes	408	58.30
No	292	41.70
Total	**700**	**100**

Source: primary data

Table 4.9 depicts the information regarding their institution facilitates and involves in developing soft skills. Out of 700 engineering students, 58.30% of the students agreed that their institution facilitates and involves in developing soft skills. 41.70% of the students accepted that their institution facilitates and involves in developing soft skills. It is observed that most of the students (58.30%) agreed that their institution facilitates and involves in developing soft skills.

4.2.6 Level of facilitation in developing the soft skills

Respondents studying in engineering institutions were selected for the study. They have expressed their opinion regarding the Level of facilitation in developing the soft skills. Table 4.10 displays the institution wise opinion of engineering students towards the Level of facilitation in developing the soft skills.

Table 4.10 Level of facilitation in developing the soft skills

			Institution		Total
			Engineering college	University	
Level of facilitation	Very good	N	8	0	8
		%	3.7%	-	2%
	Good	N	76	104	180
		%	35.1%	54.2%	44.1%
	Neither good nor bad	N	88	28	116
		%	40.7%	14.5%	28.4%
	Bad	N	36	52	88
		%	16.8%	27.1%	21.6%
	Very bad	N	8	8	16
		%	3.7%	4.2%	3.9%
Total		N	216	192	408
		%	100.0%	100.0%	100.0%

Source: primary data

Table 4.10 explores the opinion of engineering students towards the Level of facilitation in developing the soft skills. Out of 216 students studying in engineering colleges, 3.7% agreed that the level of facilitation is very good, 35.1% agreed that the level of facilitation is good, 40.7% agreed that the level of facilitation of campus recruitment is neither good nor bad, 16.8% agreed that the level of facilitation is bad and 3.7% agreed that the level of facilitation is very bad towards the level of facilitation in developing the soft skills. Out of 192 students studying in Universities, 54.2% agreed that the level of facilitation is good, 14.5% agreed that the level of facilitation of campus recruitment is neither good nor bad, 27.1% agreed that the level of facilitation is bad and 4.2% agreed that the level of facilitation is very bad towards the level of facilitation in developing the soft skills. This shows that nearly 46% of the engineering students felt that the level of facilitation towards developing the soft skills in their institutions is better.

4.2.7 Course curriculum covers Communication skills in the syllabus

Respondents studying in engineering institutions were selected for the study. Engineering students have given the information towards their course curriculum covers Communication skills in the syllabus. Table 4.11 displays the information regarding their course curriculum covers Communication skills in the syllabus.

Table 4.11 Course curriculum covers Communication skills in the syllabus

	Number of Engineering students	**Percentage**
Yes	460	65.70
No	240	34.30
Total	**700**	**100**

Source: primary data

Table 4.11 depicts the information regarding their course curriculum covers Communication skills in the syllabus. Out of 700 engineering students, 65.70% of the students agreed that their course curriculum covers Communication skills in the syllabus and 34.30% of the students accepted that their course curriculum are not covering Communication skills in the syllabus. It is observed that most of the students (65.70%) agreed that their course curriculum covers Communication skills in the syllabus.

4.2.8 Level of coverage of communication skills

Respondents studying in engineering institutions were selected for the study. They have expressed their opinion regarding the level of coverage of communication skills. Table 4.12 displays the institution wise opinion of engineering students towards the level of coverage of communication skills.

Table 4.12 Level of coverageof communication skills

			Institution		Total
			Engineering college	University	
Level of coverage	Very good	N	8	4	12
		%	3.5%	1.7%	2.6%
	Good	N	76	136	212
		%	33.3%	58.6%	46.1%
	Neither good nor bad	N	84	60	144
		%	36.8%	25.9	31.3%
	Bad	N	56	28	84
		%	24.6%	12.1%	18.3%
	Very bad	N	4	4	8
		%	1.8%	1.7%	1.7%
Total		N	228	232	460
		%	100.0%	100.0%	100.0%

Source: primary data

Table 4.12 reveals the opinion of engineering students towards the level of coverage of communication skills. Out of 228 students studying in engineering colleges, 3.5% agreed that the level of coverage of communication skills is very good, 33.3% agreed that the level of coverage of communication skills is good, 36.8% agreed that the level of coverage of communication skills is neither good or bad, 24.6% agreed that the level of coverage of communication skills is bad and 1.8% agreed that the level of coverage of communication skills is very bad towards the level of coverage of communication skills. Out of 232 students studying in Universities, 1.7% agreed that the level of coverage of communication skills is very good, 58.6% agreed that the level of coverage of communication skills is good, 25.9% agreed that the level of coverage of communication skills is neither good or bad, 12.1% agreed that the level of coverage of communication skills is bad and 1.7% agreed that the level of coverage of communication skills is very bad towards the level of coverage of communication skills. This shows that nearly 48% of the engineering students agreed that the level of coverage towards communication skills is good.

4.2.9 Institution have exclusive communication skill development lab

Respondents studying in engineering institutions were selected for the study. Engineering students have given their information towards their institution has exclusive communication skill development lab. Table 4.13 displays the information regarding their institution has exclusive communication skill development lab.

Table 4.13 Institution have exclusive communication skill development lab

	Number of Engineering students	**Percentage**
Yes	584	83.40
No	116	16.60
Total	**700**	**100**

Source: primary data

Table 4.13 depicts the information regarding their institution has exclusive communication skill development lab. Out of 700 engineering students, 83.40% of the students agreed that their institution has exclusive communication skill development lab. 16.60% of the students accepted that their institution does not have communication skill development lab exclusively. It is observed that most of the students (83.40%) agreed that their institution has exclusive communication skill development lab.

4.2.10 Effectiveness of communication skill development lab

Respondents studying in engineering institutions were selected for the study. They have expressed their opinion regarding the effectiveness of communication skill development lab. Table 4.14 displays the institution wise opinion of engineering students towards the effectiveness of communication skill development lab.

Table 4.14 Effectiveness of communication skill development lab

			Institution		Total
			Engineering college	University	
Effectiveness of the lab	Very good	N	0	84	84
		%	-	24.1%	14.4%
	Good	N	88	156	244
		%	37.3%	44.8%	41.8%
	Neither good nor bad	N	72	67	139
		%	30.5%	19.3%	23.8%
	Bad	N	44	41	85
		%	18.6%	11.8%	14.5%
	Very bad	N	32	0	32
		%	13.6%	-	5.5%
Total		N	236	348	584
		%	100.0%	100.0%	100.0%

Source: primary data

Table 4.14 reveals the opinion of engineering students towards the effectiveness of communication skill development lab. Out of 236 students studying in engineering colleges, 37.3% agreed that the effectiveness of communication skill development lab is good, 30.5% agreed that the effectiveness of communication skill development lab is neither good or bad, 18.6% agreed that the effectiveness of communication skill development lab is bad and 13.6% agreed that the effectiveness of communication skill development lab is very bad. Out of 348 students who are studying in Universities, 24.1% agreed that the effectiveness of communication skill development lab is very good, 44.8% agreed that the effectiveness of communication skill development lab is good, 19.3% agreed that the effectiveness of communication skill development lab is neither good or bad and 11.8% agreed that the effectiveness of communication skill development lab is bad. This shows that nearly 56% of the engineering students agreed that the effectiveness of communication skill development lab is good.

4.2.11 Institution has separate placement cell

Respondents studying in engineering institutions were selected for the study.Engineering students have given the information towards their institution has separate placement cell. Table 4.15 displays the information regarding their institution has separate placement cell.

Table 4.15 Institution has separate placement cell

	Number of Engineering students	**Percentage**
Yes	648	92.60
No	52	7.40
Total	**700**	**100**

Source: primary data

Table 4.15 explores the information regarding their institution has separate placement cell. Out of 700 engineering students, 92.60% of the students agreed that their institution has got separate placement cells and 7.40% of the students accepted that their institution does not have separate placement cell. It is observed that most of the students (92.60%) agreed that their institution has got separate placement cell.

4.2.12 Level of efforts taken by placement cell

Respondents studying in engineering institutions were selected for the study. They have expressed their opinion regarding the Level of efforts taken by placement cell. Table 4.16 displays the institution wise opinion of engineering students towards the Level of efforts taken by placement cell.

Table 4.16 Level of efforts taken by placement cell

			Institution		Total
			Engineering college	University	
Level of effort taken by placement cell	Very good	N	88	100	188
		%	28.2%	29.8%	29.0%
	Good	N	128	104	232
		%	41.0%	31.0%	36.0%
	Neither good nor bad	N	68	28	96
		%	21.8%	8.3%	15.0%
	Bad	N	28	72	100
		%	9.0%	21.4%	15.0%
	Very bad	N	0	32	32
		%	-	9.5%	5.0%
Total		N	312	336	648
		%	100.0%	100.0%	100.0%

Source: primary data

Table 4.16 reveals the opinion of engineering students towards the level of efforts taken by placement cell. Out of 312 students studying in engineering colleges, 28.2% agreed that the level of efforts taken by placement cell is very good, 41.0% agreed that the level of efforts taken by placement cell is good, 21.8% agreed that the level of efforts taken by placement cell is neither good or bad and 9.0% agreed that the level of efforts taken by placement cell is bad. Out of 336 students studying in Universities, 29.8% agreed that the level of efforts taken by placement cell is very good, 31.0% agreed that the level of efforts taken by placement cell is good, 8.3% agreed that the level of efforts taken by placement cell is neither good or bad, 21.4% agreed that the level of efforts taken by placement cell is bad and 9.5% agreed that the level of efforts taken by placement cell is very bad. This shows that almost 65% of the engineering students agreed that the level of efforts taken by placement cell is good.

4.2.13 Appeared mock interview

Respondents studying in engineering institutions were selected for the study. Engineering students have given their opinion towards their appearance in mock interview. Table 4.17 displays the information regarding their appearance in mock interview.

Table 4.17 Appeared mock interview

	Number of Engineering students	**Percentage**
Yes	424	60.60
No	276	39.40
Total	**700**	**100**

Source: primary data

Table 4.17 provides the information regarding their appearance in mock interview. Out of 700 engineering students, 60.60% of the students agreed that

they have appeared in mock interview and 39.40% of the students accepted that they are yet to appear in mock interview. It is observed that most of the students (60.60%) agreed that they have appeared for mock interview.

4.2.14 Opinion towards the mock interview

Respondents studying in engineering institutions were selected for the study. They have expressed their opinion towards the mock interview. Table 4.18 displays the institution wise opinion of engineering students towards mock interview.

Table 4.18 Opinion towards the mock interview

			Institution		Total
			Engineering college	University	
Opinion towards the mock interview	Very good	N	4	45	49
		%	3.0%	15.6%	11.7%
	Good	N	72	128	200
		%	53.0%	44.4%	47.1%
	Neither good nor bad	N	36	64	100
		%	26.4%	22.2%	23.6%
	Bad	N	20	51	71
		%	14.6%	17.8%	16.7%
	Very bad	N	4	0	4
		%	3.0%	0	0.9%
Total		N	136	288	424
		%	100.0%	100.0%	100.0%

Source: primary data

Table 4.18 reveals the opinion of engineering students towards mock interview. Out of 136 students studying in engineering colleges, 3.0% agreed that the mock interview is very good, 53.0% agreed that the mock interview is

good, 26.4% agreed that the mock interview is neither good nor bad, 14.6% agreed that the mock interview is bad and 3.0% agreed that the mock interview is very bad. Out of 288 students studying in Universities, 15.6% agreed that the mock interview is very good, 44.4% agreed that the mock interview is good, 22.2% agreed that the mock interview is neither good nor bad and 17.8% agreed that the mock interview is bad. This shows that nearly 59% of the engineering students felt that conducting mock interview is good for their career.

4.2.15 Training program organized by the placement cell

Respondents studying in engineering institutions were selected for the study. Engineering students have given their information regarding the training programmes arranged by the Placement cell. Table 4.19 displays the information regarding training programmes arranged by the Placement cell.

Table 4.19 Training program organized by the placement cell

	Number of Engineering students	**Percentage**
Yes	600	85.70
No	100	14.30
Total	**700**	**100**

Source: primary data

Table 4.19 depicts the information regarding the training programmes organized by the Placement cell. Out of 700 engineering students, 85.70% of the students agreed that training programmes are arranged by their placement cell and 14.30% of the students accepted that their Placement cell are yet to organize training program. It is observed that most of the students (85.70%) agreed that training programmes are arranged by their Placement cell.

4.2.16 Effectiveness of training program

Respondents studying in engineering institutions were selected for the study.They have expressed their opinion regarding the effectiveness of training program. Table 4.20 displays the institution wise opinion of engineering students towards the effectiveness of training program.

Table 4.20 Effectiveness of training program

			Institution		Total
			Engineering college	University	
Effectiveness of training program	Very good	N	56	12	68
		%	18.4%	4.0%	11.3%
	Good	N	120	52	172
		%	39.5%	17.6%	28.7%
	Neither good nor bad	N	96	168	264
		%	31.6%	56.8%	44.0%
	Bad	N	28	32	60
		%	9.2%	10.8%	10.0%
	Very bad	N	4	32	36
		%	1.3%	10.8%	6.0%
Total		N	304	296	600
		%	100.0%	100.0%	100.0%

Source: primary data

Table 4.20 reveals the opinion of engineering students towards the effectiveness of training program. Out of 304 students studying in engineering colleges, 18.4% agreed that the effectiveness of training program is very good, 39.5% agreed that the effectiveness of training program is good, 31.6% agreed that the effectiveness of training program is neither good or bad, 9.2% agreed that the effectiveness of training program is bad and 1.3% agreed that the effectiveness of training program is very bad. Out of 296 students studying in

Universities, 4.0% agreed that the effectiveness of training program is very good, 17.6% agreed that the effectiveness of training program is good, 56.8% agreed that the effectiveness of training program is neither good or bad, 10.8% agreed that the effectiveness of training program is bad and 10.8% agreed that the effectiveness of training program is very bad. This shows that only 16% of the engineering students accepted that the training programs are ineffective.

4.2.17 Association between confidence to get placement during course period and type of institution

To assess the association between confidence to get placement during course period and type of institution, Chi-square test is performed to identify the association between confidence to get placement during course period and type of institution. The cross tabulation between confidence to get placement during course period and type of institution is presented in the table 4.21

Null hypothesis H_0 1(a): There is no significant association between confidence to get placement during course period and type of institution.

Table 4.21Association between confidence to get placement during course period and type of institution

			Type of institution		Total	Chi-square Value
			Engineering college	University		
Confidence to get placement during course period	Yes	N	170	282	452	10.642** (p = .001)
		%	24.3%	40.3	64.6%	
	No	N	142	106	248	
		%	20.3%	15.1%	35.4	
Total		N	312	388	700	
		%	44.6%	55.4%	100.0%	

** significant at 1% level

From the table 4.21 it is observed that there is significant association between confidence to get placement during your course period and type of institution. Chi- square value (10.642) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that confidence to get placement during your course period and classification based on type of institution are well associated. From the table 4.21 it is evident that most of the students (40.3%) studying in Universities have agreed that they are very much confident to get placement during the course period.

4.2.18 Association between institutions facilitates more campus recruitment and type of institution

To assess the association between institutions facilitates more campus recruitment and type of institution, Chi-square test is performed to identify the association between institutions facilitates more campus recruitment and type of institution. The cross tabulation between institutions facilitates more campus recruitment and type of institution is presented in the table 4.22.

Null hypothesis H_0 1(b): There is no significant association between institutions facilitates more campus recruitment and type of institution.

Table 4.22 Association between institutions facilitates more campus recruitment and type of institution

			Type of institution		Total	Chi-squareValue
			Engineering college	University		
Institutions facilitates more campus recruitment	Yes	**N**	176	244	420	**25.949** ** **(p < .001)**
		%	25.1%	34.9%	60.0%	
	No	**N**	136	144	280	
		%	19.4%	20.6%	40.0%	
Total		**N**	312	388	700	
		%	44.6%	55.4%	100.0%	

** significant at 1% level

From the table 4.22 it is observed that there is significant association between institutions facilitates more campus recruitment and type of institution. Chi- square value (25.949) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that institutions facilitate more campus recruitment and classification based on type of institution is well associated. From the table 4.22 it is evident that most of the students (34.9%) studying in universities accepted that there institutions facilitates more campus recruitment.

4.2.19 Association between institutions facilitates and involve in developing soft skills and type of institution.

To assess the association between institution facilitate and involve in developing soft skills and type of institution, Chi-square test is performed to identify the association between institutions facilitate and involve in developing soft skills and type of institution. The cross tabulation between institution facilitate and involve in developing soft skills and type of institution is presented in the table 4.23.

Null hypothesis H_0 1(c): There is no significant association between institutions facilitates and involve in developing soft skills and type of institution.

Table 4.23 Association between institutions facilitates and involve in developing soft skills and type of institution

			Type of institution		Total	Chi-square Value
			Engineering college	University		
Institution facilitate and involve in developing soft skills	Yes	**N**	216	192	408	**27.734** ** **(p < .001)**
		%	30.9%	27.4%	58.3%	
	No	**N**	96	196	292	
		%	13.7%	28.0%	41.7%	
Total		**N**	312	388	700	
		%	44.6%	55.4%	100.0%	

** significant at 1% level

From the table 4.23 it is observed that there is significant association between institutions facilitates and involve in developing soft skills and type of institution. Chi- square value (27.734) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that institutions facilitate and involve in developing soft skills and classification based on type of institution is well associated. From the table 4.23 it is evident that most of the students (30.9%) studying in engineering colleges have agreed that their institutions facilitates and shows involvement in developing their soft skills.

4.2.20 Association between course curriculum covers communication skills in the syllabus and type of institution

To assess the association between course curriculum covers communication skills in the syllabus and type of institution, Chi-square test is performed to identify the association between course curriculum covers communication skills in the syllabus and type of institution. The cross tabulation between course curriculum covers communication skills in the syllabus and type of institution is presented in the table 4.24

Null hypothesis H_0 1(d): There is no significant association between course curriculum covers communication skills in the syllabus and type of institution.

Table 4.24 Association between course curriculum covers communication skills in the syllabus and type of institution

			Type of institution		Total	Chi-square Value
			Engineering college	University		
Course curriculum covers communication skills in the syllabus	Yes	**N**	228	232	460	**75.454** (p < .001)**
		%	32.6%	33.1%	65.7%	
	No	**N**	84	156	240	
		%	12.0%	22.3%	34.3%	
Total		**N**	312	388	700	
		%	44.6%	55.4%	100.0%	

** significant at 1% level

From the table 4.24 it is observed that there is significant association between curriculum covers communication skills in the syllabus and type of institution. Chi- square value (75.454) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that curriculum covers communication skills in the syllabus and classification based on type of institution are well associated. From the table 4.24 it is evident that most of the students (33.1%) studying in Universities accepted that their course curriculum covers communication skills in the syllabus.

4.2.21 Association between institution/college has exclusive communication skill development lab and type of institution

To assess the association between institution/college has exclusive communication skill development lab and type of institution, Chi-square test is performed to identify the association between the institutions has exclusive communication skill development lab and type of institution. The cross tabulation between the institutions has exclusive communication skill development lab and type of institution is presented in the table 4.25.

Null hypothesis H_0 1(e): There is no significant association between the institutionshas exclusive communication skill development lab and type of institution.

Table 4.25 Association between the institutionshas exclusive communication skill development lab and type of institution

			Type of institution		Total	Chi-square Value
			Engineering college	University		
Institutions has exclusive communication skill development lab	Yes	**N**	236	348	584	**309.172** ** **(p < .001)**
		%	33.7%	49.7%	83.4%	
	No	**N**	76	40	116	
		%	10.9%	5.7%	16.6%	
Total		**N**	312	388	700	
		%	44.6%	55.4%	100.0%	

** significant at 1% level

From the table 4.25 it is observed that there is significant association between the institutions has exclusive communication skill development lab and type of institution. Chi- square value (309.172) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that the institutions has exclusive communication skill development lab and classification based on type of institution are well associated. From the table 4.25 it is evident that most of the students (49.7%) studying in Universities accepted that their institutions has exclusive communication skill development lab.

4.2.22 Association between appeared for mock interview and type of institution.

To assess the association between appeared for mock interview and type of institution, Chi-square test is performed to identify the association between appeared for mock interview and type of institution. The cross tabulation between appeared for mock interview and type of institution is presented in the table 4.26.

Null hypothesis H_0 1(f): There is no significant association between appeared for mock interview and type of institution.

Table 4.26 Association between appeared for mock interview and type of institution

			Type of institution		Total	Chi-square Value
			Engineering college	University		
Appeared for mock interview	Yes	N	136	288	424	24.564** (p < .001)
		%	19.4%	41.1%	60.5	
	No	N	176	100	276	
		%	25.1%	14.3%	39.5	
Total		N	312	388	700	
		%	44.6%	55.4%	100.0%	

** significant at 1% level

From the table 4.26 it is observed that there is significant association between appeared for mock interview and type of institution and type of institution. Chi- square value (24.564) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that appeared for mock interview and type of institution and classification based on type of institution are well associated. From the table 4.26 it is evident that most of the students (41.1%) studying in Universities agreed that they have appeared for mock interview.

4.2.23 Association between placement cells arranged training program and type of institution

To assess the association between placement cell arranged training program and type of institution, Chi-square test is performed to identify the association between placement cell arranged training program and type of institution. The cross tabulation between placement cell arranged training program and type of institution is presented in the table 4.27.

Null hypothesis H_0 1(g): There is no significant association between placement cell arranged any training program and type of institution.

Table 4.27 Association between placement cells arranged any training program and type of institution

			Type of institution		Total	Chi-square Value
			Engineering college	University		
Placement cell arranged training program	Yes	**N**	304	296	600	**63.160** ** **(p < .001)**
		%	43.4%	42.3%	85.7%	
	No	**N**	8	92	100	
		%	1.1%	13.1%	14.3%	
Total		**N**	312	388	700	
		%	44.6%	55.4%	100.0%	

** significant at 1% level

From the table 4.27 it is observed that there is significant association between placement cell arranged training program and type of institution. Chi-square value (63.160) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that placement cell arranged training program and classification based on type of institution are well associated. From the table 4.27 it is evident that most of the students (43.4%) studying in engineering colleges agreed that their placement cells are arranging training programs.

4.3 ASSESSING THE FACTORS OF EMPLOYABILITY SKILLS

The data reduction process is indispensable to establish a concise research consistently comprising all the characteristic features of variables involved in this study. The data reduction process is an ingenious method to represent the variable in the form of predominant factors with proper mathematical support. In social science research the research gap generates numerous variables to be examined in the research and they emerge in the form of well framed interview schedule. In particular, the perceptional studies depend upon the responses of the respondents in Likert five point scales. The assignment of numerical values in Likert five point scales for each variable creates co-variances and the variables in the same domain. These co-variances and co-efficient of correlation are useful statistical parameters to group likely variables to form an innovative factor. This is achieved through Factor analysis by Principal component method. It reduces the numerous variables into major factors; each factor comprises likely variables with nearest co-variance and correlation value. In this study factor of employability skills of students in engineering institutions has been identified. Employability skills were measured by twenty nine variables. Based on the agreement given by the selected engineering students, Factor analysis with principal component method using vari-max rotation was applied to group the variables into six factors.

Table 4.28 Initial Eigen values of various Factors

Factors	Initial Eigen values		
	Eigen Value	**Percentage ofVariance**	**Cumulative Percentage**
1	11.541	36.29	36.29
2	6.124	11.15	47.44
3	3.121	8.11	55.55
4	2.105	6.15	61.70
5	1.512	5.14	66.84
6	1.028	5.01	71.85

Twenty nine variables are reduced into fewer factors by analyzing correlation between variables (employability skills of students). In this case twenty nine variables are reduced in to six factors which explore the much of the original data. From the cumulative percentage column, the six factors extracted together accounts for 71.85 % of the total variance (information contained in twenty nine variables). The six factors extracted with their components are represented in the table 4.29.

From the table 4.29 it is inferred that factor 1 is a combination of seven variables such as “Oral Communication”, “Written Communication”, “Numerical ability”, “Listening”, “Presentation Skills” , “Enhancement of Computer skills” and “Habit of Learning and update” which is named as **Basic academic skills** factor.

Factor 2 is a combination of five variables such as “Attitude”, “Attitude towards Change”, “Motivational Skills”, “Knowledge on Emotional Intelligence” and “Importance of Time Management” which is named as **Self management** factor.

Table 4.29 Factor scores of employability skills of engineering students

Factor	Components	Factor Scores
Factor1: Basic academic skills	Oral Communication	**0.815**
	Written Communication	**0.742**
	Numerical ability	**0.714**
	Listening	**0.621**
	Presentation Skills	**0.601**
	Enhancement of Computer skills	**0.521**
	Habit of Learning and update	**0.509**
Factor 2: Self management	Attitude	**0.782**
	Attitude towards Change	**0.635**
	Motivational Skills	**0.619**
	Knowledge on Emotional Intelligence	**0.547**
	Importance of Time Management	**0.511**
Factor 3: Higher order thinking skills	Application of Engineering Knowledge in the industry	**0.815**
	Creativity	**0.753**
	Reasoning Ability	**0.618**
	Practical utility of Engineering Course Curriculum	**0.587**
	Appreciation towards Decision Making	**0.542**
Factor 4: Entrepreneurial skills	Understanding Managerial Skills	**0.785**
	Appreciation of Leadership Qualities	**0.715**
	Understanding Project Management	**0.629**
	Need for Entrepreneurship	**0.518**
	Awareness of Organisational Ethos/Values	**0.502**
Factor 5: Problem solving skills	Learning through Practical problem solving	**0.612**
	Understanding Stress Management	**0.571**
	Understanding Crisis Management	**0.546**
	Understanding Strength/Weakness	**0.514**
Factor 6: Team work	Co-ordination	**0.617**
	Appreciation of Team Work	**0.537**
	Extracurricular activities	**0.508**

Factor 3 is a combination of five variables such as “Application of Engineering Knowledge in the industry”, “Creativity”, “Reasoning Ability”, “Practical utility of Engineering Course Curriculum” and “Appreciation towards Decision Making” which is named as **Higher order thinking skills** factor.

Factor 4 is a combination of five variables such as “Understanding Managerial Skills”, “Appreciation of Leadership Qualities”, “Understanding Project Management”, “Need for Entrepreneurship” and “Awareness of Organisational Ethos/Values” which is named as **Entrepreneurial skills** factor.

Factor 5 is a combination of four variables such as “Learning through Practical problem solving”, “Understanding Stress Management”, “Understanding Crisis Management” and “Understanding Strength/Weakness” which is named as **Problem solving skills** factor.

Factor 6 is a combination of three variables such as “Co-ordination”, “Appreciation of Team Work” and “Extracurricular activities” which is named as **Team work** factor.

Oral Communication, Attitude, Application of Engineering Knowledge in the industry, Understanding Managerial Skills, Learning through Practical problem solving and Co-ordination are considered as the important employability skills of students in engineering institutions.

4.4 INTER RELATIONSHIP BETWEEN FACTORS OF EMPLOYABILITY SKILLS

Factors of employability skills are interrelated, the researcher made a valiant attempt to identify the degree of relationship between the factors. To test the significant relationship between factors of employability skills (Basic Academic skills, Self management, Higher order thinking skills,

Entrepreneurial skills, Problem solving skills, Team work) among engineering students, Bi-variate correlation was applied to ascertain the significant relationships between factors of employability skills.

Table 4.30 Inter correlation between the factors of employability skills

	BAS	SM	HOS	ES	PS	TW
BAS	1					
SM	r = 0.348**	1				
	p <.001					
HOS	r =0.373**	r =0.432**	1			
	p <.001	p <.001				
ES	r =0.572**	r =0.477**	r =0.477**	1		
	p <.001	p <.001	p <.001			
PS	r =0.432**	r =0.506**	r =0.506**	r =0.547**	1	
	p <.001	p <.001	p <.001	p <.001		
TW	r =0.332**	r =0.362**	r =0.362**	r =0.452**	r =0.324**	1
	p <.001	p <.001	p <.001	p <.001	p <.001	

** significant at 1% level

BAS- Basic Academic skills, SM- Self management, HOS- Higher order thinking skills, ES- Entrepreneurial skills, PS- Problem solving skills, TW- Team work

Positive significant correlation is observed between Basic academic skills and Self management (r = 0.348). Significant correlation is observed between Basic academic skillsand Higher order thinking skills (r = 0.373), which is positive. Positive significant correlation is observed between Basic academic skills and Entrepreneurial skills (r = 0.572). Significant correlation is

observed between Basic academic skillsand Problem solving skills (r = 0.432), which is positive. Positive significant correlation is observed between Basic academic skillsand Team work (r = 0.332).

Significant correlation is observed between Self managementand Higher order thinking skills (r = 0.432), which is positive. Positive significant correlation is observed between Self management and Entrepreneurial skills (r = 0.477). Significant correlation is observed between Self managementand Problem solving skills (r = 0.506), which is positive. Positive significant correlation is observed between Self managementand Team work (r = 0.362).

Positive significant correlation is observed between Higher order thinking skills and Entrepreneurial skills (r = 0.477). Significant correlation is observed between Higher order thinking skillsand Problem solving skills (r = 0.506), which is positive. Positive significant correlation is observed between Higher order thinking skillsand Team work (r = 0.362).

Significant correlation is observed between Entrepreneurial skillsand Problem solving skills (r = 0.547), which is positive. Positive significant correlation is observed between Entrepreneurial skillsand Team work (r = 0.452). Significant correlation is observed between Problem solving skillsand Team work (r = 0.324), which is positive.

4.5 LEVEL OF PRESENT EMPLOYABILITY SKILLS OF ENGINEERING STUDENTS

4.5.1 Opinion onBasic Academic skills

One sample t-test was used to test the opinion on Basic Academic skills among the students of engineering institutions. Opinion on present Basic Academic skills of students was measured through seven variables. To test the significant difference between the mean value of the variables measured under

opinion on Basic Academic skills of engineering students against the test average response (mean score = 3). The following null hypothesis was framed:

$H_0$2 (a): Opinion on Basic Academic skills does not differ significantly

Table 4.31 shows the results of one sample t-test for variables measured under opinion on Basic Academic skills of engineering students and average score.

Table 4.31 Opinion on Basic Academic skills

Statements	Mean	SD	t-value	p-value
Oral Communication	3.83	0.645	34.342**	< .001
Written Communication	3.67	0.643	27.410**	< .001
Numerical ability	3.52	0.763	18.036**	< .001
Listening	3.55	0.833	17.418**	< .001
Presentation Skills	3.59	0.896	17.554**	< .001
Enhancement of Computer skills	3.13	0.842	4.128**	< .001
Habit of Learning and update	3.28	0.761	9.731**	< .001

** significant at 1% level

From table 4.31, t-values of opinion about Basic Academic skills 34.342, 27.410, 18.036, 17.418, 17.554, 4.128 and 9.731 are significant at 1% level. This shows that there is significant difference between the mean responses given by the students towards their present Basic Academic skills and the test average score (=3). Further the mean values of the variables Oral Communication (3.67), Written Communication (3.83), Numerical ability (3.52), Listening (3.55), Presentation Skills (3.59), Enhancement of Computer skills (3.13) and Habit of Learning and update (3.28) which is above the test average score. This shows that the level of Basic academic skills among the students is good and they are giving more importance to Oral and Written communication.

4.5.2 Opinion on Self management

One sample t-test was used to test the opinion on Self management among the students of engineering institutions. Opinion on present Self management skills of students were measured through five variables. To test the significant difference between the mean value of the variables measured under opinion on Self management of engineering students against the test average response (mean score = 3). The following null hypothesis was framed:

$H_0$2 (b): Opinion on Self management does not differ significantly

Table 4.32 shows the results of one sample t-test for variables measured under opinion on Self management of engineering students and average score.

Table 4.32 Self management

Statements	Mean	SD	t-value	p-value
Attitude	4.18	0.815	38.387**	< .001
Attitude towards Change	3.97	0.721	35.251**	< .001
Motivational Skills	3.62	0.990	16.489**	< .001
Knowledge on Emotional Intelligence	3.66	0.900	19.326**	< .001
Importance of Time Management	3.96	0.778	32.838**	< .001

** significant at 1% level

From table 4.32, t-values of opinion about Self management 38.387, 35.251, 16.489, 19.326 and 32.838 are significant at 1% level. This shows that there is significant difference between the mean responses given by the students towards the present Self management skills and the test average score (=3). Further the mean values of the variables Attitude (4.18), Attitude towards Change (3.97), Motivational Skills (3.62), Knowledge on Emotional Intelligence (3.66) and Importance of Time Management (3.96) which is above the test average score. This shows that the level of Self management among the

students is good and the engineering students considered Attitude and Attitude to Change as important variables of Self management.

4.5.3 Opinion on Higher order thinking skills

One sample t-test was used to test the opinion on Higher order thinking skills among the students of engineering institutions. Opinion on present Higher order thinking skills of students were measured through five variables. To test the significant difference between the mean value of the variables measured under opinion on Higher order thinking skills of engineering students against the test average response (mean score = 3). The following null hypothesis was framed:

$H_0$2(c): Opinion on Higher order thinking skills does not differ significantly.

Table 4.33, shows the results of one sample t-test for variables measured under opinion on Higher order Thinking skills of engineering students and average score.

Table 4.33 Higher order thinking skills

Statements	Mean	SD	t-value	p-value
Application of Engineering Knowledge in the industry	3.76	0.901	22.313**	< .001
Creativity	3.74	0.739	26.596**	< .001
Reasoning Ability	3.72	0.860	22.147**	< .001
Practical utility of Engineering Course Curriculum	3.70	0.898	20.538**	< .001
Appreciation towards Decision Making	3.57	0.972	15.404**	< .001

** significant at 1% level

From table 4.33, t-values of opinion about Higher order Thinking skills 22.313, 26.596, 22.147, 20.538 and 15.404 are significant at 1% level. This

shows that there is significant difference between the mean responses given by the students towards their present Higher order Thinking skills and the test average score (=3). Further the mean values of the variables Application of Engineering Knowledge in the industry (3.76), Creativity (3.74), Reasoning Ability (3.72), Practical utility of Engineering Course Curriculum (3.70) and Appreciation towards Decision Making (3.57) which is above the test average score. This shows that the level of Higher order thinking skills of the students is good and the engineering students considered Application of Engineering Knowledge in the industry and Creativity are the important aspects of Higher order thinking skills.

4.5.4 Opinion on Entrepreneurial skills

One sample t-test was used to test the opinion on Entrepreneurial skills among the students of engineering institutions. Opinion on present Entrepreneurial skills of students was measured through five variables. To test the significant difference between the mean value of the variables measured under opinion on Entrepreneurial skills of engineering students against the test average response (mean score = 3). The following null hypothesis was framed:

$H_0$2 (d): Opinion on Entrepreneurial skills does not differ significantly.

Table 4.34 shows the results of one sample t-test for variables measured under opinion on Entrepreneurial skills of engineering students and average score.

Table 4.34 Entrepreneurial skills

Statements	Mean	SD	t-value	p-value
Understanding Managerial Skills	3.73	0.852	22.537**	< .001
Appreciation of Leadership Qualities	3.70	0.802	23.172**	< .001
Understanding Project Management	3.56	0.797	18.580**	< .001
Need for Entrepreneurship	3.67	0.916	19.301**	< .001
Awareness of Organisational Ethos/Values	3.64	0.809	20.935**	< .001

** significant at 1% level

From table 4.34, t-values of opinion about Entrepreneurial skills 22.537, 23.172, 18.580, 19.301 and 20.935 are significant at 1% level. This shows that there is significant difference between the mean responses given by the students towards their present Entrepreneurial skills and the test average score (=3). Further the mean values of the variables Understanding of Managerial Skills (3.73), Appreciation of Leadership Qualities (3.70), Understanding Project Management (3.56), Need for Entrepreneurship (3.67) and Awareness of Organisational Ethos/Values (3.64) which is above the test average score. This shows that the level of Entrepreneurial skills among the students is good and the engineering students considered Managerial Skills and Leadership qualities are the important aspects of Entrepreneurial skills.

4.5.5 Opinion on Problem solving skills

One sample t-test was used to test the opinion on Problem solving skills among the students of engineering institutions. Opinion on present Problem solving skills of students was measured through four variables. To test the significant difference between the mean value of the variables measured under opinion on Problem solving skills of engineering students against the test average response (mean score = 3). The following null hypothesis was framed:

$H_0$2 (e): Opinion on Problem solving skills does not differ significantly.

Table 4.35 shows the results of one sample t-test for variables measured under opinion on Problem solving skills of engineering students and average score.

Table 4.35 Problem solving skills

Statements	Mean	SD	t-value	p-value
Learning through Practical problem solving	4.02	0.807	33.519**	< .001
Understanding Stress Management	3.38	0.886	11.265**	< .001
Understanding Crisis Management	3.84	0.848	26.223**	< .001
Understanding Strength/Weakness	3.50	0.826	15.684**	< .001

** significant at 1% level

From table 4.35, t-values of opinion about Problem solving skills 33.519, 11.265, 26.223 and 15.684 are significant at 1% level. This shows that there is significant difference between the mean responses given by the students towards their present Problem solving skills and the test average score (=3). Further the mean values of the variables Learning through Practical problem solving (4.02), Understanding Stress Management (3.38), Understanding Crisis Management (3.84) and Understanding Strength/Weakness (3.50) which are above the test average score. This shows that the level of Problem solving skills among the students is good and the engineering students considered Learning Problem solving through practical approach and understanding Crisis Management as important aspects of Problem solving skills.

4.5.6 Opinion on Team work

One sample t-test was used to test the opinion on Team work among the students of engineering institutions. Opinion on present Team work skills of students were measured through three variables. To test the significant difference between the mean value of the variables measured under opinion on Team work of engineering students against the test average response (mean score = 3). The following null hypothesis was framed:

$H_0$2 (f): Opinion on Team work does not differ significantly.

Table 4.36 shows the results of one sample t-test for variables measured under opinion on Team work of engineering students and average score.

Table 4.36 Team work

Statements	Mean	SD	t-value	p-value
Co-ordination	4.05	0.740	37.399**	< .001
Appreciation of Team Work	4.02	0.749	36.154**	< .001
Extracurricular activities	3.72	0.949	20.080**	< .001

** significant at 1% level

From table 4.36, t-values of opinion about Team work 37.399, 36.154 and 20.080 are significant at 1% level. This shows that there is significant difference between the mean responses given by the students towards their present Team work skills and the test average score (=3). Further the mean values of the variables Co-ordination (4.05), Appreciation of Team Work (4.02) and extracurricular activities (3.72) which are above the test average score. This shows that the level of Team work among the students is good and the engineering students considered Co-ordination and Appreciation of Team work are considered as important variables of Team work.

4.6 COMPARISON OF ENGINEERING COLLEGES AND UNIVERSITIES TOWARDS OPINION, EXPECTATIONS, SUPPORT AND SATISFACTION OF EMPLOYABILITY SKILLS

a) Descriptive of opinion towards employability skills

Engineering students have expressed their opinion towards the level of present employability skills. The mean responses given by the respondents for each factors of employability skills were displayed institution wise in table 4.37

Table 4.37 Descriptive of opinion towards employability skills

	Mean response	
	Engineering college	**University**
Basic Academic skills	3.60	3.72
Self management	3.72	3.86
Higher order thinking skills	3.69	3.75
Entrepreneurial skills	3.66	3.72
Problem solving skills	3.64	3.72
Team work	3.94	3.98

Source: primary data

Table 4.37 reveals the mean responses given by the students towards the present employability skills. The mean response scored by the students studying in engineering colleges towards Basic academic skills is 3.60 and students studying in Universities are 3.72. The mean response scored by the students studying in engineering colleges towards Self management is 3.72 and students studying in Universities are 3.86. The mean response scored by the students studying in engineering colleges towards Higher order thinking skills is 3.69 and students studying in Universities are 3.75. The mean response scored by the students studying in engineering colleges towards Entrepreneurial skills is 3.66 and students studying in Universities are 3.72. The mean response scored by the students studying in engineering colleges towards Problem solving skills is 3.64 and students studying in Universities are 3.72. The mean response scored by the students studying in engineering colleges towards Team work is 3.94 and students studying in Universities are 3.98. This shows that the responses given by the engineering students shows that the students studying in Universities are comparatively higher than the students studying in engineering Colleges towards the present level of employability skills.

b) Descriptive of expectations towards employability skills

Engineering students have expressed their expectations towards employability skills. The mean responses given by the respondents towards their expectations for each factors of employability skills were displayed institution wise in table 4.38.

Table 4.38 Descriptive of expectations towards employability skills

	Mean response	
	Engineering college	**University**
Basic Academic skills	4.04	4.26
Self management	4.11	4.18
Higher order thinking skills	4.01	4.15
Entrepreneurial skills	4.03	4.12
Problem solving skills	4.09	4.12
Team work	4.14	4.17

Source: primary data

Table 4.38 describes the mean responses given by the students towards expectations of employability skills. The mean response scored by the students studying in engineering colleges on expectations towards Basic academic skills is 4.04 and students studying in Universities are 4.26. The mean response scored by the students studying in engineering colleges on expectations towards Self management is 4.11 and students studying in Universities are 4.18. The mean response scored by the students studying in engineering colleges on expectations towards Higher order thinking skills is 4.01 and students studying in Universities are 4.15. The mean response scored by the students studying in engineering colleges on expectations towards Entrepreneurial skills is 4.03 and students studying in Universities are 4.12. The mean response scored by the students studying in engineering colleges on expectations towards Problem solving skills is 4.09 and students studying in Universities are 4.12. The mean response scored by the students studying in engineering colleges on expectations towards Team work is 4.14 and students studying in Universities are 4.17. This shows that the responses given by the engineering students show that the expectations level of students studying in Universities are comparatively higher than the expectations level of students studying in engineering Colleges towards employability skills.

c) Descriptive of support given by the institutions towards employability skills

Engineering students have expressed their opinion towards the level of support given by the institutions towards employability skills. The mean responses given by the respondents for support given by the institutions for each factors of employability skills were displayed institution wise in table 4.39

Table 4.39 Descriptive of support given by the institutions towards employability skills

	Mean response	
	Engineering college	**University**
Basic Academic skills	3.36	3.48
Self management	3.29	3.42
Higher order thinking skills	3.26	3.39
Entrepreneurial skills	3.21	3.36
Problem solving skills	3.38	3.54
Team work	3.24	3.41

Source: primary data

Table 4.39 reveals the mean responses given by the students for the support given by the institutions towards employability skills. The mean response scored by the students studying in engineering colleges on support given by the institutions towards Basic academic skills is 3.36 and students studying in Universities are 3.48. The mean response scored by the students studying in engineering colleges on support given by the institutions towards Self management is 3.29 and students studying in Universities are 3.42. The mean response scored by the students studying in engineering colleges on support given by the institutions towards Higher order thinking skills is 3.26 and students studying in Universities are 3.39. The mean response scored by the students studying in engineering colleges on support given by the institutions towards Entrepreneurial skills is 3.21 and students studying in Universities is 3.36.The mean response scored by the students studying in engineering colleges on support given by the institutions towards Problem solving skills is 3.38 and students studying in Universities is 3.54.The mean response scored by the students studying in engineering colleges on support given by the institutions towards Team work is 3.24 and students studying in

Universities is 3.41. This shows that the responses given by the engineering students shows that the students studying in Universities are getting more support from their institution than the students studying in engineering Colleges towards employability skills.

d) Descriptive of satisfaction towards employability skills

Engineering students have expressed their opinion towards the level of satisfaction towards employability skills. The mean responses given by the respondents towards satisfaction for each factors of employability skills were displayed institution wise in table 4.40

Table 4.40 Descriptive of Satisfaction towards employability skills

	Mean response	
	Engineering college	**University**
Basic Academic skills	3.38	3.52
Self management	3.39	3.49
Higher order thinking skills	3.25	3.53
Entrepreneurial skills	3.42	3.62
Problem solving skills	3.48	3.74
Team work	3.60	3.71

Source: primary data

Table 4.40 depicts the mean responses given by the students on satisfaction towards employability skills. The mean response scored by the students studying in engineering colleges on satisfaction towards Basic academic skills is 3.38 and students studying in Universities are 3.52. The mean response scored by the students studying in engineering colleges on satisfaction towards Self management is 3.39 and students studying in Universities are 3.49. The mean response scored by the students studying in engineering colleges on satisfaction towards Higher order thinking skills is

3.25 and students studying in Universities are 3.53. The mean response scored by the students studying in engineering colleges on satisfaction towards Entrepreneurial skills is 3.42 and students studying in Universities are 3.62. The mean response scored by the students studying in engineering colleges on satisfaction towards Problem solving skills is 3.48 and students studying in Universities are 3.74. The mean response scored by the students studying in engineering colleges on satisfaction towards Team work is 3.60 and students studying in Universities are 3.71. This shows that the responses given by the engineering students shows that the satisfaction level of students studying in Universities are higher than the satisfaction level of the students studying in engineering Colleges towards employability skills.

4.7 INFLUENCE OF STUDENT'S GENDER ON EMPLOYABILITY SKILLS IN ENGINEERING INSTITUTION

4.7.1 Influence of student's gender on Employability skills in Engineering Institution

To test the significant influence of student's gender on opinion towards Employability skills in Engineering Institution, one way ANOVA is applied to ascertain the influence of student's gender on Employability skills in Engineering Institution. The following null hypotheses were framed:

H_0 3: There is no significant influence of student's gender on opinion towards (a) Basic Academic skills (b) Self management (c) Higher order thinking skills (d) Entrepreneurial skills (e) Problem solving skills (f) Team work in Engineering institutions.

Table 4.41 shows the results of influence of student's gender on opinion towards Employability skills in Engineering Institution.

Table 4.41 Influence of student's gender towards Employability skills in Engineering Institution

	Gender	N	Mean	S D	F-value
Basic Academic skills	Male	484	24.37	3.186	**1.552 (p=.091)**
	Female	216	25.03	3.181	
Self management	Male	484	19.30	2.563	**1.285 (p=.199)**
	Female	216	19.55	1.886	
Higher order thinking skills	Male	484	18.40	2.902	**1.099 (p=.272)**
	Female	216	18.66	2.925	
Entrepreneurial skills	Male	484	18.37	2.599	**1.441 (p=.150)**
	Female	216	18.12	2.700	
Problem solving skills	Male	484	14.76	2.255	**0.317 (p=.751)**
	Female	216	14.70	2.001	
Team work	Male	484	11.76	1.616	**0.489 (p=.625)**
	Female	216	11.83	1.622	

Basic Academic skills

The obtained 'F' value is 1.552 and it is not significant at 5% level. The value indicates that there is no significant influence of student's gender on Basic Academic skills. Therefore, the formulated hypothesis H_0 3(a) that "there is no significant influence of student's gender on Basic Academic skills" is accepted.

Self management

The obtained 'F' value is 1.285 and it is not significant at 5% level. The value indicates that there is no significant influence of student's gender on Self

management. Therefore, the formulated hypothesis H_0 3(b) that "there is no significant influence of student's gender on Self management" is accepted.

Higher order thinking skills

The obtained 'F' value is 1.099 and it is not significant at 5% level. The value indicates that there is no significant influence of student's gender on Higher order thinking skills. Therefore, the formulated hypothesis H_0 3(c) that "there is no significant influence of student's gender on Higher order thinking skills" is accepted.

Entrepreneurial skills

The obtained 'F' value is 1.441 and it is not significant at 5% level. The value indicates that there is no significant influence of student's gender on Entrepreneurial skills. Therefore, the formulated hypothesis H_0 3(d) that "there is no significant influence of student's gender on Entrepreneurial skills" is accepted.

Problem solving skills

The obtained 'F' value is 0.317 and it is not significant at 5% level. The value indicates that there is no significant influence of student's gender on Problem solving skills. Therefore, the formulated hypothesis H_0 3(e) that "there is no significant influence of student's gender on Problem solving skills" is accepted.

Team work

The obtained 'F' value is 0.489 and it is not significant at 5% level. The value indicates that there is no significant influence of student's gender on Team work. Therefore, the formulated hypothesis H_0 3(f) that "there is no significant influence of student's gender on Team work" is accepted.

4.7.2 Influence of Institution on Employability skills in Engineering Institution

To test the significant influence of Institution on opinion towards Employability skills in Engineering Institution, one way ANOVA is applied to ascertain the influence of Institution on Employability skills in Engineering Institution. The following null hypotheses were framed:

H_0 4: There is no significant influence of Institution on opinion towards (a) Basic Academic skills (b) Self management (c) Higher order thinking skills (d) Entrepreneurial skills (e) Problem solving skills (f) Team work in Engineering institutions.

Table 4.42 shows the results of influence of Institution on opinion towards Employability skills in Engineering Institution.

Table 4.42 Influence of Institution towards Employability skills in Engineering Institution

	Institution	N	Mean	S D	F-value
Basic Academic skills	Universities	388	25.23	3.386	**4.930** (p<.001)**
	Engineering Colleges	312	24.05	2.937	
Self management	Universities	388	20.47	2.339	**2.913** (p=.006)**
	Engineering Colleges	312	19.30	2.407	
Higher order thinking skills	Universities	388	18.92	2.339	**3.019** (p<.001)**
	Engineering Colleges	312	18.02	2.407	
Entrepreneurial skills	Universities	388	18.32	2.812	**0.211 (p=.833)**
	Engineering Colleges	312	18.27	2.480	
Problem solving skills	Universities	388	15.56	2.338	**2.951** (p=.005)**
	Engineering Colleges	312	14.28	2.032	
Team work	Universities	388	11.82	1.633	**0.468 (p=.640)**
	Engineering Colleges	312	11.76	1.606	

** significant at 1% level

Basic Academic skills

The obtained 'F' value is 4.930 and it is significant at 1% level. The value indicates that there is significant influence of institution on Basic Academic skills.

Further, the mean table 4.42 indicates that the students studying in Universities have scored higher mean value of 25.23 and the lowest mean value was scored by the students studying in Engineering Colleges (24.05). This shows that the students studying in Universities are possessing better Basic Academic skills than the students studying in Engineering Colleges. Therefore, the formulated hypothesis H_0 4(a) that "there is no significant influence of institution on Basic Academic skills" is rejected.

Self management

The obtained 'F' value is 2.913 and it is significant at 1% level. The value indicates that there is significant influence of institution on Self management.

Further, the mean table 4.42 indicates that the students studying in Universities have scored higher mean value of 20.47 and the lowest mean value was scored by the students studying in Engineering Colleges (19.30). This shows that the students studying in Universities possess better in Self management skills than the students studying in Engineering Colleges. Therefore, the formulated hypothesis H_0 4(b) that "there is no significant influence of institution on Self management" is rejected.

Higher order thinking skills

The obtained 'F' value is 3.019 and it is significant at 1% level. The value indicates that there is significant influence of institution on Higher order thinking skills.

Further, the mean table 4.42 indicates that the students studying in Universities have scored higher mean value of 18.92 and the lowest mean value was scored by the students studying in Engineering Colleges (18.02). This shows that the students studying in Universities are possessing better Higher order thinking skills than the students studying in Engineering Colleges. Therefore, the formulated hypothesis H_0 4(c) that "there is no significant influence of institution on Higher order thinking skills" is rejected.

Entrepreneurial skills

The obtained 'F' value is 0.211 and it is not significant at 5% level. The value indicates that there is no significant influence of institution on Entrepreneurial skills.

Therefore, the formulated hypothesis H_0 4(d) that "there is no significant influence of institution on Entrepreneurial skills" is accepted.

Problem solving skills

The obtained 'F' value is 2.951 and it is significant at 1% level. The value indicates that there is significant influence of institution on Problem solving skills.

Further, the mean table 4.42 indicates that the students studying in Universities have scored higher mean value of 15.56 and the lowest mean value was scored by the students studying in Engineering Colleges (14.28). This shows that the students studying in Universities are possessing better Problem solving skills than the students studying in Engineering Colleges. Therefore, the formulated hypothesis H_0 4(e) that "there is no significant influence of institution on Problem solving skills" is rejected.

Team work

The obtained 'F' value is 0.468 and it is no significant at 5% level. The value indicates that there is no significant influence of institution on Team work.

Therefore, the formulated hypothesis H_0 4(f) that "there is no significant influence of institution on Team work" is accepted.

4.7.3 Influence of branch on Employability skills in Engineering Institution

To test the significant influence of branch on opinion towards Employability skills in Engineering Institution, one way ANOVA is applied to ascertain the influence of branch on Employability skills in Engineering Institution. The following null hypotheses were framed:

H_0 5: There is no significant influence of branch on opinion towards (a) Basic Academic skills (b) Self management (c) Higher order thinking skills (d) Entrepreneurial skills (e) Problem solving skills (f) Team work in Engineering institutions.

Table 4.43 shows the results of influence of branch on opinion towards Employability skills in Engineering Institution.

Table 4.43 Influence of branch towards Employability skills in Engineering Institution

	Branch	N	Mean	S D	F-value
Basic Academic skills	Mechanical Engineering	116	23.75	2.324	**33.151** ** **(p<.001)**
	Electronic Communication	324	24.43	2.994	
	Electrical & Electronics	132	27.21	2.455	
	Computer Science	128	22.96	3.445	
Self management	Mechanical Engineering	116	18.48	1.931	**13.494** ** **(p<.001)**
	Electronic Communication	324	19.62	2.539	
	Electrical & Electronics	132	20.09	2.102	
	Computer Science	128	18.84	2.246	
Higher order thinking skills	Mechanical Engineering	116	17.34	2.769	**33.375** ** **(p<.001)**
	Electronic Communication	324	18.85	2.666	
	Electrical & Electronics	132	19.96	2.768	
	Computer Science	128	17.06	2.794	
Entrepreneurial skills	Mechanical Engineering	116	17.20	2.181	**22.626** ** **(p<.001)**
	Electronic Communication	324	18.81	2.397	
	Electrical & Electronics	132	19.00	2.580	
	Computer Science	128	17.25	2.990	
Problem solving skills	Mechanical Engineering	116	14.20	2.032	**13.583** ** **(p<.001)**
	Electronic Communication	324	15.02	1.875	
	Electrical & Electronics	132	15.30	1.921	
	Computer Science	128	13.93	2.860	
Team work	Mechanical Engineering	116	11.37	1.613	**8.348** ** **(p<.001)**
	Electronic Communication	324	12.00	1.573	
	Electrical & Electronics	132	12.03	1.295	
	Computer Science	128	11.47	1.873	

** significant at 1% level

Basic Academic skills

The obtained 'F' value is 33.151 and it is significant at 1% level. The value indicates that there is significant influence of branch on Basic Academic skills.

Further, the mean table 4.43 indicates that the students studying courses in Electrical & Electronics have scored higher mean value of 27.21 and the lowest mean value was scored by the students studying courses in Computer Science (22.96). This shows that the students studying courses in Electrical & Electronics possess better Basic Academic skills and the students studying courses in Computer Science are lacking in Basic Academic skills. Therefore, the formulated hypothesis H_0 5(a) that "there is no significant influence of branch on Basic Academic skills" is rejected.

Self management

The obtained 'F' value is 13.494 and it is significant at 1% level. The value indicates that there is significant influence of branch on Self management.

Further, the mean table 4.43 indicates that the students studying courses in Electrical & Electronics have scored higher mean value of 20.09 and the lowest mean value was scored by the students studying courses in Mechanical Engineering (18.84). This shows that the students studying courses in Electrical & Electronics possess better Self management skills and the students studying courses in Mechanical Engineering are lacking in Self management skills. Therefore, the formulated hypothesis H_0 5(b) that "there is no significant influence of branch on Self management" is rejected.

Higher order thinking skills

The obtained 'F' value is 33.375 and it is significant at 1% level. The value indicates that there is significant influence of branch on Higher order thinking skills.

Further, the mean table 4.43 indicates that the students studying courses in Electrical & Electronics have scored higher mean value of 19.96 and the lowest mean value was scored by the students studying courses in Computer Science (17.06). This shows that the students studying courses in Electrical & Electronics are possessing better Higher order thinking skills and the students studying courses in Computer Science are lacking in Higher order thinking skills. Therefore, the formulated hypothesis H_0 5(c) that "there is no significant influence of branch on Higher order thinking skills" is rejected.

Entrepreneurial skills

The obtained 'F' value is 22.626 and it is significant at 1% level. The value indicates that there is significant influence of branch on Entrepreneurial skills.

Further, the mean table 4.43 indicates that the students studying courses in Electrical & Electronics have scored higher mean value of 19.00 and the lowest mean value was scored by the students studying courses in Mechanical Engineering (17.20). This shows that the students studying courses in Electrical & Electronics possess better Entrepreneurial skills and the students studying courses in Mechanical Engineering are lacking in Entrepreneurial skills. Therefore, the formulated hypothesis H_0 5(d) that "there is no significant influence of branch on Entrepreneurial skills" is rejected.

Problem solving skills

The obtained 'F' value is 13.583 and it is significant at 1% level. The value indicates that there is significant influence of branch on Problem solving skills.

Further, the mean table 4.43 indicates that the students studying courses in Electrical & Electronics have scored higher mean value of 15.30 and the lowest mean value was scored by the students studying courses in Computer

Science (13.93). This shows that the students studying courses in Electrical & Electronics possess better Problem solving skills and the students studying courses in Computer Science are lacking in Problem solving skills. Therefore, the formulated hypothesis H_0 5(e) that "there is no significant influence of branch on Problem solving skills" is rejected.

Team work

The obtained 'F' value is 8.348 and it is significant at 1% level. The value indicates that there is significant influence of branch on Team work.

Further, the mean table 4.43 indicates that the students studying courses in Electrical & Electronics have scored higher mean value of 12.03 and the lowest mean value was scored by the students studying courses in Mechanical Engineering (11.37). This shows that the students studying courses in Electrical & Electronics are good in Team work skills and the students studying courses in Mechanical Engineering are lacking in Team work skills. Therefore, the formulated hypothesis H_0 5(f) that "there is no significant influence of branch on Team work" is rejected.

4.7.4 Influence of existence of institution on Employability skills in Engineering Institution

To test the significant influence of existence of institution on opinion towards Employability skills in Engineering Institution, one way ANOVA is applied to ascertain the influence of existence of institution on Employability skills in Engineering Institution. The following null hypotheses were framed:

H_0 6: There is no significant influence of existence of institution on opinion towards (a) Basic Academic skills (b) Self management (c) Higher order thinking skills (d) Entrepreneurial skills (e) Problem solving skills (f) Team work in Engineering institutions.

Table 4.44 shows the results of influence of existence of institution on opinion towards Employability skills in Engineering Institution.

Table 4.44 Influence of existence of institution towards Employability skills in Engineering Institution

	Existence of Institution	N	Mean	S D	F-value
Basic Academic skills	Less than 10 years	120	24.68	3.285	**6.083** (p=.002)
	10-15 years	168	24.72	3.042	
	More than 15 years	412	25.36	3.280	
Self management	Less than 10 years	120	19.40	2.344	**3.987** (p=846)
	10-15 years	168	19.42	2.404	
	More than 15 years	412	20.21	2.390	
Higher order thinking skills	Less than 10 years	120	19.40	2.344	**8.976** (p=.846)
	10-15 years	168	19.42	2.404	
	More than 15 years	412	19.95	2.390	
Entrepreneurial skills	Less than 10 years	120	18.16	2.568	**4.480** (p=.075)
	10-15 years	168	18.58	2.716	
	More than 15 years	412	19.01	2.572	
Problem solving skills	Less than 10 years	120	14.24	2.393	**6.313** (p<.001)
	10-15 years	168	14.56	2.035	
	More than 15 years	412	15.26	1.920	
Team work	Less than 10 years	120	11.73	1.567	**2.786*** (p=.297)
	10-15 years	168	11.90	1.797	
	More than 15 years	412	12.12	1.400	

* significant at 5% level ** significant at 1% level

Basic Academic skills

The obtained 'F' value is 6.083 and it is significant at 1% level. The value indicates that there is significant influence of existence of institution on Basic Academic skills.

Further, the mean table 4.44 indicates that the students studying in institutions existing more than 15 years have scored higher mean value of 25.36 and the lowest mean value was scored by the students studying in institutions existing less than 10 years (24.68). This shows that students studying in institutions existing more than 15 years possess better Basic Academic skills and the students studying in institutions existing less than 10 years are lacking in Basic Academic skills. Therefore, the formulated hypothesis H_0 6(a) that "there is no significant influence of institution on Basic Academic skills" is rejected.

Self management

The obtained 'F' value is 3.987 and it is significant at 1% level. The value indicates that there is significant influence of existence of institution on Self management.

Further, the mean table 4.44 indicates that the students studying in institutions existing more than 15 years have scored higher mean value of 20.21 and the lowest mean value was scored by the students studying in institutions existing less than 10 years (19.40). This shows that students studying in institutions existing more than 15 years possess better Self management skills and the students studying in institutions existing less than 10 years are lacking in Self management skills. Therefore, the formulated hypothesis H_0 6(b) that "there is no significant influence of institution on Self management" is rejected.

Higher order thinking skills

The obtained 'F' value is 8.976 and it is significant at 1% level. The value indicates that there is significant influence of existence of institution on Higher order thinking skills.

Further, the mean table 4.44 indicates that the students studying in institutions existing more than 15 years have scored higher mean value of 19.95 and the lowest mean value was scored by the studying in institutions existing less than 10 years (19.40). This shows that students studying in institutions existing more than 15 years are possessing better Higher order thinking skills and the students studying in institutions existing less than 10 years are lacking in Higher order thinking skills.

Therefore, the formulated hypothesis H_0 6(c) that "there is no significant influence of institution on Higher order thinking skills" is rejected.

Entrepreneurial skills

The obtained 'F' value is 4.480 and it is significant at 1% level. The value indicates that there is significant influence of existence of institution on Entrepreneurial skills.

Further, the mean table 4.44 indicates that the students studying in institutions existing more than 15 years have scored higher mean value of 19.01 and the lowest mean value was scored by the students studying in institutions existing less than 10 years (18.16). This shows that the students studying in institutions existing more than 15 years are possessing better Entrepreneurial skills and the students studying in institutions existing less than 10 years are lacking in Entrepreneurial skills. Therefore, the formulated hypothesis H_0 6(d) that "there is no significant influence of institution on Entrepreneurial skills" is rejected.

Problem solving skills

The obtained 'F' value is 6.313 and it is significant at 1% level. The value indicates that there is significant influence of existence of institution on Problem solving skills.

Further, the mean table 4.44 indicates that the students studying in institutions existing more than 15 years have scored higher mean value of 15.26 and the lowest mean value was scored by the students studying in institutions existing less than 10 years(14.24). This shows that the students studying in institutions existing more than 15 years possess better Problem solving skills and the students studying in institutions existing less than 10 years are lacking in Problem solving skills. Therefore, the formulated hypothesis H_0 6(e) that "there is no significant influence of institution on Problem solving skills" is rejected.

Team work

The obtained 'F' value is 2.786 and it is significant at 5% level. The value indicates that there is significant influence of existence of institution on Team work.

Further, the mean table 4.44 indicates that the students studying in institutions existing more than 15 years have scored higher mean value of 12.12 and the lowest mean value was scored by the students studying in institutions existing less than 10 years (11.73). This shows that the students studying in institutions existing more than 15 years possess better Team work skills and the students studying in institutions existing less than 10 years are lacking in Team work skills. Therefore, the formulated hypothesis H_0 6(f) that "there is no significant influence of institution on Team work" is rejected.

4.7.5 Influence of father's employment on Employability skills in Engineering Institution

To test the significant influence of father's employment on opinion towards Employability skills in Engineering Institution, one way ANOVA is applied to ascertain the influence of father's employment on Employability skills in Engineering Institution. The following null hypotheses were framed:

H_0 7: There is no significant influence of father's employment on opinion towards (a) Basic Academic skills (b) Self management (c) Higher order thinking skills (d) Entrepreneurial skills (e) Problem solving skills (f) Team work in Engineering institutions.

Table 4.45 shows the results of influence of father's employment on opinion towards Employability skills in Engineering Institution.

Table 4.45

Influence of father's employment towards Employability skills in Engineering Institution

	Father's employment	N	Mean	S D	F-value
Basic Academic skills	Government	156	23.58	2.742	**8.109** ** **(p<.001)**
	Private	296	24.81	3.454	
	Business	136	25.29	2.926	
	Self-Employed	112	24.47	3.095	
Self management	Government	156	18.96	1.952	**4.451** ** **(p=.004)**
	Private	296	19.74	2.489	
	Business	136	19.29	2.328	
	Self-Employed	112	19.11	2.553	
Higher order thinking skills	Government	156	17.93	2.771	**3.742*** **(p=.011)**
	Private	296	18.86	2.918	
	Business	136	18.29	2.976	
	Self-Employed	112	18.49	2.888	
Entrepreneurial skills	Government	156	17.98	2.700	**1.113 (p=.343)**
	Private	296	18.46	2.591	
	Business	136	18.29	2.844	
	Self-Employed	112	18.29	2.354	
Problem solving skills	Government	156	14.44	1.945	**1.986 (p=.115)**
	Private	296	14.95	2.279	
	Business	136	14.67	2.159	
	Self-Employed	112	14.66	2.207	
Team work	Government	156	11.61	1.640	**0.802 (p=.493)**
	Private	296	11.85	1.646	
	Business	136	11.82	1.641	
	Self-Employed	112	11.80	1.475	

** significant at 1% level

Basic Academic skills

The obtained 'F' value is 8.109 and it is significant at 1% level. The value indicates that there is significant influence of father's employment on Basic Academic skills.

Further, the mean table 4.45 indicates that the students whose fathers is running business have scored higher mean value of 25.29 and the lowest mean value was scored by the students whose fathers is working in Government sector (23.58). This shows that students whose fathers running own business are better in Basic Academic skills and the students whose fathers working in Government sector are lacking in Basic Academic skills. Therefore, the formulated hypothesis H_0 7(a) that "there is no significant influence of father's employment on Basic Academic skills" is rejected.

Self management

The obtained 'F' value is 4.451 and it is significant at 1% level. The value indicates that there is significant influence of father's employment on Self management.

Further, the mean table 4.45 indicates that the students whose fathers working in private sector have scored higher mean value of 19.74 and the lowest mean value was scored by the students whose fathers working in Government sector (18.96). This shows that the students whose fathers working in private employees are better in Self management skills and the students whose fathers working in Government are lacking in Self management skills. Therefore, the formulated hypothesis H_0 7(b) that "there is no significant influence of father's employment on Self management" is rejected.

Higher order thinking skills

The obtained 'F' value is 3.742 and it is significant at 5% level. The value indicates that there is significant influence of father's employment on Higher order thinking skills.

Further, the mean table 4.45 indicates that the students whose fathers working in private organization have scored higher mean value of 18.86 and the lowest mean value was scored by the students whose fathers working in Government employees (17.93). This shows that the students whose fathers working in private employees are possessing better Higher order thinking skills and the students whose fathers working in Government employees are lacking in Higher order thinking skills. Therefore, the formulated hypothesis H_0 7(c) that "there is no significant influence of father's employment on Higher order thinking skills" is rejected.

Entrepreneurial skills

The obtained 'F' value is 1.113 and it is not significant at 5% level. The value indicates that there is no significant influence of father's employment on Entrepreneurial skills. Therefore, the formulated hypothesis H_0 7(d) that "there is no significant influence of father's employment on Entrepreneurial skills" is accepted.

Problem solving skills

The obtained 'F' value is 1.986 and it is not significant at 5% level. The value indicates that there is no significant influence of father's employment on Problem solving skills. Therefore, the formulated hypothesis H_0 7(e) that "there is no significant influence of father's employment on Problem solving skills" is accepted.

Team work

The obtained 'F' value is 0.802 and it is not significant at 5% level. The value indicates that there is no significant influence of father's employment on Team work. Therefore, the formulated hypothesis H_0 7(f) that "there is no significant influence of father's employment on Team work" is accepted.

4.7.6 Influence of mother's employment on Employability skills in Engineering Institution

To test the significant influence of mother's employment on opinion towards Employability skills in Engineering Institution, one way ANOVA is applied to ascertain the influence of mother's employment on Employability skills in Engineering Institution. The following null hypotheses were framed:

H_0 8: There is no significant influence of mother's employment on opinion towards (a) Basic Academic skills (b) Self management (c) Higher order thinking skills (d) Entrepreneurial skills (e) Problem solving skills (f) Team work in Engineering institutions.

Table 4.46 shows the results of influence of mother's employment on opinion towards Employability skills in Engineering Institution.

Table 4.46 Influence of mother's employment towards Employability skills in Engineering Institution

	Mother's employment	N	Mean	S D	F-value
Basic Academic skills	Government	68	25.08	3.729	**11.548** ** **(p<.001)**
	Private	188	25.55	3.202	
	Business	64	24.62	2.803	
	Self-Employed	136	23.26	2.852	
	House wife	244	24.39	3.048	
Self management	Government	68	19.52	1.927	**2.616*** **(p=.034)**
	Private	188	19.42	2.263	
	Business	64	20.18	2.084	
	Self-Employed	136	19.08	2.580	
	House wife	244	19.26	2.493	

	Mother's employment	N	Mean	S D	F-value
Higher order thinking skills	Government	68	19.00	2.932	**5.401** (p<.001)
	Private	188	19.04	3.156	
	Business	64	18.37	2.074	
	Self-Employed	136	18.64	2.879	
	House wife	244	17.85	2.804	
Entrepreneurial skills	Government	68	19.11	2.949	**5.540** (p<.001)
	Private	188	18.29	2.264	
	Business	64	19.06	1.999	
	Self-Employed	136	18.44	2.963	
	House wife	68	14.52	1.696	
Problem solving skills	Government	188	14.76	1.986	**0.985** (p=.415)
	Private	64	14.75	1.532	
	Business	136	14.50	2.851	
	Self-Employed	244	14.91	2.149	
	House wife	68	11.76	1.527	
Team work	Government	68	11.76	1.527	**7.516** (p<.001)
	Private	188	11.55	1.517	
	Business	64	12.31	1.622	
	Self-Employed	136	12.29	1.568	
	House wife	244	11.55	1.658	

*significant at 5% level **significant at 1% level

Basic Academic skills

The obtained 'F' value is 11.548 and it is significant at 1% level. The value indicates that there is significant influence of mother's employment on Basic Academic skills.

Further, the mean table 4.46 indicates that the students whose mothers working in private organisation have scored higher mean value of 25.55 and the lowest mean value was scored by the students whose mothers are self employed (23.26). This shows that the students whose mothers working in private organisation possess better Basic Academic skills and the students whose mothers are self employed are lacking in Basic Academic skills. Therefore, the formulated hypothesis H_0 8(a) that "there is no significant influence of mother's employment on Basic Academic skills" is rejected.

Self management

The obtained 'F' value is 2.616 and it is significant at 5% level. The value indicates that there is significant influence of mother's employment on Self management.

Further, the mean table 4.46 indicates that the students whose mothers running their own business have scored higher mean value of 20.18 and the lowest mean value was scored by the students whose mothers working in Government sector (19.08). This shows that students whose mothers working in private organisation are possessing better Self management skills and students whose mothers working in Government are lacking in Self management skills. Therefore, the formulated hypothesis H_0 8(b) that "there is no significant influence of mother's employment on Self management" is rejected.

Higher order thinking skills

The obtained 'F' value is 5.401 and it is significant at 5% level. The value indicates that there is significant influence of mother's employment on Higher order thinking skills.

Further, the mean table 4.46 indicates that the students whose mothers are working in private organization have scored higher mean value of 19.04

and the lowest mean value was scored by the students whose mothers are House wives (17.85). This shows that students whose mothers are working in private employees are possessing better Higher order thinking skills and the students whose mothers are House wives are lacking in Higher order thinking skills. Therefore, the formulated hypothesis H_0 8(c) that "there is no significant influence of mother's employment on Higher order thinking skills" is rejected.

Entrepreneurial skills

The obtained 'F' value is 5.540 and it is significant at 1% level. The value indicates that there is significant influence of mother's employment on Entrepreneurial skills.

Further, the mean table 4.46 indicates that the students whose mothers working in Government sector have scored higher mean value of 19.11 and the lowest mean value was scored by the students whose mothers are House wives (14.52). This shows that the students whose mothers are working in Government are possessing better Entrepreneurial skills and the students whose mothers are House wives are lacking in Entrepreneurial skills. Therefore, the formulated hypothesis H_0 8(d) that "there is no significant influence of mother's employment on Entrepreneurial skills" is rejected.

Problem solving skills

The obtained 'F' value is 0.985 and it is not significant at 5% level. The value indicates that there is no significant influence of mother's employment on Problem solving skills.

Therefore, the formulated hypothesis H_0 8(e) that "there is no significant influence of mother's employment on Problem solving skills" is accepted.

Team work

The obtained 'F' value is 7.516 and it is significant at 1% level. The value indicates that there is significant influence of mother's employment on Team work.

Further, the mean table 4.46 indicates that the students whose mothers are running their own business have scored higher mean value of 12.31 and the lowest mean value was scored by the students whose mothers are House wives (11.55). This shows that the students whose mothers doing business are possessing better Team work skills and the students whose mothers are House wives are little lacking in Team work skills. Therefore, the formulated hypothesis H_0 8(f) that "there is no significant influence of mother's employment on Team work" is rejected.

4.7.7 Influence of student's native area on Employability skills in Engineering Institution

To test the significant influence of student's native area on opinion towards Employability skills in Engineering Institution, one way ANOVA is applied to ascertain the influence of student's native area on Employability skills in Engineering Institution. The following null hypotheses were framed:

H_0 9: There is no significant influence of student's native area on opinion towards (a) Basic Academic skills (b) Self management (c) Higher order thinking skills (d) Entrepreneurial skills (e) Problem solving skills (f) Team work in Engineering institutions.

Table 4.47 shows the results of influence of student's native area on opinion towards Employability skills in Engineering Institution.

Table 4.47 Influence of student's native area towards Employability skills in Engineering Institution

	Native area	N	Mean	S D	F-value
Basic Academic skills	Urban	240	24.01	3.439	**8.324** **(p<.001)**
	Sub-urban	280	24.60	3.160	
	Rural	180	25.28	2.761	
Self management	Urban	240	19.38	2.689	**0.184** **(p=832)**
	Sub-urban	280	19.32	2.313	
	Rural	180	19.46	2.012	
Higher order thinking skills	Urban	240	17.88	2.978	**9.509** **(p< .001)**
	Sub-urban	280	18.61	2.705	
	Rural	180	19.08	2.988	
Entrepreneurial skills	Urban	240	17.95	2.789	**5.152** **(p=.006)**
	Sub-urban	280	18.28	2.746	
	Rural	180	18.77	2.123	
Problem solving skills	Urban	240	14.71	2.420	**5.044** **(p=.007)**
	Sub-urban	280	14.50	2.180	
	Rural	180	15.15	1.742	
Team work	Urban	240	11.67	1.108	**11.985** **(p<.001)**
	Sub-urban	280	11.46	1.087	
	Rural	180	12.67	1.124	

** significant at 1% level

Basic Academic skills

The obtained 'F' value is 8.324 and it is significant at 1% level. The value indicates that there is significant influence of students' native area on Basic Academic skills.

Further, the mean table 4.47 indicates that the students from rural background have scored higher mean value of 25.28 and the lowest mean value was scored by the students from urban area (24.01). This shows that students from rural area are possessing better Basic Academic skills and the students from urban area are lacking in Basic Academic skills. Therefore, the formulated hypothesis H_0 9(a) that "there is no significant influence of students' native area on Basic Academic skills" is rejected.

Self management

The obtained 'F' value is 0.184 and it is not significant at 5% level. The value indicates that there is no significant influence of students' native area on Self management. Therefore, the formulated hypothesis H_0 9(b) that "there is no significant influence of students' native area on Self management" is accepted.

Higher order thinking skills

The obtained 'F' value is 9.509 and it is significant at 1% level. The value indicates that there is significant influence of students' native area on Higher order thinking skills.

Further, the mean table 4.47 indicates that the students from rural area have scored higher mean value of 19.08 and the lowest mean value was scored by the students from urban area (17.88). This shows that students from rural area are possessing better Higher order thinking skills and the students from urban area are lacking in Higher order thinking skills. Therefore, the formulated hypothesis H_0 9(c) that "there is no significant influence of students' native area on Higher order thinking skills" is rejected.

Entrepreneurial skills

The obtained 'F' value is 5.152 and it is significant at 1% level. The value indicates that there is significant influence of students' native area on Entrepreneurial skills.

Further, the mean table 4.47 indicates that the students from rural area have scored higher mean value of 18.77 and the lowest mean value was scored by the students from urban area (17.95). This shows that the students from rural area are possessing better Entrepreneurial skills and the students from urban area are lacking in Entrepreneurial skills. Therefore, the formulated hypothesis H_0 9(d) that "there is no significant influence of students' native area on Entrepreneurial skills" is rejected.

Problem solving skills

The obtained 'F' value is 5.044 and it is significant at 1% level. The value indicates that there is significant influence of students' native area on Problem solving skills.

Further, the mean table 4.47 indicates that the students from rural area have scored higher mean value of 15.15 and the lowest mean value was scored by the students from Sub-urban area (14.50). This shows that students from rural area are possessing better Problem solving skills and the students from Sub-urban area are lacking in Problem solving skills. Therefore, the formulated hypothesis H_0 9(e) that "there is no significant influence of students' native area on Problem solving skills" is rejected.

Team work

The obtained 'F' value is 11.985 and it is significant at 1% level. The value indicates that there is significant influence of students' native area on Team work.

Further, the mean table 4.47 indicates that the students from urban area have scored higher mean value of 12.67 and the lowest mean value was scored by the students from sub-urban area (11.46). This shows that students from urban area are possessing better Team work skills and the students from sub-urban area are lacking in Team work skills. Therefore, the formulated hypothesis H_0 9(f) that "there is no significant influence of students' native area on Team work" is rejected.

4.8 ASSOCIATION OF DEMOGRAPHICS ON OPINION, EXPECTATIONS, SUPPORT AND SATISFACTION OF EMPLOYABILITY SKILLS

4.8.1 Association between gender and opinion towards employability skills

To assess the association between gender and opinion towards employability skills, Chi-square test is performed to identify the association between gender and opinion towards employability skills. The cross tabulation between gender and opinion towards employability skills is presented in the table 4.48.

Null hypothesis H_0 10(a): There is no significant association between gender and opinion towards employability skills.

Table 4.48 Association between gender and opinion towards employability skills

			Opinion			Total	Chi-square Value
			Low	Medium	High		
Gender	Male	N	124	136	224	484	11.156** (p = .004)
		%	17.7%	19.4%	32.0%	69.1%	
	Female	N	48	40	128	216	
		%	6.9%	5.7%	18.3%	30.9%	
Total		N	172	176	352	700	
		%	24.6%	25.1%	50.3%	100.0%	

** significant at 1% level

From the table 4.48 it is observed that there is significant association between gender and opinion towards employability skills. Chi- square value (11.156) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that classification based on gender and opinion towards employability skills are well associated. From the table 4.48 it is evident that most of the men (32.0%) are having high opinion towards employability skills.

4.8.2 Association between gender and students expectations towards employability skills

To assess the association between gender and students expectations towards employability skills, Chi-square test is performed to identify the association between gender and students expectations. The cross tabulation between gender and students expectations towards employability skills is presented in the table 4.49.

Null hypothesis H_0 10(b): There is no significant association between gender and students expectations towards employability skills.

Table 4.49 Association between gender and students expectations towards employability skills

			Expectation			Total	Chi-square Value
			Low	Medium	High		
Gender	Male	N	120	128	236	484	2.827 (p = .243)
		%	17.1%	18.3%	33.7%	69.1%	
	Female	N	48	48	120	216	
		%	6.9%	6.9%	17.1%	30.9%	
Total		N	168	176	356	700	
		%	24.0%	25.1%	50.9%	100.0%	

From the table 4.49 it is observed that there is no significant association between gender and students expectations towards employability skills. Chi-square value (2.827) shows that the null hypothesis is accepted at 5% level. Hence it is concluded from the analysis that classification based on gender and expectations towards employability skills are not well associated.

4.8.3 Association between gender and support given by the institutions towards employability skills

To assess the association between gender and support given by the institutions towards employability skills, Chi-square test is performed to identify the association between gender and support given by the institutions towards employability skills. The cross tabulation between gender and support given by the institutions towards employability skills is presented in the table 4.50.

Null hypothesis H_0 10(c): There is no significant association between gender and support given by the institutions towards employability skills.

Table 4.50 Association between gender and support given by the institutions towards employability skills

			Support			Total	Chi-square Value
			Low	Medium	High		
Gender	Male	N	140	120	224	484	21.376** (p < .001)
		%	20.0%	17.1%	32.0%	69.1%	
	Female	N	28	60	128	216	
		%	4.0%	8.6%	18.3%	30.9%	
Total		N	168	180	352	700	
		%	24.0%	25.7%	50.3%	100.0%	

** significant at 1% level

From the table 4.50 it is observed that there is significant association between gender and support given by the institutions towards employability skills. Chi- square value (21.376) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that classification based on gender and support given by the institutions towards employability skills are well associated. From the table 4.50 it is evident that most of the men (32.0%) accepted that they are getting high support from their institutions towards employability skills.

4.8.4 Association between gender and students satisfaction towards employability skills

To assess the association between gender and students satisfaction towards employability skills, Chi-square test is performed to identify the association between gender and students satisfaction towards employability skills. The cross tabulation between gender and students satisfaction towards employability skills is presented in the table 4.51.

Null hypothesis H_0 10(d): There is no significant association between gender and students satisfaction towards employability skills

Table 4.51 Association between gender and students satisfaction towards employability skills

			Satisfaction			Total	Chi-square Value
			Low	Medium	High		
Gender	Male	N	128	128	228	484	7.389* (p = .025)
		%	18.3%	18.3%	32.6%	69.1%	
	Female	N	40	52	124	216	
		%	5.7%	7.4%	17.7%	30.9%	
Total		N	168	180	352	700	
		%	24.0%	25.7%	50.3%	100.0%	

* significant at 5% level

From the table 4.51 it is observed that there is significant association between gender and students satisfaction towards employability skills. Chi-square value (7.389) shows that the null hypothesis is rejected at 5% level. Hence it is concluded from the analysis that classification based on gender and students' satisfaction towards employability skills are well associated. From the table 4.51 it is evident that most of the men (32.6%) are having high satisfaction towards employability skills.

4.8.5 Association between student's native area and opinion towards employability skills

To assess the association between student's native area and opinion towards employability skills, Chi-square test is performed to identify the association between student's native area and opinion towards employability skills. The cross tabulation between student's native area and opinion towards employability skills is presented in the table 4.52.

Null hypothesis H_0 10(e): There is no significant association between student's native area and opinion towards employability skills.

Table 4.52Association between student's native area and opinion towards employability skills

			Opinion			Total	Chi-square Value
			Low	Medium	High		
Native area	Urban	N	68	64	108	240	18.302** (p = .001)
		%	9.7%	9.1%	15.4%	34.3%	
	Sub-urban	N	80	64	136	280	
		%	11.4%	9.1%	19.4%	40.0%	
	Rural	N	24	48	108	180	
		%	3.4%	6.9%	15.4%	25.7%	
Total		N	172	176	352	700	
		%	24.6%	25.1%	50.3%	100.0%	

** significant at 1% level

From the table 4.52 it is observed that there is significant association between student's native area and opinion towards employability skills. Chi-square value (18.302) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that classification based on student's native area and opinion towards employability skills are well associated. From the table 4.52 it is evident that most of the students (19.4%) from sub urban area are having high opinion towards employability skills.

4.8.6 Association between student's native area and students' expectations towards employability skills

To assess the association between student's native area and students' expectations towards employability skills, Chi-square test is performed to identify the association between student's native area and students' expectations towards employability skills. The cross tabulation between student's native area and students expectations towards employability skills is presented in the table 4.53.

Null hypothesis H_0 10(f): There is no significant association between student's native area and students' expectations towards employability skills.

Table 4.53 Association between student's native area and students' expectations towards employability skills

			Expectation			Total	Chi-square Value
			Low	Medium	High		
Native area	Urban	N	44	68	128	240	17.695** (p = .001)
		%	6.3%	9.7%	18.3%	34.3%	
	Sub-urban	N	68	56	156	280	
		%	9.7%	8.0%	22.3%	40.0%	
	Rural	N	56	52	72	180	
		%	8.0%	7.4%	10.3%	25.7%	
Total		N	168	176	356	700	
		%	24.0%	25.1%	50.9%	100.0%	

** significant at 1% level

From the table 4.53 it is observed that there is significant association between student's native area and students' expectations towards employability skills. Chi- square value (17.695) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that classification based on student's native area and students' expectations towards employability skills are well associated. From the table 4.53 it is evident that most of students (22.3%) from sub urban area are having high expectations towards employability skills.

4.8.7 Association between student's native area and support given by the institutions towards employability skills

To assess the association between student's native area and support given by the institutions towards employability skills, Chi-square test is performed to identify the association between student's native area and support given by the institutions towards employability skills. The cross tabulation between student's native area and support is presented in the table 4.54.

Null hypothesis H_0 10(g): There is no significant association between student's native area and support given by the institutions towards employability skills.

Table 4.54 Association between student's native area and support given by the institutions towards employability skills

			Support			Total	Chi-square Value
			Low	Medium	High		
Native area	Urban	N	56	84	100	240	24.768** (p < .001)
		%	8.0%	12.0%	14.3%	34.3%	
	Sub-urban	N	72	68	140	280	
		%	10.3%	9.7%	20.0%	40.0%	
	Rural	N	40	28	112	180	
		%	5.7%	4.0%	16.0%	25.7%	
Total		N	168	180	352	700	
		%	24.0%	25.7%	50.3%	100.0%	

** significant at 1% level

From the table 4.54 it is observed that there is significant association between student's native area and support given by the institutions towards employability skills. Chi- square value (24.768) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that classification based on student's native area and support given by the institutions towards employability skills are well associated. From the table 4.54 it is evident that most of the students from sub urban area (20.0%) agreed that their institutions are giving high support towards employability skills.

4.8.8 Association between student's native area and students' satisfaction towards employability skills

To assess the association between student's native area and students' satisfaction towards employability skills, Chi-square test is performed to identify the association between native area and students' satisfaction. The cross tabulation between native area and students satisfaction towards employability skills is presented in the table 4.55

Null hypothesis H_0 10(h): There is no significant association between student's native area and students' satisfaction towards employability skills.

Table 4.55 Association between student's native area and students' satisfaction towards employability skills

			Satisfaction			Total	Chi-square Value
			Low	Medium	High		
Native area	Urban	N	76	88	76	240	64.076** (p < .001)
		%	10.9%	12.6%	10.9%	34.3%	
	Sub-urban	N	72	52	156	280	
		%	10.3%	7.4%	22.3%	40.0%	
	Rural	N	20	40	120	180	
		%	2.9%	5.7%	17.1%	25.7%	
Total		N	168	180	352	700	
		%	24.0%	25.7%	50.3%	100.0%	

** significant at 1% level

From the table 4.55 it is observed that there is significant association between student's native area and students' satisfaction towards employability skills. Chi- square value (64.076) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that classification based on student's native area and students' satisfaction towards employability skills are well associated. From the table 4.55 it is evident that most of the students (22.3%) from sub urban areas agreed that they are having high satisfaction towards employability skills.

4.9 RELATIONSHIP BETWEEN EXPECTATIONS, SUPPORT AND SATISFACTION TOWARDS EMPLOYABILITY SKILLS

4.9.1 Relationship between expectations, support and satisfaction towards Basic academic skills

To test the significant relationship between expectations, support given by the institutions and satisfaction towards Basic academic skills of engineering students, Bi-variate correlation was applied to assess the significant relationships between expectations, support and satisfaction towards Basic academic skills. The following null hypotheses were framed:

$H_0$11(a): There is no significant relationship between support given by the institutions and satisfaction towards Basic academic skills.

$H_0$11(b): There is no significant relationship between expectations and satisfaction towards Basic academic skills.

$H_0$11(c): There is no significant relationship between expectations towards Basic academic skills and support given by the institutions.

Table 4.56 Relationship between expectations, support and satisfaction towards Basic Academic skills

	Satisfaction	Support	Expectation
Satisfaction	1		
Support	r = 0.704**	1	
	p <.001		
Expectation	r = 0.637**	r = 0.629**	1
	p <.001	p <.001	

** significant at 1% level

Positive significant correlation is observed between support given by the institutions and satisfaction towards Basic academic skills (r = 0.704). Hence the null hypothesis "There is no significant relationship between support given by the institutions and satisfaction towards basic academic skills" is rejected at 1% level. This shows that support given by the institutions to the students brings satisfaction towards Basic academic skills by 70.4%.

Significant correlation is observed between expectation and satisfaction towards Basic academic skills (r = 0.637), which is positive. Hence the null hypothesis "There is no significant relationship between expectation and satisfaction towards basic academic skills" is rejected at 1% level. This shows that relationship between satisfactions has fulfilled the students' expectation towards Basic academic skills by 63.7%.

Positive significant correlation is observed between expectation towards Basic academic skills and support given by the institutions (r = 0.629). Hence the null hypothesis "There is no significant relationship between expectations towards Basic academic skills and support given by the institutions" is rejected

at 1% level. This shows that support given by the institutions has fulfilled the expectations of students towards Basic academic skills by 62.9%.

4.9.2 Relationship between expectations, support and satisfaction towards Self management

To test the significant relationship between expectations, support given by the institutions and satisfaction towards Self management of engineering students, Bi-variate correlation was applied to ascertain the significant relationships between expectations, support and satisfaction towards Self management. The following null hypotheses were framed:

$H_0$12(a): There is no significant relationship between support given by the institutions and satisfaction towards Self management.

$H_0$12(b): There is no significant relationship between expectations and satisfaction towards Self management.

$H_0$12(c): There is no significant relationship between expectations towards Self management and support given by the institutions.

Table 4.57 Relationship between expectations, support and satisfaction towards Self Management

	Satisfaction	Support	Expectation
Satisfaction	1		
Support	r = 0.714**	1	
	p <.001		
Expectation	r = 0.555**	r = 0.584**	1
	p <.001	p <.001	

** significant at 1% level

Positive significant correlation is observed between support given by the institutions and satisfaction towards Self management (r = 0.714). Hence the null hypothesis "There is no significant relationship between support given by the institutions and satisfaction towards self management" is rejected at 1% level. This shows that support given by the institutions brings satisfaction among students towards Self management by 71.4%.

Significant correlation is observed between expectation and satisfaction towards Self management (r = 0.555), which is positive. Hence the null hypothesis "There is no significant relationship between expectation and satisfaction towards self management" is rejected at 1% level. The relationship between satisfaction and expectations shows that satisfaction has fulfilled the students' expectation towards Self management by 55.5%.

Positive significant correlation is observed between expectation and support towards Self management (r = 0.584). Hence the null hypothesis "There is no significant relationship between expectation towards self management and support given by the institutions" is rejected at 1% level. This shows that support given by the institutions has fulfilled the expectations of students towards Self management by 58.4%.

4.9.3 Relationship between expectations, support and satisfaction towards Higher order thinking skills

To test the significant relationship between expectations, support given by the institutions and satisfaction towards Higher order thinking skills of engineering students, Bi-variate correlation was applied to ascertain the significant relationships between expectations, support given by the institutions and satisfaction towards Higher order thinking skills. The following null hypotheses were framed:

$H_0$13(a): There is no significant relationship between support given by the institutionsand satisfaction towards Higher order thinking skills.

$H_0$13(b): There is no significant relationship between expectations and satisfaction towards Higher order thinking skills.

$H_0$13(c): There is no significant relationship between expectations towards Higher order thinking skills and support given by the institutions.

Table 4.58 Relationship between expectations, support and satisfaction towards Higher order thinking skills

	Satisfaction	Support	Expectation
Satisfaction	1		
Support	r = 0.703**	1	
	p <.001		
Expectation	r = 0.537**	r = 0.549**	1
	p <.001	p <.001	

** significant at 1% level

Positive significant correlation is observed between support and satisfaction towards Higher order thinking (r =.703). Hence the null hypothesis "There is no significant relationship between support given by the institutions and satisfaction towards higher order thinking" is rejected at 1% level. This shows that support given by the institutions brings satisfaction among students towards Higher order thinking by 70.3%.

Significant correlation is observed between expectation and satisfaction towards Higher order thinking (r = 0.537), which is positive. Hence the null hypothesis "There is no significant relationship between expectation and satisfaction towards higher order thinking" is rejected at 1% level. The relationship between satisfaction and expectations shows that satisfaction has fulfilled the students' expectation towards Higher order thinking by 53.7%.

Positive significant correlation is observed between expectation and support towards Higher order thinking (r = 0.549). Hence the null hypothesis "There is no significant relationship between expectation towards higher order thinking and support given by the institutions" is rejected at 1% level. This shows that support given by the institutions has fulfilled the expectations of students towards Higher order thinking by 54.9%.

4.9.4 Relationship between expectations, support and satisfaction towards Entrepreneurial skills

To test the significant relationship between expectations, support given by the institutions and satisfaction towards Entrepreneurial skills of engineering students, Bi-variate correlation was applied to ascertain the significant relationships between expectations, support and satisfaction towards Entrepreneurial skills. The following null hypotheses were framed:

$H_0$14(a): There is no significant relationship between support given by the institutions and satisfaction towards Entrepreneurial skills

$H_0$14(b): There is no significant relationship between expectations and satisfaction towards Entrepreneurial skills

$H_0$14(c): There is no significant relationship between expectations towards Entrepreneurial skills and support given by the institutions

Table 4.59Relationship between expectations, support and satisfaction towards Entrepreneurial skills

	Satisfaction	Support	Expectation
Satisfaction	1		
Support	r = 0.797**	1	
	p <.001		
Expectation	r = 0.622**	r = 0.538**	1
	p <.001	p <.001	

** significant at 1% level

Positive significant correlation is observed between support and satisfaction towards Entrepreneurial skills (r = 0.797). Hence the null hypothesis "There is no significant relationship between support given by the institutions and satisfaction towards entrepreneurial skills" is rejected at 1% level. This shows that support given by the institutions brings satisfaction among students towards Entrepreneurial skills by 79.7%.

Significant correlation is observed between expectation and satisfaction towards Entrepreneurial skills (r = 0.622), which is positive. Hence the null hypothesis "There is no significant relationship between expectation and satisfaction towards entrepreneurial skills" is rejected at 1% level. This shows that relationship between satisfaction has fulfilled the students' expectation towards Entrepreneurial skills by 62.2%.

Positive significant correlation is observed between expectation and support towards Entrepreneurial skills (r = 0.538). Hence the null hypothesis "There is no significant relationship between expectation towards entrepreneurial skills and support given by the institutions" is rejected at 1% level. This shows that support given by the institutions has fulfilled the expectations of students towards Entrepreneurial skills by 53.8%.

4.9.5 Relationship between expectations, support and satisfaction towards Problem solving skills

To test the significant relationship between expectations, support given by the institutions and satisfaction towards Problem solving skills of engineering students, Bi-variate correlation was applied to ascertain the significant relationships between expectations, support and satisfaction towards Problem solving skills. The following null hypotheses were framed:

$H_0$15(a): There is no significant relationship between supportgiven by the institutions and satisfaction towards Problem solving skills

$H_0$15(b): There is no significant relationship between expectations and satisfaction towards Problem solving skills

$H_0$15(c): There is no significant relationship between expectations towards Problem solving skills and supportgiven by the institutions

Table 4.60Relationship between expectations, support and satisfaction towards Problem solving skills

	Satisfaction	Support	Expectation
Satisfaction	1		
Support	r =.788**	1	
	p <.001		
Expectation	r =.608**	r =.556**	1
	p <.001	p <.001	

** significant at 1% level

Positive significant correlation is observed between support and satisfaction towards Problem solving skills (r = 0.788). Hence the null hypothesis "There is no significant relationship between support given by the institutions and satisfaction towards problem solving skills" is rejected at 1% level. This shows that support given by the institutions brings satisfaction among students towards Problem solving skills by 78.8%.

Significant correlation is observed between expectation and satisfaction towards Problem solving skills (r = 0.608), which is positive. Hence the null hypothesis "There is no significant relationship between expectation and satisfaction towards problem solving skills" is rejected at 1% level. This shows that relationship between satisfactions has fulfilled the students' expectation towards Problem solving skills by 60.8%

Positive significant correlation is observed between expectation and support towards Problem solving skills (r = 0.556). Hence the null hypothesis "There is no significant relationship between expectation towards problem solving skills and support given by the institutions" is rejected at 1% level. This shows that support given by the institutions has fulfilled the expectations of students towards Problem solving skills by 55.6%.

4.9.6 Relationship between expectations, support and satisfaction towards Team work

To test the significant relationship between expectations, support given by the institutions and satisfaction towards Team work of engineering students, Bi-variate correlation was applied to ascertain the significant relationships between expectations, support and satisfaction towards Team work. The following null hypotheses were framed:

$H_0$16(a): There is no significant relationship between support given by the institutions and satisfaction towards Team work

$H_0$16(b): There is no significant relationship between expectations and satisfaction towards Team work

$H_0$16(c): There is no significant relationship between expectations towards Team work and support given by the institutions

Table 4.61 Relationship between expectations, support and satisfaction towards Team work

	Satisfaction	Support	Expectation
Satisfaction	1		
Support	r =.741**	1	
	p <.001		
Expectation	r =.639**	r =.593**	1
	p <.001	p <.001	

** significant at 1% level

Positive significant correlation is observed between support and satisfaction towards Team work (r =.741). Hence the null hypothesis "There is no significant relationship between support given by the institutions and satisfaction towards team work" is rejected at 1% level. This shows that support given by the institutions brings satisfaction among students towards Team work by 74.1%.

Significant correlation is observed between expectation and satisfaction towards Team work (r = 0.639), which is positive. Hence the null hypothesis "There is no significant relationship between expectation and satisfaction towards team work" is rejected at 1% level. This shows that relationship between satisfactions has fulfilled the students' expectation towards Team work by 63.9%.

Positive significant correlation is observed between expectation and support towards Team work (r = 0.593). Hence the null hypothesis "There is no significant relationship between expectation towards team work and support given by the institutions" is rejected at 1% level. This shows that support given by the institutions has fulfilled the expectations of students towards Team work by 59.3%.

4.10 ASSESSING THE PREDICTOR VARIABLES FOR STUDENTS' SATISFACTION TOWARDS EMPLOYABILITY SKILLS

Multiple regression analysis was conducted by taking satisfaction towards employability skills as dependent variable and enhancement of Basic academic skills, Higher order thinking skills, Entrepreneurial skills, Problem solving skills, Team work and Support given by the institution towards employability skills are taken as independent variables (shown in the table 4.62)

Table 4.62 Regression analysis for students' satisfaction towards employability skills

Predictor Variables	R^2	Standard Beta	F-statistics	t- value
Basic academic skills		0.422		6.521**
Higher order thinking skills	0.598	0.562		7.965**
Entrepreneurial skills		0.113		3.182**
Problem solving skills	Adjusted R^2	0.403	84.785**	7.627**
Team work		0.104		2.892**
Support given by the institution	0.591	0.519		10.564**

** significant at 1% level

It is observed from the table 4.62, the regression model's F value is 84.785 and it is significant at 1% level. The regression model's coefficient of determination (R^2) is 0.598 (59.8% of variability) and its adjusted R^2 is 0.591, which is a healthy coefficient. One unit increase in enhancement of Basic academic skills improves students' satisfaction towards employability skills by 0.422 units. Improvement of one unit in Higher order thinking skills increases students' satisfaction towards employability skills. This shows that enhancement in Higher order thinking skills is the important reason for students' satisfaction towards employability skills. Enhancement of Entrepreneurial skills, Problem solving skills and Team work serves as significant predictors for students' satisfaction towards employability skills and improves student's satisfaction towards employability skills by 0.113, 0.403 and 0.104 units. Support given by the institutions significantly predicts and improves student's satisfaction towards employability skills by 0.519 units. The regression equation for students' satisfaction towards employability skills is

Students' satisfaction towards employability skills = 6.582 + 0.422 (Basic academic skills) + 0.562 (Higher order thinking skills) + 0.113 (Entrepreneurial skills) + 0.503 (Problem solving skills) + 0.104 (Team work) + 0.519(Support given by the institution)

Hence enhancement of Basic academic skills, Higher order thinking skills, Entrepreneurial skills, Problem solving skills, Team work and Support given by the institution towards employability skills serves as significant predictors for students' satisfaction towards employability skills.

4.11 DISCRIMINANT ANALYSIS FOR GROUP PREDICTABILITY OF TRAINING PROGRAM OFFERED BY THE PLACEMENT CELLS

Discriminant analysis is used to identify the relationship between a group of independent variables and one categorical variable. The interest is to identify how many dimensions are needed to express this relationship. Using this relationship, prediction of classification based on the independent variables or assesses how well the independent variables separate the categories in the classification.

Six factors of employability skills (Basic academic skills, Self management, Higher order thinking skills, Entrepreneurial skills, Problem solving skills and Team work) are the scaled numeric variables and training offered by the placement cells towards enhancing students employability skills is the categorical variable.

Table 4.63 Descriptive of independent variables

Training offered by the placement cells		N	Mean	S.D
Yes	Basic Academic skills	600	24.67	3.15
	Self management	600	19.56	2.40
	Higher order thinking skills	600	18.84	2.94
	Entrepreneurial skills	600	18.34	2.63
	Problem solving skills	600	14.81	2.18
	Team work	600	11.80	1.63
No	Basic Academic skills	100	23.08	3.39
	Self management	100	18.35	2.18
	Higher order thinking skills	100	17.42	2.69
	Entrepreneurial skills	100	17.04	2.62
	Problem solving skills	100	13.32	2.12
	Team work	100	10.78	1.52
Total	Basic Academic skills	700	24.44	3.19
	Self management	700	19.39	2.37
	Higher order thinking skills	700	18.64	2.92
	Entrepreneurial skills	700	18.15	2.63
	Problem solving skills	700	14.60	2.17
	Team work	700	11.65	1.61

It is inferred from the table 4.63 the mean values of Basic academic skills, Self management, Higher order thinking skills, Entrepreneurial skills, Problem solving skills and Team work of the students attended the training programs organized by their placement cells are better than the students have not attended the training programs.

Table 4.64 Tests of Equality of Group Means

	Wilks' Lambda	F	p-value
Basic Academic skills	0.861	42.384	<.001
Self management	0.892	40.213	<.001
Higher order thinking skills	0.736	65.825	<.001
Entrepreneurial skills	0.905	15.919	<.001
Problem solving skills	0.942	12.066	<.001
Team work	1.000	0.006	.939

From the table 4.64 it is observed that Wilks' lambda of five factors (Basic academic skills, Self management, Higher order thinking skills, Entrepreneurial skills, and Problem solving skills) of employability skills are less than 1 and are significant at 1% level. This shows that Basic academic skills, Self management, Higher order thinking skills, Entrepreneurial skills, Problem solving skills all significantly predicts and contributes discriminant function to separate the groups.

Table 4.65 Eigen value of Discriminating function

Eigen value	Canonical correlation	Variance explained
4.052	0.715	0.511 (51.1%)

The Eigen value in table 4.65, 4.052 is larger and it shows that it explains much of the variance in dependent variable (training organized by the placement cell) in the discriminant function. Since the dependent variable training organized by the placement cell has two categories, one discriminant function will exist. The canonical correlation 0.715 which is good is the measure of association between the discriminant function and the dependent variable. The square of canonical correlation coefficient 0.511 (51.1%) is the percentage of variance explained in the dependent variable training organized by the placement cell.

Table 4.66 Testing of Discriminating function

Wilks' Lambda	Chi-square	df	p-value
0.614	178.95	6	<.001

Wilks' lambda value of 0.614 in table 4.66 explains greater discriminatory ability of the function. The associated chi-square statistic 178.95 and it is significant at 1% level tests the hypothesis that the means of the functions listed are unequal across the groups which shows that discriminant function does better than chance at separating the groups.

Table 4.67 Standardized Canonical Discriminant function coefficients

Discriminating variables	Function
Basic Academic skills	0.843
Self management	0.541
Higher order thinking skills	0.615
Entrepreneurial skills	0.162
Problem solving skills	1.146

The standardized discriminant function coefficients in the table 4.67 indicate the relative importance of the independent variables in predicting the dependent variable training organized by the placement cell. They allow you to compare variables measured on different scales. Coefficients with large absolute values correspond to variables with greater discriminating ability. The coefficient of Problem solving skills is 1.146 which is greater among the coefficients of independent variables and it is discriminating the function more. The coefficient of Entrepreneurial skills is 0.162 which implies that Entrepreneurial skills is discriminating the function less.

Table 4.68 Correlations between discriminating variables and canonical discriminant functions

Discriminating variables	Function
Basic Academic skills	0.603
Self management	0.411
Higher order thinking skills	0.589
Entrepreneurial skills	0.307
Problem solving skills	0.752

Table 4.68 shows the correlations of each discriminating variables with standardized canonical discriminant function. The correlation between discriminant function and Basic Academic skills is 0.603. The correlation between discriminant function and Self management is 0.411. The correlation between discriminant function and Higher order thinking skills is 0.589. The correlation between discriminant function and Entrepreneurial skills is 0.307. The correlation between discriminant function and Problem solving skills is 0.752.

Table 4.69 Canonical Discriminant function coefficients

Discriminating variables	Function
Basic Academic skills	0.732
Self management	0.417
Higher order thinking skills	0.629
Entrepreneurial skills	0.212
Problem solving skills	0.817
Constant	2.584

Table 4.69 contains the non standardized discriminant function coefficients. These would be used to construct the actual prediction equation which can be used to classify new cases. Discriminant function for the model should be as follows:

D = 2.584 + 0.732 (Basic Academic skills) + 0.417 (Self management) + 0.629 (Higher order thinking skills) + 0.212 (Entrepreneurial skills) + 0.817 (Problem solving skills)

Table 4.70 Classification of group size

		Training organized by the placement cell	Predicted group membership		Total
			Yes	No	
Original	N	Yes	586	14	600
		No	6	94	100
	%	Yes	97.67	2.33	100.0
		No	6.0	94.0	100.0

Table 4.70 shows the predicted frequencies of groups from the analysis. 85.1% of the original grouped cases are correctly classified.

Predictive Group membership

Column total of 592 of the students accepted that their placement cells are organizing training programs, 586 were correctly predicted, and 6 were incorrectly predicted. 100 of the students agreed that their placements cells are not conducting training programs, 94 were correctly predicted and 14 of them were incorrectly predicted.

Original Group membership

Row total of 600 of the students accepted that their placement cells are organizing training programs, 586 were correctly predicted, and 14 were incorrectly predicted. 100 of the students agreed that their placement cells are not conducting training programs, 94 were correctly predicted and 6 of them were incorrectly predicted.

4.12 ASSESSING THE LEVEL OF SUPPORT GIVEN BY THE INSTITUTIONS AND SATISFACTION TOWARDS EMPLOYABILITY SKILLS

4.12.1 Association between confidence to get placement during course period and support given by the institutions towards employability skills.

To assess the association between confidence to get placement during your course period and support given by the institutions towards employability skills, Chi-square test is performed to identify the association between confidence to get placement during course period and support given by the institutions towards employability skills. The cross tabulation between confidence to get placement during course period and support given by the institutions towards employability skills is presented in the table 4.71

Null hypothesis H_0 17(a): There is no significant association between confidence to get placement during course period and support towards employability skills.

Table 4.71Association between confidence to get placement during course period and support

			Support			Total	Chi-square Value
			Low	Medium	High		
Confidence to get placement during Course period	Yes	N	140	100	212	452	87.113** (p < .001)
		%	20%	14.3%	30.3%	64.6%	
	No	N	28	80	140	248	
		%	4%	11.4%	20%	35.4%	
Total		N	168	180	352	700	
		%	24.0%	25.7%	50.3%	100.0%	

** significant at 1% level

From the table 4.71 it is observed that there is significant association between confidence to get placement during course period and support given by the institutions towards employability skills. Chi- square value (87.113) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that confidence to get placement during course period and support given by the institutions towards employability skills are well associated. From the table 4.71 it is evident that most of the students (30.3%) who got high support given by the institutions towards employability skills are confident to get placement during their course period.

4.12.2 Association between institutions facilitates more campus recruitment and support given by the institutions towards employability skills

To assess the association between institutions facilitate more campus recruitment and support given by the institutions towards employability skills, Chi-square test is performed to identify the association between institutions facilitate more campus recruitment and support given by the institutions towards employability skills. The cross tabulation between institutions facilitate more campus recruitment and support towards employability skills is presented in the table 4.72

Null hypothesis H_0 17(b): There is no significant association between institutions facilitate more campus recruitment and support given towards employability skills.

Table 4.72 Association between institutions facilitate more campus recruitment and support

			Support			Total	Chi-square Value
			Low	Medium	High		
Institution facilitate more campus recruitment	Yes	**N**	64	108	248	420	**34.934** ** **(p < .001)**
		%	9.1%	15.5%	35.4%	60.0%	
	No	**N**	104	72	104	280	
		%	14.8%	10.3%	14.9	40.0%	
Total		**N**	168	180	352	700	
		%	24.0%	25.7%	50.3%	100.0%	

** significant at 1% level

From the table 4.72 it is observed that there is significant association between institutions facilitate more campus recruitment and support given by the institutions towards employability skills. Chi- square value (34.934) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that institutions facilitate more campus recruitment and support given by the institutions towards employability skills is well associated. From the table 4.72 it is evident that most of the students (35.4%) who got high support from their institutions towards employability skills agreed that their intuitions facilitates more campus recruitment.

4.12.3 Association between institutions facilitates and involve in developing soft skills and support given by the institutions towards employability skills.

To assess the association between institution facilitate and involve in developing soft skills and support given by the institutions towards employability skills, Chi-square test is performed to identify the association between institution facilitate and involve in developing soft skills and support given by the institutions towards employability skills. The cross tabulation

between institution facilitate and involve in developing soft skills and support towards employability skills is presented in the table 4.73.

Null hypothesis H_0 17(c): There is no significant association between institutions facilitates and involves in developing soft skills and support towards employability skills.

Table 4.73 Association between institutions facilitates and involve in developing soft skills and support

			Support			Total	Chi-square Value
			Low	Medium	High		
Institution facilitate and involve in developing soft skills	Yes	**N**	72	104	232	408	**24.881** ** **(p < .001)**
		%	10.3%	14.9%	33.1%	58.3%	
	No	**N**	96	76	120	292	
		%	13.7%	10.9%	17.1%	41.7%	
Total		**N**	168	180	352	700	
		%	24.0%	25.7%	50.3%	100.0%	

** significant at 1% level

From the table 4.73 it is observed that there is significant association between institution facilitate and involve in developing your soft skills and support given by the institutions towards employability skills. Chi- square value (24.881) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that institutions facilitates and involve in developing your soft skills and support given by the institutions towards employability skills is well associated. From the table 4.73 it is evident that most of the students (33.1%) who has got high support from their institutions towards employability skills have agreed that their institutions facilitates and involve in developing their soft skills.

4.12.4 Association between course curriculum covers communication skills in the syllabus and support given by the institutions towards employability skills.

To assess the association between course curriculum covers communication skills in the syllabus and support given by the institutions towards employability skills, Chi-square test is performed to identify the association between course curriculum covers communication skills in the syllabus and support given by the institutions towards employability skills. The cross tabulation between course curriculum covers communication skills in the syllabus and support given by the institutions towards employability skills is presented in the table 4.74

Null hypothesis H_0 17(d): There is no significant association between course curriculum covers communication skills in the syllabus and support towards employability skills.

Table 4.74 Association between course curriculum covers communication skills in the syllabus and support

			Support			Total	Chi-square Value
			Low	Medium	High		
Course curriculum covers Communication skills in the syllabus	Yes	**N**	80	120	260	460	**27.399** ** **(p < .001)**
		%	11.4%	17.0%	37.0%	65.4%	
	No	**N**	88	60	92	240	
		%	12.5%	9.0%	13.1	34.6%	
Total		**N**	168	180	352	700	
		%	24.0%	25.7%	50.3%	100.0%	

** significant at 1% level

From the table 4.74 it is observed that there is significant association between curriculum covers communication skills in the syllabus and support given by the institutions towards employability skills. Chi- square value (27.399) shows that the null hypothesis is rejected at 1% level. Hence it is

concluded from the analysis that curriculum covers communication skills in the syllabus and support given by the institutions towards employability skills are well associated. From the table 4.74 it is evident that most of the students (37.0%) who have got high support from their institutions towards employability skills have accepted that their course curriculum covers communication skills in the syllabus.

4.12.5 Association between institutions has exclusive communication skill development lab and support given by the institutions towards employability skills.

To assess the association between institutions have exclusive communication skill development lab and support given by the institutions towards employability skills, Chi-square test is performed to identify the association between institutions have exclusive communication skill development lab and support given by the institutions towards employability skills. The cross tabulation between institutions have exclusive communication skill development lab and support given by the institutions towards employability skills is presented in the table 4.75

Null hypothesis H_0 17(e): There is no significant association between institutions has exclusive communication skill development lab and support.

Table 4.75 Association between institutions has exclusive communication skill development lab and support

			Support			Total	Chi-square Value
			Low	Medium	High		
Institutions have exclusive communication skill development lab	Yes	**N**	140	120	324	584	**39.756** (p < .001)**
		%	20.0%	17.1%	46.3%	83.4%	
	No	**N**	28	60	28	116	
		%	4.0%	8.6%	4	16.6%	
Total		**N**	168	180	352	700	
		%	24.0%	25.7%	50.3%	100.0%	

** significant at 1% level

From the table 4.75 it is observed that there is significant association between institutions have exclusive communication skill development lab and support given by the institutions towards employability skills. Chi- square value (39.756) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that institutions have exclusive communication skill development lab and support given by the institutions towards employability skills are well associated. From the table 4.75 it is evident that most of the students (46.3%) who got high support from the instuitions towards employability skills agreed that their institution have exclusive communication skill development lab.

4.12.6 Association between institutions has separate placement cell and support given by the institutions towards employability skills.

To assess the association between institution has separate placement cell and support given by the institutions towards employability skills, Chi-square test is performed to identify the association between institution has separate placement cell and support given by the institutions towards employability skills. The cross tabulation between institution has separate placement cell and support given by the institutions towards employability skills is presented in the table 4.76

Null hypothesis H_0 17(f): There is no significant association between institution has separate placement cell and support towards employability skills

Table 4.76 Association between institutions has separate placement cell and support

			Support			Total	Chi-square Value
			Low	Medium	High		
Institution has separate placement cell	Yes	N	156	152	340	648	25.578** (p < .001)
		%	22.3%	21.7%	48.6%	92.6%	
	No	N	12	28	12	52	
		%	1.7%	4.0%	1.7%	7.4%	
Total		N	168	180	352	700	
		%	24.0%	25.7%	50.3%	100.0%	

** significant at 1% level

From the table 4.76, it is observed that there is significant association between institutions has separate placement cell and support given by the institutions towards employability skills. Chi- square value (25.578) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that institution has separate placement cell and support given by the institutions towards employability skills are well associated. From the table 4.76 it is evident that most of the students (48.6%) who got high support from their institutions towards employability skills have agreed that their institution has got separate placement cell.

4.12.7 Association between appeared mock interview and support given by the institutions towards employability skills

To assess the association between appeared mock interview and support given by the institutions towards employability skills, Chi-square test is performed to identify the association between appeared mock interview and support given by the institutions towards employability skills. The cross tabulation between appeared mock interview and support given by the institutions towards employability skills is presented in the table 4.77.

Null hypothesis H_0 17(g): There is no significant association between appeared mock interview and support towards employability skills

Table 4.77 Association between appeared mock interview and support

			Support			Total	Chi-square Value
			Low	Medium	High		
Appeared mock interview	Yes	N	124	100	200	424	14.095** (p = .001)
		%	17.7%	14.2%	28.6%	60.5	
	No	N	44	80	152	276	
		%	6.4%	11.4%	21.7%	39.5	
Total		N	168	180	352	700	
		%	24.0%	25.7%	50.3%	100.0%	

** significant at 1% level

From the table 4.77 it is observed that there is significant association between appeared mock interview and support given by the institutions towards employability skills. Chi- square value (14.095) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that appeared mock interview and support given by the institutions towards employability skills are well associated. From the table 4.77 it is evident that most of the students (28.6%) who got high support from their institutions towards employability skills have appeared mock interview.

4.12.8 Association between placement cell arranged training program and support given by the institutions towards employability skills.

To assess the association between placement cell arranged any training program and support given by the institutions towards employability skills, Chi-square test is performed to identify the association between placement cell arranged any training program and support given by the institutions towards employability skills. The cross tabulation between placement cell arranged any

training program and support given by the institutions towards employability skills is presented in the table 4.78.

Null hypothesis H_0 17(h): There is no significant association between placement cell arranged any training program and support towards employability skills

Table 4.78 Association between placement cell arranged any training program and support

			Support			Total	Chi-square Value
			Low	Medium	High		
Placement cell arranged training program	Yes	N	136	148	316	600	9.639** (p = .008)
		%	19.4%	21.1%	45.1%	85.7%	
	No	N	32	32	36	100	
		%	4.6%	4.6%	5.1%	14.3%	
Total		N	168	180	352	700	
		%	24.0%	25.7%	50.3%	100.0%	

** significant at 1% level

From the table 4.78, it is observed that there is significant association between placement cells arranged any training program and support given by the institutions towards employability skills. Chi- square value (9.639) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that placement cell arranged any training program and support given by the institutions towards employability skills are well associated. From the table 4.78 it is evident that most of the students (45.1%) who got high support from their institutions towards employability skills have agreed that their placement cells have arranged training program.

4.12.9 Association between confidence to get placement during course period and satisfaction towards employability skills.

To assess the association between confidence to get placement during course period and satisfaction towards employability skills, Chi-square test is performed to identify the association between confidence to get placement during course period and satisfaction towards employability skills. The cross tabulation between confidence to get placement during course period and satisfaction towards employability skills is presented in the table 4.79.

Null hypothesis H_0 17(i): There is no significant association between confidence to get placement during course period and satisfaction towards employability skills

Table 4.79 Association between confidence to get placement during course period and satisfaction

			Satisfaction			Total	Chi-square Value
			Low	Medium	High		
Confidence to get placement during Course period	Yes	N	68	60	192	320	24.038** (p < .001)
		%	9.6%	8.7%	27.3%	45.6%	
	No	N	100	120	160	380	
		%	14.3%	17.1%	23.0%	54.4%	
Total		N	168	180	352	700	
		%	24.0%	25.7%	50.3%	100.0%	

** significant at 1% level

From the table 4.79 it is observed that there is significant association between confidence to get placement during your course period and satisfaction towards employability skills. Chi- square value (24.038) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that confidence to get placement during your course period and satisfaction towards employability skills are well associated. From the table 4.79 it is evident that

most of the students (27.3%) confidence to get placement during their course period are highly satisfied.

4.12.10 Association between institutions facilitates more campus recruitment and satisfaction towards employability skills.

To assess the association between institutions facilitates more campus recruitment and satisfaction towards employability skills, Chi-square test is performed to identify the association between institutions facilitate more campus recruitment and satisfaction towards employability skills. The cross tabulation between institutions facilitate more campus recruitment and satisfaction towards employability skills is presented in the table 4.80.

Null hypothesis H_0 17(j): There is no significant association between institutions facilitates more campus recruitment and satisfaction towards employability skills

Table 4.80 Association between institutions facilitate more campus recruitment and satisfaction

			Satisfaction			Total	Chi-square Value
			Low	Medium	High		
Institutions facilitates more campus recruitment	Yes	**N**	36	80	204	320	**61.296** (p < .001)**
		%	5.1%	11.4%	29.2%	45.7%	
	No	**N**	132	100	148	380	
		%	18.9%	14.3%	21.1%	54.3%	
Total		**N**	168	180	352	700	
		%	24.0%	25.7%	50.3%	100.0%	

** significant at 1% level

From the table 4.80, it is observed that there is significant association between institutions facilitate more campus recruitment and satisfaction towards employability skills. Chi- square value (61.296) shows that the null

hypothesis is rejected at 1% level. Hence it is concluded from the analysis that institutions facilitate more campus recruitment and satisfaction towards employability skills is well associated. From the table 4.80 it is evident that most of students (29.2%) who are highly satisfied agreed that their institutions facilitates more campus recruitment.

4.12.11 Association between institutions facilitates and involve in developing soft skills and satisfaction towards employability skills.

To assess the association between institution facilitate and involve in developing soft skills and satisfaction towards employability skills, Chi-square test is performed to identify the association between institution facilitate and involve in developing soft skills and satisfaction towards employability skills. The cross tabulation between institution facilitate and involve in developing soft skills and satisfaction towards employability skills is presented in the table 4.81.

Null hypothesis H_0 17(k): There is no significant association between institutions facilitates and involve in developing soft skills and satisfaction towards employability skills

Table 4.81 Association between institutions facilitates and involve in developing soft skills and satisfaction

			Satisfaction			Total	Chi-square Value
			Low	Medium	High		
Institution facilitate and involve in developing soft skills	Yes	**N**	56	112	240	408	**58.347** ** **(p < .001)**
		%	8.0%	16.0%	34.3%	58.3%	
	No	**N**	112	68	112	292	
		%	16.0%	9.7%	16.0%	41.7%	
Total		**N**	168	180	352	700	
		%	24.0%	25.7%	50.3%	100.0%	

** significant at 1% level

From the table 4.81 it is observed that there is significant association between institutions facilitates and involve in developing your soft skills and satisfaction towards employability skills. Chi- square value (58.347) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that institutions facilitate and involve in developing your soft skills and satisfaction towards employability skills is well associated. From the table 4.81 it is evident that most of the students (34.3%) who are highly satisfied agreed that their institutions facilitates and involve in developing your soft skills.

4.12.12 Association between course curriculum covers communication skills in the syllabus and satisfaction towards employability skills

To assess the association between course curriculum covers communication skills in the syllabus and satisfaction towards employability skills, Chi-square test is performed to identify the association between course curriculum covers communication skills in the syllabus and satisfaction towards employability skills. The cross tabulation between course curriculum covers communication skills in the syllabus and satisfaction towards employability skills is presented in the table 4.82.

Null hypothesis H_0 17(l): There is no significant association between course curriculum covers communication skills in the syllabus and satisfaction towards employability skills

Table 4.82 Association between course curriculum covers communication skills in the syllabus and satisfaction

			Satisfaction			Total	Chi-square Value
			Low	Medium	High		
Course curriculum covers Communication skills in the syllabus	Yes	N	56	104	224	384	43.004** (p < .001)
		%	8.0%	14.9%	32.0%	54.9%	
	No	N	112	76	128	316	
		%	16.0%	10.9%	18.2%	45.1%	
Total		N	168	180	352	700	
		%	24.0%	25.7%	50.3%	100.0%	

** significant at 1% level

From the table 4.82 it is observed that there is significant association between curriculum covers communication skills in the syllabus and satisfaction towards employability skills. Chi- square value (43.004) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that curriculum covers communication skills in the syllabus and satisfaction towards employability skills are well associated. From the table 4.82 it is evident that most of the students (32.0%) who are highly satisfied agreed that their course curriculum covers communication skills in the syllabus.

4.12.13 Association between institution/college has exclusive communication skill development lab and satisfaction towards employability skills.

To assess the association between institutions have exclusive communication skill development lab and satisfaction towards employability skills, Chi-square test is performed to identify the association between institutions have exclusive communication skill development lab and satisfaction towards employability skills. The cross tabulation between

institutions have exclusive communication skill development lab and satisfaction towards employability skills is presented in the table 4.83.

Null hypothesis H_0 17(m): There is no significant association between institutions has exclusive communication skill development lab and satisfaction towards employability skills

Table 4.83 Association between institutions has exclusive communication skill development lab and satisfaction

			Satisfaction			Total	Chi-square Value
			Low	Medium	High		
Institutions have exclusive communication skill development lab	Yes	**N**	44	48	184	276	**48.918** ** **(p < .001)**
		%	6.3%	6.9%	26.2%	39.4%	
	No	**N**	124	132	168	424	
		%	17.7%	18.9%	24.0%	60.6%	
Total		**N**	168	180	352	700	
		%	24.0%	25.7%	50.3%	100.0%	

** significant at 1% level

From the table 4.83 it is observed that there is significant association between institution/college have exclusive communication skill development lab and satisfaction towards employability skills. Chi- square value (48.918) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that institutions have exclusive communication skill development lab and satisfaction towards employability skills are well associated. From the table 4.83 it is evident that most of the students (26.2%) who are highly satisfied have agreed that their institutions have exclusive communication skill development lab.

4.12.14 Association between institutions has separate placement cell and satisfaction towards employability skills.

To assess the association between institutions has separate placement cell and satisfaction towards employability skills, Chi-square test is performed to identify the association between institution has separate placement cell and satisfaction towards employability skills. The cross tabulation between institution has separate placement cell and satisfaction towards employability skills is presented in the table 4.84

Null hypothesis H_0 17(n): There is no significant association between institution has separate placement cell and satisfaction towards employability skills

Table 4.84 Association between institutions has separate placement cell and satisfaction

			Satisfaction			Total	Chi-square Value
			Low	Medium	High		
Institutions has separate placement cell	Yes	**N**	156	156	336	648	**13.401** ** **(p < .001)**
		%	22.3%	22.3%	48.0%	92.6%	
	No	**N**	12	24	16	52	
		%	1.7%	3.4%	2.3%	7.4%	
Total		**N**	168	180	352	700	
		%	24.0%	25.7%	50.3%	100.0%	

** significant at 1% level

From the table 4.84 it is observed that there is significant association between institutions has separate placement cell and satisfaction towards employability skills. Chi- square value (13.401) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that institution has separate placement cell and satisfaction towards employability skills are well associated. From the table 4.84 it is evident that most of the students

(48.0%) who are highly satisfied accepted that their institutions has separate placement cell.

4.12.15 Association between appeared mock interview and satisfaction towards employability skills.

To assess the association between appeared mock interview and satisfaction towards employability skills, Chi-square test is performed to identify the association between appeared mock interview and satisfaction towards employability skills. The cross tabulation between appeared mock interview and satisfaction towards employability skills is presented in the table 4.85.

Null hypothesis H_0 17(o): There is no significant association between appeared mock interview and satisfaction towards employability skills

Table 4.85 Association between appeared mock interview and satisfaction

			Satisfaction			Total	Chi-square Value
			Low	Medium	High		
Appeared mock interview	Yes	N	106	106	212	424	0.869 (p = . 648)
		%	15.1%	15.1%	30.3%	60.5%	
	No	N	62	74	140	276	
		%	8.9	10.6	20	39.5%	
Total		N	168	180	352	700	
		%	24.0%	25.7%	50.3%	100.0%	

** significant at 1% level.

From the table 4.85 it is observed that there is no significant association between appeared mock interview and satisfaction towards employability skills. Chi- square value (0.869) shows that the null hypothesis is accepted at 5% level. Hence it is concluded from the analysis that appeared in mock interview and satisfaction towards employability skills is not well associated.

4.12.16 Association between placement cells arranged training program and satisfaction towards employability skills.

To assess the association between placement cell arranged training program and satisfaction towards employability skills, Chi-square test is performed to identify the association between placement cell arranged training program and satisfaction towards employability skills. The cross tabulation between placement cell arranged training program and satisfaction towards employability skills is presented in the table 4.86.

Null hypothesis H_0 17(p): There is no significant association between placement cells arranged any training program and satisfaction towards employability skills

Table 4.86 Association between placement cells arranged any training program and satisfaction

			Satisfaction			Total	Chi-square Value
			Low	Medium	High		
Placement cells arranged any training program	Yes	**N**	132	152	316	600	**11.972** ** **(p = . 003)**
		%	18.9%	21.7%	45.1%	85.7%	
	No	**N**	36	28	36	100	
		%	5.1%	4.0%	5.1%	14.2%	
Total		**N**	168	180	352	700	
		%	24.0%	25.7%	50.3%	100.0%	

** significant at 1% level

From the table 4.86 it is observed that there is significant association between placement cells arranged any training program and satisfaction towards employability skills. Chi- square value (11.972) shows that the null hypothesis is rejected at 1% level. Hence it is concluded from the analysis that placement cell arranged training program and satisfaction towards employability skills are well associated. From the table 4.86 it is evident that

most of the students (45.1%) who are highly satisfied have agreed that their placement cells have arranged training programs.

4.13 MODEL FOR PERCEPTION OF EMPLOYABILITY SKILLS IN ENGINEERING INSTITUTIONS

Structural equation modeling (SEM) is a statistical technique for testing and estimating causal relations using a combination of statistical data and qualitative causal assumptions. This definition of SEM was articulated by the geneticist Sewall Wright (1921), the economist TrygveHaavelmo (1943) and the cognitive scientist Herbert Simon (1953), and formally defined by Judea Pearl (2000) using a calculus of counterfactuals.

SEM allows both confirmatory and exploratory modeling, meaning they are suited to both theory testing and theory development. Confirmatory modeling usually starts out with a hypothesis that gets represented in a causal model. The concepts used in the model must then be operationalized to allow testing of the relationships between the concepts in the model. The model is tested against the obtained measurement data to determine how well the model fits the data. The causal assumptions embedded in the model often have falsifiable implications which can be tested against the data.

With an initial theory SEM can be used inductively by specifying a corresponding model and using data to estimate the values of free parameters. Often the initial hypothesis requires adjustment in light of model evidence. When SEM is used purely for exploration, this is usually in the context of exploratory factor analysis as in psychometric design.

A model was developed by using analysis of moment structure (AMOS 16.1). A model is fit to ensure the Employability skills of students studying in engineering institutions. In this model factors such as Basic academic skills, Self management, Higher order thinking skills, Entrepreneurial skills, Problem solving skills, Team work, Support given by the institutions and Satisfaction

towards employability skills are taken as observed variables (measured through variables and reduced as factors) and Employability skills is taken as unobserved variable. e1, e2, e3, e4, e5, e6, e7 and e8 are error terms (residuals) for observed variables.

Null Hypothesis $H_0$18: The model fitted for perception of employability skills in engineering institutions is good

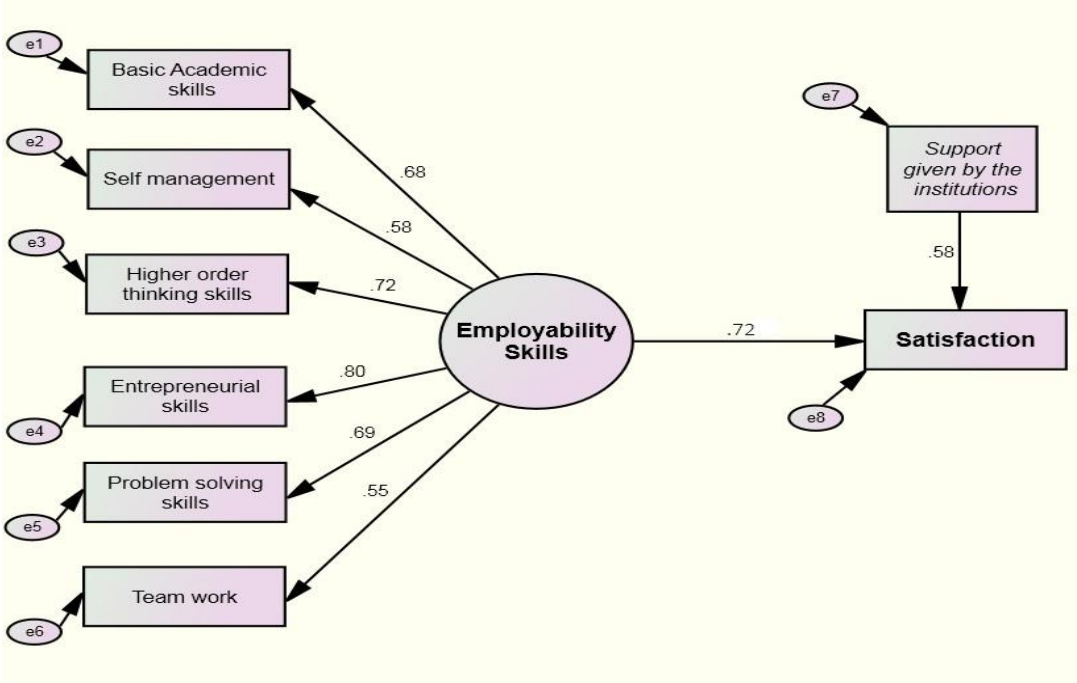

Figure 4.1: Model for perception of employability skills in engineering institutions

Model fit Summary

The model fit Chi-square χ^2 = 2.154 and the model's p-value is 0.141 which is insignificant at 5% level, which shows that the null hypothesis "The model fitted for perception of employability skills in engineering institutions is good" is accepted. The goodness of fit index (GFI) is 0.916 of the model, shows reasonably good fit, and its adjusted goodness of fit (AGFI) is 0.902. The Root Mean Square Error of Approximation (RMSEA) is 0.083, a smaller value indicates better model, and Expected Cross Validation Index (ECVI) is 0.098, which are within the acceptable range indicating a better model fit.

CHAPTER 5

SUMMARY OF FINDINGS, SUGGESTIONS AND CONCLUSION

Respondents studying in engineering institutions have expressed their views regarding their present employability skills. Expectations, support given by the institutions and satisfaction level towards employability skills in engineering institutions were discussed. Data collected through well structured questionnaires are given to the students from selected engineering institutions to record their responses and the recorded responses were examined and analyzed in the previous chapter. In this chapter key findings and conclusions of this research are explored. Based on these findings, suggestions have been proposed to improve the employability skills in engineering institutions.

5.1 SUMMARY OF FINDINGS

5.1.1 Profile of engineering students

a) Majority of the selected students (69.10%) studying in engineering institutions are men.

b) Most of the students (34.90%) studying in engineering institutions belongs to OC.

c) Majority of the selected students (55.40%) are studying in Universities.

d) Majority of the students (46.30%) studying in engineering institutions belongs to the Electronic Communication branch.

e) Majority of the students (40.00%) studying in engineering institutions are from sub-urban background.

f) Majority of the students (58.10%) studying in engineering institutions are living in nuclear family.

g) Most of the students (58.86%) expressed that their institutions are existing for more than 15 years.

h) Most of the student's fathers (58.86%) are employed with private organizations.

i) Most of the student's mothers (34.90%) are House wives.

5.1.2 Information pertaining to employability skills

a) Most of the students (64.57%) agreed that they are confident of getting placed during the course period.

b) Most of the students (50%) who felt that their skills need to be possessed and updated are intended to improve both technical as well as soft skills.

c) Most of the students (60.0%) agreed that their institution facilitates more campus recruitments.

d) More than 45% of the engineering students accepted that the level of facilitation of campus recruitment in their institutions is good.

e) Most of the students (58.30%) agreed that their institution facilitates and involves in developing soft skills.

f) Nearly 46% of the engineering students felt that the level of facilitation towards developing the soft skills in their institutions is better.

g) Most of the students (65.70%) agreed that their course curriculum covers Communication skills in the syllabus.

h) Nearly 48% of the engineering students agreed that the level of coverage towards communication skills is good.

i) Most of the students (83.40%) agreed that their institution has exclusive communication skill development lab.

j) Nearly 56% of the engineering students agreed that the effectiveness of communication skill development lab is good.

k) Most of the students (92.60%) agreed that their institution has got separate placement cell.

l) Almost 65% of the engineering students agreed that the level of efforts taken by placement cell is good.

m) Most of the students (60.60%) agreed that they have appeared for mock interview.

n) Nearly 59% of the engineering students felt that conducting mock interview is good for their career.

o) Most of the students (85.70%) agreed that training programmes are arranged by their Placement cell.

p) Only 16% of the engineering students accepted that the training programs are ineffective.

q) Significant association between confidence to get placement during your course period and type of institution is observed. Confidence to get placement during your course period and classification based on type of institution are well associated. Most of students (40.3%) studying in Universities have agreed that they are very much confident to get placement during the course period.

r) Significant association between institutions facilitates more campus recruitment and type of institution is observed. Institutions facilitate more campus recruitment and classification based on type of institution is well associated. Most of students (34.9%) studying in universities accepted that there institutions facilitates more campus recruitment.

s) Significant association between institutions facilitates and involve in developing soft skills and type of institution is observed. Institutions facilitate and involve in developing soft skills and classification based on type of institution is well associated. Most of students (30.9%) studying in engineering colleges have agreed that their institutions facilitates and shows involvement in developing their soft skills.

t) Significant association between curriculum covers communication skills in the syllabus and type of institution is observed. Curriculum covers communication skills in the syllabus and classification based on type of institution are well associated. Most of students (33.1%) studying in Universities accepted that their course curriculum covers communication skills in the syllabus.

u) Significant association between the institutions has exclusive communication skill development lab and type of institution is observed. Institutions has exclusive communication skill development lab and classification based on type of institution are well associated. Most of students (49.7%) studying in Universities accepted that their institutions has exclusive communication skill development lab.

v) Significant association between appeared for mock interview and type of institution and type of institution is observed. Appeared for mock interview and type of institution and classification based on type of institution are well associated. Most of students (41.1%) studying in Universities agreed that they have appeared for mock interview.

w) Significant association between placement cells arranged training program and type of institution is observed. Placement cell arranged training program and classification based on type of institution are well associated. Most of students (43.4%) studying in engineering colleges agreed that their placement cells are arranging training programs.

5.1.3 Factors of employability skills

Factors of employability skills of engineering students were determined as

a) Basic academic skills
b) Self management
c) Higher order thinking skills
d) Entrepreneurial skills
e) Problem solving skills
f) Team work

5.1.4 Inter relationship between factors of employability skills

a) Positive significant correlation is observed between Basic academic skills and Self management (r = 0.348).

b) Significant correlation is observed between Basic academic skillsand Higher order thinking skills (r = 0.373), which is positive.

c) Positive significant correlation is observed between Basic academic skills and Entrepreneurial skills (r = 0.572).

d) Significant correlation is observed between Basic academic skillsand Problem solving skills (r = 0.432), which is positive.

e) Positive significant correlation is observed between Basic academic skillsand Team work (r = 0.332).

f) Significant correlation is observed between Self managementand Higher order thinking skills (r = 0.432), which is positive.

g) Positive significant correlation is observed between Self management and Entrepreneurial skills (r = 0.477).

h) Significant correlation is observed between Self managementand Problem solving skills (r = 0.506), which is positive.

i) Positive significant correlation is observed between Self managementand Team work (r = 0.362).

j) Positive significant correlation is observed between Higher order thinking skills and Entrepreneurial skills (r = 0.477).

k) Significant correlation is observed between Higher order thinking skillsand Problem solving skills (r = 0.506), which is positive.

l) Positive significant correlation is observed between Higher order thinking skillsand Team work (r = 0.362).

m) Significant correlation is observed between Entrepreneurial skillsand Problem solving skills (r = 0.547), which is positive.

n) Positive significant correlation is observed between Entrepreneurial skillsand Team work (r = 0.452).

o) Significant correlation is observed between Problem solving skillsand Team work (r = 0.324), which is positive.

5.1.5 Level of present employability skills of engineering students

a) Level of Basic academic skills among the students is good and they are giving more importance to Oral and Written communication.

b) Level of Self management among the students is good and the engineering students considered Attitude and Attitude to Change as important variables of Self management.

c) Level of Higher order thinking skills of the students is good and the engineering students considered Application of Engineering Knowledge in the industry and Creativity are the important aspects of Higher order thinking skills.

d) Level of Entrepreneurial skills among the students is good and the engineering students considered Managerial Skills and Leadership qualities are the important aspects of Entrepreneurial skills.

e) Level of Problem solving skills among the students is good and the engineering students considered Learning Problem solving through practical approach and understanding Crisis Management as important aspects of Problem solving skills.

f) Level of Team work among the students is good and the engineering students considered Co-ordination and Appreciation of Team work are considered as important variables of Team work.

5.1.6 Comparison of engineering colleges and universities towards opinion, expectations, support and satisfaction of employability skills

a) Students studying in Universities are comparatively higher than the students studying in engineering Colleges towards the present level of employability skills.

b) Expectations level of students studying in Universities is comparatively higher than the expectations level of students studying in engineering Colleges towards employability skills.

c) Responses given by the engineering students show that the students studying in Universities are getting more support from their institution than the students studying in engineering Colleges towards employability skills.

d) Satisfaction level of students studying in Universities is higher than the satisfaction level of the students studying in engineering Colleges towards employability skills.

5.1.7 Influence of student's gender on employability skills in engineering institution

5.1.7.1 Basic academic skills

a) Significant influence of student's gender on Basic Academic skills is not observed.

b) Significant influence of institution on Basic Academic skills is observed. Students studying in Universities are possessing better Basic Academic skills than the students studying in Engineering Colleges.

c) Significant influence of branch on Basic Academic skills is observed. Students studying courses in Electrical & Electronics are possessing better Basic Academic skills and the students studying courses in Computer Science are lacking in Basic Academic skills.

d) Significant influence of existence of institution on Basic Academic skills is observed. Students studying in institutions existing more than 15 years are possessing better Basic Academic skills and the students studying in institutions existing less than 10 years are lacking in Basic Academic skills.

e) Significant influence of father's employment on Basic Academic skills is observed. Students whose fathers running own business are better in Basic Academic skills and the students whose fathers working in Government sector are lacking in Basic Academic skills.

f) Significant influence of mother's employment on Basic Academic skills is observed. Students whose mothers working in private organisationare possessing better Basic Academic skills and the students whose mothers are self employed are lacking in Basic Academic skills.

g) Significant influence of students' native area on Basic Academic skills is observed. Students from urban area (24.01). This shows that students from rural area are possessing better Basic Academic skills and the students from urban area are lacking in Basic Academic skills.

5.1.7.2 Self management

a) Significant influence of student's gender on Self management is not observed.

b) Significant influence of institution on Self management is observed. Students studying in Universities are possessing better in Self management skills than the students studying in Engineering Colleges.

c) Significant influence of branch on Self management is observed. Students studying courses in Electrical & Electronics are possessing better Self management skills and the students studying courses in Mechanical Engineering are lacking in Self management skills.

d) Significant influence of existence of institution on Self management is observed. Students studying in institutions existing more than 15 years are possessing better Self management skills and the students studying in institutions existing less than 10 years are lacking in Self management skills.

e) Significant influence of father's employment on Self management is observed. Students whose fathers working in private employees are better in Self management skills and the students whose fathers working in Government are lacking in Self management skills.

f) Significant influence of mother's employment on Self management is observed. Students whose mothers working in private organisation are possessing better Self management skills and students whose mothers working in Government are lacking in Self management skills.

g) Significant influence of students' native area on Self management is not observed.

5.1.7.3 Higher order thinking skills

a) Significant influence of student's gender on Higher order thinking skills is not observed.

b) Significant influence of institution on Higher order thinking skills is observed. Students studying in Universities are possessing better Higher order thinking skills than the students studying in Engineering Colleges.

c) Significant influence of branch on Higher order thinking skills is observed. Students studying courses in Electrical & Electronics are possessing better Higher order thinking skills and the students studying courses in Computer Science are lacking in Higher order thinking skills.

d) Significant influence of existence of institution on Higher order thinking skills is observed. Students studying in institutions existing more than 15 years are possessing better Higher order thinking skills and the students studying in institutions existing less than 10 years are lacking in Higher order thinking skills.

e) Significant influence of father's employment on Higher order thinking skills is observed. Students whose fathers working in private employees are possessing better Higher order thinking skills and the students whose fathers working in Government employees are lacking in Higher order thinking skills.

f) Significant influence of mother's employment on Higher order thinking skills is observed. Students whose mothers are working in private employees are possessing better Higher order thinking skills and the students whose mothers are House wives are lacking in Higher order thinking skills.

g) Significant influence of students' native area on Higher order thinking skills is observed. students from rural area are possessing better Higher order thinking skills and the students from urban area are lacking in Higher order thinking skills.

5.1.7.4 Entrepreneurial skills

a) Significant influence of student's gender on Entrepreneurial skills is not observed.

b) Significant influence of institution on Entrepreneurial skills is not observed.

c) Significant influence of branch on Entrepreneurial skills is observed. Students studying courses in Electrical & Electronics possess better Entrepreneurial skills and the students studying courses in Mechanical Engineering are lacking in Entrepreneurial skills.

d) Significant influence of existence of institution on Entrepreneurial skills is observed. Students studying in institutions existing more than 15 years possess better Entrepreneurial skills and the students studying in institutions existing less than 10 years are lacking in Entrepreneurial skills.

e) Significant influence of father's employment on Entrepreneurial skills is not observed.

f) Significant influence of mother's employment on Entrepreneurial skills is observed. Students whose mothers are working in Government are possessing better Entrepreneurial skills and the students whose mothers are House wives are lacking in Entrepreneurial skills.

g) Significant influence of students' native area on Entrepreneurial skills is observed. Students from urban area (17.95). This shows that the students from rural area are possessing better Entrepreneurial skills and the students from urban area are lacking in Entrepreneurial skills.

5.1.7.5 Problem solving skills

a) Significant influence of student's gender on Problem solving skills is not observed.

b) Significant influence of institution on Problem solving skills is observed. Students studying in Universities are possessing better Problem solving skills than the students studying in Engineering Colleges.

c) Significant influence of branch on Problem solving skills is observed. Students studying courses in Electrical & Electronics possess better Problem solving skills and the students studying courses in Computer Science are lacking in Problem solving skills.

d) Significant influence of existence of institution on Problem solving skills is observed. Students studying in institutions existing more than 15 years are possessing better Problem solving skills and the students studying in institutions existing less than 10 years are lacking in Problem solving skills.

e) Significant influence of father's employment on Problem solving skills is not observed.

f) Significant influence of mother's employment on Problem solving skills is not observed.

g) Significant influence of students' native area on Problem solving skills is observed. Students from rural area are possessing better Problem solving skills and the students from Sub-urban area are lacking in Problem solving skills.

5.1.7.6 Team work

a) Significant influence of student's gender on Team work is not observed.

b) Significant influence of institution on Team work is not observed.

c) Significant influence of branch on Team work is observed. Students Studying courses in Electrical & Electronics are good in Team work skills and the students studying courses in Mechanical Engineering are lacking in Team work skills.

d) Significant influence of existence of institution on Team work is observed. Students studying in institutions existing more than 15 years possess better Team work skills and the students studying in institutions existing less than 10 years are lacking in Team work skills.

e) Significant influence of father's employment on Team work is not observed.

f) Significant influence of mother's employment on Team work is observed. Students whose mothers doing business are possessing better Team work skills and the students whose mothers are House wives are little lacking in Team work skills.

g) Significant influence of students' native area on Team work is observed. Students from urban area are possessing better Team work skills and the students from sub-urban area are lacking in Team work skills.

5.1.8 Association of demographics on opinion, expectations, support and satisfaction of employability skills

a) Significant association between gender and opinion towards employability skills is observed. Classification based on gender and opinion towards employability skills is well associated. Most of the men (32.0%) are having high opinion towards employability skills.

b) Significant association between gender and students expectations towards employability skills. Classification based on gender and expectations towards employability skills are not well associated.

c) Significant association between gender and support given by the institutions towards employability skills is observed. Classification based on gender and support given by the institutions towards employability skills is well associated. Most of the men (32.0%) accepted that they are getting high support from their institutions towards employability skills.

d) Significant association between gender and students satisfaction towards employability skills is observed. Classification based on gender and students' satisfaction towards employability skills is well associated. Most of the men (32.6%) are having high satisfaction towards employability skills.

e) Significant association between student's native area and opinion towards employability skills is observed. Classification based on student's native area and opinion towards employability skills is well associated. Most of the students (19.4%) from sub urban area are having high opinion towards employability skills.

f) Significant association between student's native area and students' expectations towards employability skills is observed. Classification based on native area and students' expectations towards employability skills are well associated. Most of the students (22.3%) from sub urban area are having high expectations towards employability skills.

g) Significant association between student's native area and support given by the institutions towards employability skills is observed. Classification based on student's native area and support given by the institutions towards employability skills is well associated. Most of the students from sub urban area (20.0%) agreed that their institutions are giving high support towards employability skills.

h) Significant association between student's native area and students' satisfaction towards employability skills is observed. Classification based on native area and students' satisfaction towards employability skills is well associated. Most of the students (22.3%) from sub urban areas agreed that they are having high satisfaction towards employability skills.

5.1.9 Relationship betweenexpectations, support and satisfaction towards employability skills

5.1.9.1 Basic academic skills

a) Positive significant correlation is observed between support given by the institutions and satisfaction towards Basic academic skills (r = 0.704). Support given by the institutions to the students brings satisfaction towards Basic academic skills by 70.4%.

b) Significant correlation is observed between expectation and satisfaction towards Basic academic skills (r = 0.637), which is positive. Relationship between satisfactions has fulfilled the students' expectation towards Basic academic skills by 63.7%.

c) Positive significant correlation is observed between expectation towards Basic academic skills and support given by the institutions (r = 0.629). Support given by the institutions has fulfilled the expectations of students towards Basic academic skills by 62.9%.

5.1.9.2 Self management

a) Positive significant correlation is observed between support given by the institutions and satisfaction towards Self management (r = 0.714). Support given by the institutions brings satisfaction among students towards Self management by 71.4%.

b) Significant correlation is observed between expectation and satisfaction towards Self management (r = 0.555), which is positive. Satisfaction has fulfilled the students' expectation towards Self management by 55.5%.

c) Positive significant correlation is observed between expectation and support towards Self management (r = 0.584). Support given by the institutions has fulfilled the expectations of students towards Self management by 58.4%.

5.1.9.3 Higher order thinking skills

a) Positive significant correlation is observed between support and satisfaction towards Higher order thinking (r =.703). Support given by the institutions brings satisfaction among students towards Higher order thinking by 70.3%.

b) Significant correlation is observed between expectation and satisfaction towards Higher order thinking (r = 0.537), which is positive. Satisfaction has fulfilled the students' expectation towards Higher order thinking by 53.7%.

c) Positive significant correlation is observed between expectation and support towards Higher order thinking (r = 0.549). Support given by the institutions has fulfilled the expectations of students towards Higher order thinking by 54.9%.

5.1.9.4 Entrepreneurial skills

a) Positive significant correlation is observed between support and satisfaction towards Entrepreneurial skills (r = 0.797). Support given by the institutions brings satisfaction among students towards Entrepreneurial skills by 79.7%.

b) Significant correlation is observed between expectation and satisfaction towards Entrepreneurial skills (r = 0.622), which is positive. Satisfactions have fulfilled the students' expectation towards Entrepreneurial skills by 62.2%.

c) Positive significant correlation is observed between expectation and support towards Entrepreneurial skills (r = 0.538). Support given by the institutions has fulfilled the expectations of students towards Entrepreneurial skills by 53.8%.

5.1.9.5 Problem solving skills

a) Positive significant correlation is observed between support and satisfaction towards Problem solving skills (r = 0.788). Support given by the institutions brings satisfaction among students towards Problem solving skills by 78.8%.

b) Significant correlation is observed between expectation and satisfaction towards Problem solving skills (r = 0.608), which is positive. Satisfactions have fulfilled the students' expectation towards Problem solving skills by 60.8%.

c) Positive significant correlation is observed between expectation and support towards Problem solving skills (r = 0.556). Support given by the institutions has fulfilled the expectations of students towards Problem solving skills by 55.6%.

5.1.9.6 Team work

a) Positive significant correlation is observed between support and satisfaction towards Team work (r =.741). Support given by the institutions brings satisfaction among students towards Team work by 74.1%.

b) Significant correlation is observed between expectation and satisfaction towards Team work (r = 0.639), which is positive. Satisfactions have fulfilled the students' expectation towards Team work by 63.9%.

c) Positive significant correlation is observed between expectation and support towards Team work (r = 0.593). Support given by the institutions has fulfilled the expectations of students towards Team work by 59.3%.

5.1.10 Predictor variables for students' satisfaction towards employability skills

Enhancement of Basic academic skills, Higher order thinking skills, Entrepreneurial skills, Problem solving skills, Team work and Support given by the institution towards employability skills serves as significant predictors for students' satisfaction towards employability skills.

5.1.11 Discriminant analysis for group predictability of training program offered by the placement cells

Basic academic skills, Self management, Higher order thinking skills, Entrepreneurial skills, Problem solving skills are discriminating the discriminating function. Problem solving skills is discriminating the function more and Entrepreneurial skills is discriminating the function less.

5.1.12 Level of support given by the institutions and satisfaction towards employability skills

a) Significant association between confidence to get placement during course period and support given by the institutions towards employability skills is observed. Confidence to get placement during course period and support given by the institutions towards employability skills are well associated. Most of students (30.3%) who got high support given by the institutions towards employability skills are confident to get placement during their course period.

b) Significant association between institutions facilitates more campus recruitment and support given by the institutions towards employability skills is observed. Institutions facilitate more campus recruitment and support given by the institutions towards employability skills is well associated. Most of students (35.4%) who got high support from their

institutions towards employability skills agreed that their intuitions facilitate more campus recruitment.

c) Significant association between institutions facilitates and involve in developing your soft skills and support given by the institutions towards employability skills is observed. Institutions facilitate and involve in developing your soft skills and support given by the institutions towards employability skills is well associated. Most of students (33.1%) who has got high support from their institutions towards employability skills have agreed that their institutions facilitates and involve in developing their soft skills.

d) Significant association between curriculum covers communication skills in the syllabus and support given by the institutions towards employability skills is observed. Curriculum covers communication skills in the syllabus and support given by the institutions towards employability skills are well associated. Most of the students (37.1%) who have got high support from their institutions towards employability skills have accepted that their course curriculum covers communication skills in the syllabus.

e) Significant association between institutions have exclusive communication skill development lab and support given by the institutions towards employability skills is observed. Institutions have exclusive communication skill development lab and support given by the institutions towards employability skills are well associated. Most of the students (46.3%) who got high support from the intuitions towards employability skills agreed that their institution have exclusive communication skill development lab.

f) Significant association between institutions has separate placement cell and support given by the institutions towards employability skills is observed. Institution has separate placement cell and support given by the institutions

towards employability skills are well associated. Most of students (48.6%) who got high support from their institutions towards employability skills have agreed that their institution has got separate placement cell.

g) Significant association between appeared mock interview and support given by the institutions towards employability skills is observed. Appeared mock interview and support given by the institutions towards employability skills are well associated. Most of the students (28.6%) who got high support from their institutions towards employability skills have appeared mock interview.

h) Significant association between placement cells arranged any training program and support given by the institutions towards employability skills is observed. Placement cell arranged any training program and classification based on support given by the institutions towards employability skills are well associated. Most of the students (45.1%) who got high support from their institutions towards employability skills have agreed that their placement cells have arranged training program.

i) Significant association between confidence to get placement during your course period and satisfaction towards employability skills is observed. Confidence to get placement during your course period and satisfaction towards employability skills are well associated. Most of the students (27.4%) confidence to get placement during their course period are highly satisfied.

j) Significant association between institutions facilitates more campus recruitment and satisfaction towards employability skills is observed. Institutions facilitate more campus recruitment and satisfaction towards employability skills is well associated. Most of students (29.1%) who are highly satisfied agreed that their institutions facilitate more campus recruitment.

k) Significant association between institutions facilitates and involve in developing your soft skills and satisfaction towards employability skills is observed. Institutions facilitate and involve in developing your soft skills and classification based on satisfaction towards employability skills is well associated. Most of the students (34.3%) who are highly satisfied agreed that their institutions facilitates and involve in developing your soft skills.

l) Significant association between curriculum covers communication skills in the syllabus and satisfaction towards employability skills is observed. Curriculum covers communication skills in the syllabus and satisfaction towards employability skills are well associated. Most of the students (32.0%) who are highly satisfied agreed that their course curriculum covers communication skills in the syllabus.

m) Significant association between institution/college have exclusive communication skill development lab and satisfaction towards employability skills is observed. Institutions have exclusive communication skill development lab and satisfaction towards employability skills are well associated. Most of students (26.3%) who are highly satisfied have agreed that their institutions have exclusive communication skill development lab.

n) Significant association between institutions has separate placement cell and satisfaction towards employability skills is observed. Most of the students (48.0%) who are highly satisfied accepted that their institutions has separate placement cell.

o) Significant association between appeared mock interview and satisfaction towards employability skills is not observed. Appeared in mock interview and satisfaction towards employability skills is not well associated.

p) Significant association between placement cells arranged any training program and satisfaction towards employability skills is observed. Placement cell arranged training program and satisfaction towards employability skills are well associated. Most of the students (45.1%) who are highly satisfied have agreed that their placement cells have arranged training programs.

5.1.13 Model for perception of employability skills in engineering institutions

A model is fit to ensure the Employability skills of students studying in engineering institutions. The model fit Chi-square $\chi^2 = 2.154$ and the model's p-value is 0.141 which is insignificant at 5% level, the goodness of fit index (GFI) is 0.916 and adjusted goodness of fit (AGFI) is 0.902 shows that the model fit is good.

5.2 SUGGESTIONS

a) Around 35% of engineering students from colleges and universities are not having confidence to get placement while pursuing engineering course, hence the college and university authorities have to put more effort for placement, training performance of the students, hence the students would enable to get more confidence about the placement facilities provided by the institution.

b) Around 53% of the respondents feel bad, very bad and not in a position about good or bad about facilities for placement activities which is built up by the institution, especially many universities are not equipped good placement facilities, hence the universities and concerned colleges need to initiate to establish excellent placement facility for betterment of student community in terms of career opportunity in the competitive employability market.

c) Around 34% of the respondents say there is no separate course for placement and soft skill development in the colleges and universities, hence the colleges and university authorities have to frame a separate course to fulfill the student requirement as well as facilitate to improve the progress of the students in the competitive placement scenario.

d) Only 14% of the respondents feel very good about communication skill lab equipments for facilitating in the students' performance placement, hence the colleges and university authorities have to create excellent communication lab equipments and develop faculty to excel in helping student community in placement activities.

e) Only 40% of students have more confidence about placement especially only at university level, hence the colleges need to improve the placement activities and build a good confidence measures among the student community in term of placement.

f) Only 33% of students, who study in universities accepted that their course curriculum covered the communication skills, hence the rest of the institutions/universities and colleges have to be more focused in their communication syllabus, only then the student community will enable to enhance more communication skills.

g) 40% of students felt bad that there is no chance to attend the mock interview while pursuing the course, hence the colleges/universities have to initiate and arrange mock interview process for betterment of student community to get more placement.

h) Regarding basic academic skills performance of students rated by institution wise in college and universities, the engineering college students performance is somewhat lagging than university students, hence the engineering college authorities should make more effort in improving the performance towards the academic skills.

i) Regarding entrepreneurial skills, the engineering college students performance is somewhat less than university students, hence the engineering college students has to take more initiative for improving the performance towards entrepreneurial skills.

j) Regarding problem solving skills, engineering college students' performance is less than university students, hence the engineering college students has to take more initiative for improving the performance towards problem skills.

k) Regarding the branch wise analysis of employability skills in engineering institutions, the basic academic skills for mechanical and electrical students is somewhat less than compared to computer science and electronics and communication students, hence the particular branch faculty have to take more initiative to improve the academic skills for betterment in technical interviews.

l) Regarding self management skills of respondents, the mechanical and electrical students performance is not good compared with computer science and electronics and communication students, hence the appropriate branch faculty have to take more initiative to improve the students self management skills.

m) Regarding team work, it is found that the students studying in electrical and electronics branch are better off towards team work compared to students of mechanical branch, hence there is a need for the mechanical branch students to acknowledge along with the faculty to appropriately takes measures to improve the performance towards team work.

n) It is interesting to note that the students of rural background have scored better and have better basic academic skills compared to that of urban students, there is a need for the urban students along with the faculty and colleges to understand the weak links and take necessary initiatives to improve the performance towards improving the basic academic skills.

5.3 CONCLUSION

In the globalised work place, everyone has the equal opportunity to get employed appropriately based on various factors that are inclusive of educational qualification and strength of the individual. Unfortunately, the employability level of fresh engineering graduates from India is in pitiable state.

The dynamic world in which engineers operate presents them with new demands and provides new challenges in the diverse, profound and incessant changes which confront mankind as it heads into the new era. Such change is occurring in technology, its practice and application, in the natural environment and, of course, in society's evolving expectations. In such a rapidly changing environment, too great a focus on technical competence for engineers and not enough on competence in non-technical skills and attributes such as communication, problem solving and management skills has added to the problem of unemployability.

Engineering education in India is perceived as purely technical in nature, across the society irrespective of social status, economical background, demographical location, urban, rural, culture, educational background. This mindset that has imprinted over a long period in the society and stereo-typed repetition on the views of engineering education has become a hindrance to realize, acknowledge and change our perceived ideas about engineering education. The need to transform our mindset and perception of engineering education from its narrow approach to a broader approach with the view of employability in the ever demanding global business environment is urgent.

Today, the engineering graduates perceptions towards the employability skills performance is based on the present research objectives, most of the students who are studying in colleges feel about placement, facilities, communication skills, mock interview is not adequate to face the stiff competitions, whereas the university students perceptions towards the placement, facilities, communication skills, training and mock interview is

good and enables the students to face the competition in employment market, in addition to that, most of the present universities are not having sufficient placement cells and effective training methods when it is compared with engineering colleges.

Regarding technical and soft skills, the engineering college students who responded, only 18% of respondents improve their skills in the competitive field, rest of the 72% of the engineering college students and the placement have to take more effort for improving students performances in both technical and soft skills.

40% of the respondents feel that there is no campus recruitment facility for engineering students, hence the engineering college authority have to initiate measures and effort to create good facilities.

The overall performance of engineering student's skills for rural areas is poor, the main reason is lack of communication skills, problem solving skills, self management skills. Hence, the rural based colleges have to initiate and put more effort for betterment of student community and placement areas. The research finding inferences on the gender wise performance of students on employability skills, the female respondents opinion is only at 18.3% of high level on employability skills and the male respondents opinion is 32% of high levels on the employability skills. In this context, the institutions are to focused more on female respondents for improvement of their bid in the competitive market.

Based on the research objectives, the statistical inferences are more useful to the student community, to identify the respondents perceptions on the employability skills in different dimensions including training, communication skills, mock interview, basic academic skills, high order thinking skills, problem solving skills and team work. In this context, the research is more focused on the budding engineers and institutions to equip their skills and facilities to excel in the competitive market.

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QUESTIONNAIRE

Dear Participant:

My name is V Chandra Shekar and I am pursuing my Ph D at St. Peter's University, Chennai. I have undertaken a research study on "**Students Perception Of Employability Skills With Respect To Engineering Institution"**. I am inviting you to participate in this research study by completing the attached surveys. The following questionnaire will require approximately 20 minutesto complete. I assure all information will remain confidential. Please answer all questions as honestly as possible and return the completed questionnaires promptly. Thank you for taking the time to assist me in my educational endeavors. The data collected will provide useful information towards my research study which shall benefit the student community.

Section A

1. Gender:
a. Male b. Female

2. Community:
a. OC b. BC c. MBC d. SC/ SCT

3. Institution:
a. Deemed university b. College

4. Branch:
a. Mechanical Engineering
b. Electronic Communication
c. Electrical & Electronics
d. Computer Science

5. Existence of Institution
a. Less than 10 years
b. 10-15 years
c. More than 15 years

6. Academic Performance:
a. Percentage of Marks in Secondary Education:
b. Percentage of Marks in Higher Secondary Education:
c. Cumulative Grade Point/ Percentage of Marks in Engineering:

7. Father's Employment:
a. Government b. Private c. Business d. Self-Employed

8. Mother's Employment:
a. Government b. Private c. Businessd. Self-Employed e. House wife

9. Type of Family
a. Joint b. Nuclear

10. Native Area:
a. Urban b. Semi-Urban c. Rural

Section B

1. Give your opinion towards the level of present employability skills towards the following attributes:

VG- Very good; G- Good; N-Neutral; B- Bad; VB-Very bad

Sl.No.	Attributes	VG	G	N	B	VB
1	My overall Oral Communication is					
2	My overall Written Communication is					
3	My Presentation Skills is					
4	My listening skills is					
5	My numerical ability is					
6	My sense of Time Management is					
7	My understanding of Managerial Skills is					
8	My appreciation of Team Work is					
9	Understanding of my Strength/ Weakness is					
10	My awareness of Organisational Ethos/Values is					
11	My appreciation on enhancement of Computer skills is					
12	My understanding of Stress Management is					
13	My understanding of Crisis Management is					
14	My appreciation of application of Engineering Knowledge in the industry is					
15	My appreciation of Leadership Qualities					
16	My understanding of practical Utility of the Engineering Course Curriculum is					
17	My appreciation of creativity is					
18	My ability to Learning through Practical problem solving is					
19	My sense of Reasoning Ability is					
20	My Attitude towards Change is					
21	My belief in Motivational Skills is					
22	My Knowledge on Emotional Intelligence is					
23	My belief towards Extracurricular activities is					
24	My Habit of Learning and update is					
25	My appreciation towards Decision Making is					
26	My appreciation of Need for Entrepreneurship is					
27	My understanding of Project Management is					
28	My belief in co-ordination is					
29	My understanding of Attitude is					

2. Give your level of expectation for enhancement of Employability Skills in your career:

VG- Very high; H-High; N-Neutral; L- Low; VL-Very Low

Sl.No.	Attributes	VH	H	N	L	VL
1	Oral Communication					
2	Written Communication					
3	Presentation Skills					
4	Listening					
5	Numerical ability					
6	Importance of Time Management					
7	Understanding of Managerial Skills					
8	Appreciation of Team Work					
9	Understanding your Strength/Weakness					
10	Awareness of Organisational Ethos/Values					
11	Enhancement of Computer skills					
12	Understanding of Stress Management					
13	Understanding of Crisis Management					
14	Application of Engineering Knowledge in the industry					
15	Appreciation of Leadership Qualities					
16	Practical Utility of the Engineering Course Curriculum					
17	Creativity					
18	Learning through Practical problem solving					
19	Reasoning Ability					
20	Attitude towards Change					
21	Motivational Skills					
22	Knowledge on Emotional Intelligence					
23	Extracurricular activities					
24	Habit of Learning and update					
25	Appreciation towards Decision Making					
26	Need for Entrepreneurship					
27	Understanding of Project Management					
28	co-ordination					
29	Attitude					

3. Give the level of your institutional support for the enhancement for my employability skills:

VG- Very high; H-High; N-Neutral; L- Low; VL-Very Low

S.No.	Attributes	VH	H	N	L	VL
1	Oral Communication					
2	Written Communication					
3	Presentation Skills					
4	Listening					
5	Numerical ability					
6	Importance of Time Management					
7	Understanding of Managerial Skills					
8	Appreciation of Team Work					
9	Understanding your Strength/Weakness					
10	Awareness of Organisational Ethos/Values					
11	Enhancement of Computer skills					
12	Understanding of Stress Management					
13	Understanding of Crisis Management					
14	Application of Engineering Knowledge in the industry					
15	Appreciation of Leadership Qualities					
16	Practical Utility of the Engineering Course Curriculum					
17	Creativity					
18	Learning through Practical problem solving					
19	Reasoning Ability					
20	Attitude towards Change					
21	Motivational Skills					
22	Knowledge on Emotional Intelligence					
23	Extracurricular activities					
24	Habit of Learning and update					
25	Appreciation towards Decision Making					
26	Need for Entrepreneurship					
27	Understanding of Project Management					
28	Co-ordination					
29	Attitude					

4. Give your level of satisfaction towards the possession of Employability skills which are motivated by your engineering college/Institute:

HS-Highly satisfied; S-Satisfied; A-Average; D-Dissatisfied; HD- Highly dissatisfied

S.No.	Attributes	HS	S	A	DS	HDS
1	Oral Communication					
2	Written Communication					
3	Presentation Skills					
4	Listening					
5	Numerical ability					
6	Importance of Time Management					
7	Understanding of Managerial Skills					
8	Appreciation of Team Work					
9	Understanding your Strength/Weakness					
10	Awareness of Organizational Ethos/Values					
11	Enhancement of Computer skills					
12	Understanding of Stress Management					
13	Understanding of Crisis Management					
14	Application of Engineering Knowledge in the industry					
15	Appreciation of Leadership Qualities					
16	Practical Utility of the Engineering Course Curriculum					
17	Creativity					
18	Learning through Practical problem solving					
19	Reasoning Ability					
20	Attitude towards Change					
21	Motivational Skills					
22	Knowledge on Emotional Intelligence					
23	Extracurricular activities					
24	Habit of Learning and update					
25	Appreciation towards Decision Making					
26	Need for Entrepreneurship					
27	Understanding of Project Management					
28	Co-ordination					
29	Attitude					

5. **Do you have confidence to get placement during your Course period?** Yes/No

   If No, What skills you need to possess and update:

   (a) Technical Skills
   (b) Soft Skills
   (c) Both

6. **Does your institution facilitate more campus recruitment?** Yes/No

   If yes, what is the level of facilitation?

   (a) Very Good
   (b) Good
   (c) Neither Good Nor Bad
   (d) Bad
   (e) Very Bad

7. **Does your institute facilitate and involve in developing your soft skills?** Yes/No

   If yes, what is the level of facilitation?

   (a) Very High
   (b) High
   (c) Neither High nor low
   (d) Low
   (e) Very Low

8. **Your course curriculum covers Communication skills in the syllabus?** Yes/No

   If yes, what is the level of coverage?

   (a) Very Good
   (b) Good
   (c) Neither Good Nor Bad
   (d) Bad
   (e) Very Bad

9. **Does your institute/college have exclusive communication skill development lab?** Yes/No

   If yes, how effective is the lab?

   (a) Very Good
   (b) Good
   (c) Neither Good Nor Bad
   (d) Bad
   (e) Very Bad

10. **Whether your institute has separate placement cell?** Yes/No

    If yes, State the level of effort taken by placement cell?

    (a) Very Good
    (b) Good
    (c) Neither Good Nor Bad
    (d) Bad
    (e) Very Bad

11. **Have you appeared (practiced) mock interview?** Yes/ No

    If yes, State the level of opinion towards the mock interview

    (a) Very High
    (b) High
    (c) Neither High nor low
    (d) Low
    (e) Very Low

12. **Whether your placement cell arranged any training program?** Yes/No

    If yes, state the effectiveness of training program?

    (a) Very High
    (b) High
    (c) Neither High nor low
    (d) Low
    (e) Very Low

Any suggestions to improve employability skills in your institution ----------
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----- Thank you -----

PUBLICATIONS

1. Shekar, ChandraV and Maran. K., "Employability skills: Need of the hour for fresh engineering graduates in India", Global Journal of Business and Management Research Vol. 1, Issue 1, Dec 2013, ISSN:2347-7814.

2. Shekar, Chandra V and Maran. K., "A Study on engineering students employability skills for excellence in Career with reference to India", SPIM International Journal of Management Research, Vol. 1, Issue 1, Feb 2015, ISSN:2391-5842. Impact Factor:3.27.

3. Shekar, Chandra V and Maran. K., "A Study on Students Perception of Employability Skills with Reference to Engineering Institution", International Journal of Research in Engineering and Social Science, Vol. 5, Issue 3, Mar 2015, ISSN:2249-9482.Impact Factor:4.16.