2. LITERATURE OVERVIEW

Employers, engineering students, faculty members, and educational institutions are the main stakeholders in the studies related to ‘employability status of students’. Employability has been defined as ‘doing value creating work, getting paid for it, learning at the same time and enhancing the ability to shape work in the future’ (Sumantra, 1997). The present review of literature includes studies that has focused on the skill sets employers feel as important to become employable, the contemporary perception, employers have about students' employability level has also been touched upon. Additionally studies related to students’ perception and faculty members’ perception about the types of skill sets and competencies required by the corporate has also been reviewed. The research studies highlighting the gap between ‘industries and institutions’, and role of higher education in enhancing placement opportunities also form a part of this literature. This section has given enormous attention to both predictor and moderator studies wherein the role of variables with regard to employability status has been explored.

2.1 EMPLOYABILITY – EMPLOYERS’ PERSPECTIVE

In ‘employers’ perspective study’ the research work underlying the concept of employers' perception and expectation they have from engineering graduates is reviewed.

Lang et al. (1999) conducted research in this area with an objective to assist curriculum designers in formulating the engineering curriculum which would meet the job market needs. The study aimed at identifying the skills that the employers feel is important to be included in engineering curriculum to develop graduates' employability. The data was collected from four hundred and twenty engineers and engineering managers of aerospace and defense companies, United States. An adapted questionnaire was used for the study. The questionnaire consisted of one
hundred and seventy two attributes related to engineering programme outcomes of US. The respondents were asked to rate the level of importance of each attribute on a five point rating scale. The data was analyzed using spearman’s rank correlation coefficient method. The findings revealed that the attributes such as knowledge and understanding of product life cycle, product design, development cycle, design criteria for products and production and operations knowledge were considered to be very important by employers to work in aerospace and defense company. The study concluded that including these attributes in the US engineering curriculum would facilitate graduates’ in enhancing their employability opportunity.

Further, Enshassi and Hassouna (2005) conducted research with an objective to explore thirty five contractors and seven employers of civil engineering companies of Gaza, Palestine regarding the skills obtained by engineering graduates. They formed the respondents for the study. The respondents evaluated the quality of civil engineering graduates belonging to the Islamic university of Gaza, Palestine who have obtained their degree in the past five years. The questionnaire supported by an interview schedule was used for data collection. The questionnaire consisted of twelve attributes measuring civil engineering competency. The hypothesis stated that there is significant difference between the skills obtained by the graduates and the skills required by the employers. The descriptive analysis revealed that the civil engineering graduates come across practical problem while working on the construction site. The study suggested that the civil engineering graduates should be practically trained on site and should be taught thoroughly about using surveying instruments. The overall research findings highlighted that graduates have not obtained the required skills that are necessary for civil engineers. To improve civil engineering graduates’ competency level, the study suggested that the students should have practical exposure. An exposure to the real life working environment would be helpful in enhancing their employability status.
Goel (2006) made an attempt to understand the competency required by an engineer to work in an IT industry. The study further classified these competencies into various categories. The data was collected from fifty four engineers and managers working in various multinational IT companies in India. Questionnaire was used for eliciting data from the respondents. The study included twenty three parameters measuring core engineering and general professional competencies. The respondents were asked to assign numeric ratings from 0 to 10 on these parameters of which 10 represented competencies of ‘highest importance’. The data was analyzed on the basis of numeric ratings and the parameters were classified into five categories namely (i) pivotal (numeric rating of nine or more) most important competencies, (ii) critical (numeric rating between seven and nine) competencies considered mandatory, (iii) obligatory (numeric rating between five and seven) required competencies, (iv) desirable (numeric rating between four and five) competencies to be known in general and (v) complementary (numeric rating less than four) competencies required to fulfill the program objectives. The findings revealed that problem solving ability was rated high and so it was classified as pivotal. The other competencies such as methodological analysis, basic engineering proficiency, development know – how, team work skills, english language skills, presentation skills, practical engineering experience, leadership skills and communication skills which are a mix of both engineering and general skills were classified as critical. Ability to develop engineering expertise, research know – how, ability to develop a broad general education, awareness of environmental issues, social skills and specialized engineering proficiency were classified as obligatory. Project management skills, management of business process and administration skills and sensitivity towards socio – economic aspects for sustainable technological development were classified as desirable. The competencies such as finance, marketing, law and other language skills were classified as complementary. The research study recommended that the teaching – learning assessment process should be given maximum attention in the
process of developing these competencies. The research study also suggested that curriculum must be designed appropriately such that it provides opportunities for the development of these competencies. The study concluded that Indian educational institutions should align engineering curriculum in such a way that it meets the expectations of industry experts.

Goel (2006) carried out a research to bring awareness among engineering graduates regarding the competencies required for gaining better employment. A comparison was made between the accreditation agencies of various countries. The comparison in between accreditation agencies was made on the basis of educational pattern followed by the accreditation agencies of respective countries. The curriculum suggested by the Accreditation Board for Engineering and Technology, US include practical application of engineering knowledge, make students to work in a team, make them understand professional, ethical and social responsibilities, include contemporary professional, societal and global issues and prepare students for continuous learning. The UK accreditation agency’s standards for professional engineering competence emphasize on preparing students with an ability to cope up with changing advanced technologies. The Institution of Engineers, Singapore accreditation agency emphasize on the application of mathematical, science and engineering knowledge, to use engineering tools and techniques for public health and safety, to make them aware of cultural, societal and environmental constraints and to understand professional, ethical and moral responsibility in its engineering curriculum. The Engineers Australia Accreditation Board, Australian accreditation agency follow the engineering education which emphasize on basic science and engineering fundamentals, communication skill, technical competency, problem solving skill, team working and system and technology skill. Japan accreditation agency, The Japan Accreditation Board for Engineering Education follow the engineering pattern which includes the application of engineering knowledge, engineering ethics, develop Japanese language communication skills such as methodical writing, verbal presentation and
debate abilities and to develop basic skills for international communication. On the basis of comparison in between accreditation agencies the study inferred that engineering educational pattern followed by US, UK, Australia, Japan and Singapore accreditation agencies emphasize on outcome based approach in which students are trained to compete globally in the job market. Whereas in India the All India Council for Technical Education (AICTE) focuses more on concept based, theoretical inputs rather than contemporary and flexible curriculum. As a result the students are seldom encouraged to think creatively and independently. Majority of students fail to possess the qualities that are expected to gain employment in the job market. The study recommends Indian higher education to modify engineering curriculum as per the demands of employers and technological advancements. The study suggested that faculty members could be given an opportunity to deal with real life projects which would be highly helpful in improving the quality of engineering education. The Successful Practices in International Engineering Education (SPINE) project report was used for creating awareness among graduates regarding the competencies required for employment. This international engineering education project included one hundred and forty five managers, thousand three hundred and seventy two engineers and five hundred and forty three professors of Europe and US as the respondents for the study. The questionnaire consisted of fifty one parameters measuring quality of education, teaching methods, engineering competencies and general professional skills. The descriptive analysis was carried out. The findings revealed that the competencies such as design skills, problem solving skills, technical knowledge, team working, effective communicative skill, commitment towards learning, analytical skills, creative thinking and systems knowledge were among the most important competencies required for gaining employment. The study recommended that apart from institutions the students should also take self interest in developing these competencies.
Further, Abdullah et al. (2007) the research objective was to identify the employability skills that the employers expect the most while recruiting fresh engineering graduates. The data was collected from the high ranking personnel working in all the sectors of Malaysia among which thirty nine belonged to health care, social, entertainment and leisure, seventy belonged to education and consulting, fifty five belonged to commerce, trade, finance, agriculture and food, forty three belonged to communication, information technology, defense, security, transport, one hundred and two belonged to engineered materials, energy and natural sources and one hundred and thirteen belonged to build environment sector. Face to face interview with questionnaire was the data collection method used. The questionnaire consisted of thirteen attributes related to types of knowledge, skills and experience that need to be possessed by engineering graduates to gain employment. Five point Likert’s rating scale of which five representing ‘most important’ and one representing ‘not important at all’ was used for the study. Convenient sampling technique was used. The descriptive analysis revealed that the problem solving skill and communication skill were the most important attributes that are expected by the majority of employers from graduates. The study recommended that the engineering institutions of Malaysia should focus on strengthening those expected skills to the students.

Spinks et al. (2007) investigated the skills and attributes required by engineering graduates for present and for the future job market. The data was collected from twenty seven industrial experts belonging to large scale organizations and small and medium sized sectors in UK. In – depth interview pattern was used. Thematic analysis was made. The findings revealed that technical skills such as theoretical understanding, technical knowledge and practical application, personal skills such as communication skills, team working, creativity and innovation and business skills such as commercial awareness are the skills expected by the industries of UK from an under graduated engineer irrespective of various engineering disciplines.
To make engineering graduates to face challenges in the future, the study identified three broad areas namely (i) technological awareness – employers look for systems knowledge from graduates to work with an advanced technological invention, (ii) core competencies of engineering graduate – technical skills, personal skills and business skills, and (iii) creative and innovative skills – to face competitive challenge. Based upon the required skills and attributes, the study classified the ‘role’ that is expected from the industries to be performed by engineering graduates into three categories such as (i) engineer as specialist – being a technical expert, (ii) engineer as integrator – operating and managing complex business environment across boundaries and (iii) engineer as change agent – to cope with changes for meeting the future needs. The study concluded that the identified roles, skills and attributes would be highly helpful for the engineering graduates to withstand in the present labor market as well as to overcome the challenges of the future labor market.

Further, Zaharim et al. (2009) the research objective was to study the perception and expectation of employers regarding engineering graduates. The hypothesis stated that there is significant difference between the employers’ perception towards graduates and employers’ expectation from graduates. The data was collected from high ranking personnel of four hundred and twenty two companies in Malaysia belonging to all the sectors health care, social entertainment and leisure, education and consulting, commerce, trade, finance, agriculture and food, communication, information technology, defense, security, transport, engineered materials, energy and natural sources and built environment. Adapted questionnaire with face to face interview was used as mode for data collection. The respondents were questioned on the expectation they have from engineering students and the competencies they feel is not very satisfactory among them. Thirteen attributes related to knowledge, skills and experience were used for the study. The five point Likert’s rating scale of five representing ‘most important’ and one representing ‘not important at all’ was used for studying employers
expectation and five point rating scale of five representing ‘most satisfied’ and one representing ‘most dissatisfied’ was used for studying employers perception. Descriptive analysis was done. The findings revealed that clear effective communication and problem solving are considered to be the most expected attributes by the majority of employers. In the mean way employers perceived that they are highly satisfied with engineering graduates in two attributes namely programming knowledge and team working skills. Through the findings it was inferred that graduates do not possess the skills that are expected by the employers. The study recommended that engineering graduates should focus on developing the attributes that are expected by employers.

The research study carried out by Husain et al. (2010) aimed at exploring the expectations; employers of owning engineering industries have from graduates at the time of recruitment. Convenient sampling technique was used in the selection of respondents. The data was collected from one hundred and eighty employers of civil, mechanical and electrical engineering companies in Malaysia. Adapted questionnaire was used for the study. The questionnaire consisted of various attributes related to employability skills. To assess employers’ ratings of attributes in term of its level of importance, five point Likert’s rating scale was used. The descriptive analysis revealed ‘personal quality’ as the fore most attribute followed by inter personal skills, resources skills, basic skills, information skills, thinking skills and systems' skills respectively. The hypothesis stated that there is significant relationship between the employability skills obtained by the graduate and the type of the company they selected. To test the hypothesis, one – way ANOVA was used. The findings revealed that civil engineering companies do not demand systems skills from the graduates, as they work at the project site. On the contrary, practical knowledge in using surveying instruments onsite is considered as more preferable for civil engineering graduate. Electrical and mechanical engineering companies are found to expect employability skills such as personal quality, inter personal skills, resources skills, basic skills,
information skills, thinking skills and systems’ skills from the graduates. The study concluded that employer preferences regarding the employability skills from the graduates vary depending upon the type of the company. The study recommended that educational institutions should focus on developing employability skills of students either through lectures or by means of industry oriented curriculum.

Similar study was conducted by Hinchliffe and Jolly (2011) to understand the preferences and expectation of employers. The data was collected from one hundred employers of UK belonging to various organizations such as national and multinational companies, public sectors, small and medium sized enterprises, training programme institutions and assessment centers. Self-administered questionnaire was used for the study. To study employers’ preference level regarding personal qualities, forty seven statements related to attributes required at different stages of graduates’ career was used. The employers were asked to rate the statements by preference of three options namely (i) on appointment, (ii) at one year and (iii) at three years. Descriptive analysis was done. The result found that honesty, integrity and trust are found to be expected ethical qualities by the employers at the time of appointment and the employers are found to prefer technical skills at the completion of one year of experience. The findings inferred that the majority of employers prefer graduates who are self-directed, good in managing time and who have interest in continuous learning and growth. The study also focused on studying the employability skills that the employers expect from experienced graduates who have put in three and more years of service in the organization. Seven competencies related to employability skill were used. The data was analysed using forced choice ranking method in which employers were asked to rank the skills in order of importance. The result reported that interpersonal skills ranked one, written communication ranked two, IT skills ranked three, numeracy ranked four, commercial awareness ranked five, work experience ranked six and presentation skills ranked seven respectively. Based upon the employers’
preference and expectations, the study proceeded with constructing a model named as ‘graduate identity. The concept ‘graduate identity’ referred to graduates being aware of their own identity’. The study constructed graduate identity on the basis of four elements namely (i) values – personal ethics, social values and organizational values, (ii) intellect – graduate ability to think critically, analyze and communicate information, (iii) social engagement – being participative with the community or society and (iv) performance – ability to work good. The study suggested that the graduate identity would be helpful for graduates in enhancing their employability and to gain employment.

To assess the employability skill level of students, aspiring minds research cell (2011) conducted employability test named ‘Aspiring minds computer adaptive test’. The test is conducted all over India and it is also called as India’s largest employability test. Aspiring minds computer adaptive test is used to predict the employability of engineers in various technical roles including IT services, IT product, KPOs, BPOs and technical support etc. The parameters such as English communication, quantitative skills, problem solving skills and computer science and programming skills are assessed through this test. The research objective was to study employability percentage of engineers across different states of India. The result for this study is based on ‘Aspiring minds computer adaptive test scores’ of one hundred and twenty thousand engineering and computer application graduates’. The hypothesis stated that number of engineering colleges in a state influences the percentage of employment in the state. The descriptive and inferential statistics revealed that employment percentage falls with increase in the number of colleges in the state. Even though Tamil Nadu has lower number of engineering colleges compared to Andhra Pradesh, it has lower employment percentage. Even though Delhi has more colleges than Bihar, the employment percentage is seemed to be very high in Delhi. Based upon the findings, the study inferred that graduates who are in the states with more government colleges as compared to private colleges
have good employability skills. The study suggested that the quality of engineering education should be improved for increasing the employability of graduates which would also result in the increased employment ratio of the country.

The research objective of a study conducted by Turhan and Akman (2013) was to identify the employability skills that the employers expect from the information technology graduates in Turkey. The study also aimed at giving suggestions to the graduates’ for improving their employability. Employability skills that the employers expect from the graduates were examined in terms of two categories namely curriculum competencies and graduates’ adequacies. Competencies such as time management, leadership, ethics and communication and adequacies such as graduates’ involvement in software development, graduates’ getting adapted to new methods and techniques in the organization and graduates’ ability in deriving solution to the problem was considered as the dependent variable for the study. Whereas the influencing factors such as habits, experience, personal characteristics, success and university was used as independent variable. The data was collected from eighty one IT professionals working in various government and private sectors in Turkey. New questionnaire was developed for the study. The questionnaire consisted of various attributes related to the variables used for the study. Likert’s five point rating scale of which one representing ‘very little’ and five representing ‘very much’ was used for the study. One of the hypothesis stated that there is significant relationship between the dependent variable and independent variable used in the study. Descriptive analysis was carried out. The findings revealed the existence of relationship between the dependent and the independent variable. Based upon the findings, the study inferred that the competencies ‘time management’ and ‘leadership skills’ is the most expected attribute by the majority of employers and this competencies is found to be highly related to the independent variables such as habits gained by the graduates’ through their university education and
personal characteristics obtained by the graduate. The study reported that majority of the IT employers are found to be dissatisfied with the employability skills possessed by the new graduates. The study concluded that leadership skills and time management skills are found to be the most expected employability skills by the employers from fresh graduates. The study suggested that the graduates should concentrate on developing those skills during their university education for gaining employment. The study recommended industry – institute interaction and summer projects for the graduates to enhance new graduates’ employability.

The study conducted by Jake and Leon (2014) was to identify the competencies that the employers prefer towards the graduates from Philippines University in terms of the possession of knowledge, values and skills. The study aimed at modifying the curriculum as per industrial requirements to enhance the employability of graduates. The data was collected from fourteen employers of Philippines belonging to various sectors such as manufacturing, health care providers and marine industry. Self-made questionnaire was used for the study. The questionnaire consisted of various attributes related to personal qualities and skills that need to be possessed by the graduates to gain employment. The five point likert’s rating scale of five representing ‘strongly agree’ and one representing ‘strongly disagree’ was used for studying employers’ preference towards each attributes. Simple frequency count and weighted mean was calculated to analyse the data. The findings revealed that graduates possessing adequate knowledge and skills in specialized area, communication skill, computer literacy, team working skill, dedicated and result oriented are considered to be the most preferred attributes by the majority of employers. The study concluded that the efforts for developing the preferred attributes should be given more importance while designing the course syllabus. It is suggested that the students should be asked to participate in national and international level academic, cultural and sports activities. This would enable students to possess the adequate competences to gain employment.
This section gives clear understanding about the skills/competencies that are expected in the job market. It would definitely guide graduates to prepare themselves to match employers’ demands.

2.2 EMPLOYABILITY – ENGINEERING STUDENTS’ PERSPECTIVE

This section explores the perception of students towards the institutional facilities offered by their respective educational institutions to enhance students’ employability. The various studies included here also focuses on students’ self-employability measurement towards employers and the job market. The awareness level of students on the nature of job market has also been reviewed in this section.

Glover et al. (2002) carried out research to study students’ perception regarding the facilities offered by their educational institution. Their perception towards teaching – learning outcomes was the main focus of the study. The data was collected from four hundred students of first term and four hundred students of final term of Nottingham University, UK. Adapted questionnaire was used. The questionnaire consisted of fifteen items related to engineering education. The respondents were asked to rank the responses. The hypothesis stated that there is significant difference between the perception of students studying in first term and those studying in final term regarding the education offered by the university. Descriptive analysis was done. The findings for the first term students revealed that the students are interested in developing their competency through the university curriculum. Whereas findings for the students in final term revealed that the students have obtained only theoretical knowledge and they have not gained any practical knowledge and skills through the curriculum. The result also reported that the students strongly feel that information technology skill, research and problem solving skill are important for employment. The overall findings confined that the university has not fulfilled the expectations of the final year students, as they have not gained practical knowledge and skills through the current curriculum. The study
concluded that despite theoretical teaching, universities should also focus on developing practical skills for enhancing their employability status.

Further, Tan and Kek (2004) extended research in this area with an objective to study the perception and expectation of the students regarding the services rendered by their educational institution. Nine hundred and fifty eight engineering students from two universities were the respondents for the study of which four hundred and ninety seven belonged to university A and four hundred and sixty one belonged to university B of Singapore. The questionnaire consisted of seventy six attributes related to eight factors namely (i) course organization (ii) work load and assessment (iii) learning, teaching and advising (iv) university facilities (v) social activities (vi) library facilities and (vii) computing facilities. The hypothesis stated that students across different years have different perceptions and expectations towards the services rendered by the institution. The data was analyzed using Service Quality tool for measuring students’ satisfaction towards service quality. The findings revealed that students of University A are highly satisfied by the services provided by institutions in terms of course, teaching and advising, assessment and university facilities. Whereas students of University B is found to be highly satisfied by the services in terms of course content, assessment and university facilities. The students of both the universities are found to be dissatisfied by the communicating channels used by the management for communicating with the students. Students’ perceived that universities should provide additional channels to communicate their views to the management and in turn management should also show its willingness to accept their opinion. To study the determinants of overall satisfaction, step wise regression analysis was calculated for University A and University B students. The findings revealed that ‘learning factor’ has played a major role in determining overall student satisfaction for the students of both the universities. The study concluded that the students’ expectations could be met by the institution by offering prompt services.
Taylor (2005) carried out research to assess young graduates’ perception regarding the skills and the abilities, they think that employers expect from them. Semi structured interview pattern was used for the study. Ninety one young people who had undertaken vocational education programme in Australia were the respondents for the study. Qualitative analysis was done. Based on the comments given by the respondents, the attributes such as character, work behavior, job competence, presentation skills, interpersonal relationship and work experience were perceived to be important by the graduates. The study also aimed at identifying the competencies that the employers expect while recruiting the graduates. Thirty three employers of building trade industries in Western Australia were interviewed. Qualitative analysis was made. The findings revealed that attribute such as basic skills and knowledge of tools and equipments is considered to be important by employers’ for trade oriented jobs. Majority of the employers reported that vocational training institutions have failed to meet the expectations, as the new recruits have poor skills during their entry stage in the work environment. The study suggested that the educational programmes should be in line with the industry needs to enhance employability of students.

A study conducted by Nguyen et al. (2005) focused on identifying how job seeking students evaluate their personal qualities. The perception regarding the qualities they think to be important for gaining employment has also been identified in this research. Two hundred and seventy students were the respondents for the study of which one hundred and eighty six belonged to national university, fifty three belonged to public university and thirty one belonged to private university of Japan. Adapted questionnaire was used for the study. The questionnaire consisted of twenty three competencies related to the personal qualities of students with five point Likert’s rating scale. To assess the qualities possessed by an individual student, five point rating scale was used. The findings revealed that the students rated themselves highly in competencies such as optimism,
cooperation and responsibility. In the mean way they have rated themselves to be very low in competencies such as communication and presentation skills. To identify the qualities that the students’ think to be important for gaining employment, descriptive analysis was carried out. The findings revealed that the students have rated most important for the competencies such as communication skill, problem solving skill and goal setting skill. The study inferred that the students have rated themselves to be low in the competencies required by the job market. The study concluded that the students themselves are aware that they haven’t met the expectations of job market. The study suggested that universities should focus on developing these competencies in students and similar efforts need to be taken by the students themselves for their self-development.

Gracia and Liu (2007) proceeded further in their research with an objective to study the views and perception of under graduate engineering students regarding the factors they think that adds excellence to engineering education. The data was collected from forty seven under graduate engineering students of Michigan University. The respondents were asked to answer four brainstorming questions regarding engineering education excellence, educational technology, students’ role and professors’ role in engineering education. Content analysis was used to analyze the data. The findings revealed that excellence in engineering education is determined by factors such as possession of knowledge and skills by the students, quality of educational system and personalized instructions by teachers to the students. The respondents were then asked to participate in a focus group discussion on ten questions based on topics related to students’ and professors’ interaction type, teaching methods, teaching environment and course evaluation methods. The responses were audio taped. The data was analyzed using content analysis method. The findings revealed that working with real life examples could also determine the excellence of engineering courses. Through the literature review the study inferred that the three stake holders (i) faculty members, (ii) university and (iii) engineering programme
standards contribute to excellence in engineering education. By making comparison between the stake holders and engineering students, the study inferred that there was not much difference in their views regarding the factors they perceive that it would add excellence to engineering education. The study recommended that the teachers should involve students in creative process for developing students’ knowledge and skills which would also facilitate educational institutions in improving the quality standards.

Tomlinson (2007) conducted research with an objective to study students’ perception regarding employability and career. Interview pattern was used to collect the data. Fifty three final year students belonging to various disciplines of old pre – 1992 university, UK were the respondents for the study. The students were interviewed regarding their views about job market conditions. Content analysis was made. The overall findings confined that students are interested to learn more about the jobs available outside. They also seemed to be interested in job transfers from one company to another which would give them an opportunity to gain exposure in various fields. Few respondents seemed to be very passive and poor career oriented. Based on the findings, the study developed a model named ‘ideal – type model’ which was influenced from Merton’s theory of social adaptation. The model consist of various categories such as ‘careerist’ referring students who are active and career oriented, ‘ritualist’ referring students who are passive and poor career oriented and ‘retreatist’ referring to those students who give up job market goals. Through the findings the study inferred that majority of the students belong to either careerist or ritualist category. The study concluded that students are aware of the job market issues though one set of respondents seemed to be disinterested in their future career whereas the other set of respondents seemed to have intense focus on developing job market skills.

Bakar and Hanafi (2007) collected data from one hundred and sixty two third year students studying in technical training institute of Malaysia. The hypothesis stated that there is no significant difference
between male and female students with regard to the employability skills possessed by them. Adapted questionnaire was resorted to for collection of data. The questionnaire consisted of seven attributes related to employability skills. The data was analyzed using independent sample t – test. The findings revealed that for the attributes ‘basic skills’ and ‘personal quality’, female students scored higher than that of male students, however no significant differences were observed between male and female students for other employability skills such as thinking skills, resource management skills, informational skills, interpersonal skills and system and technology skills. The study inferred that comparatively female students possess better employability skills than male students. The study suggested that in line with institution, the students should also take equal interest in enhancing their job skills.

Further, Zafiropoulos and Vrana (2008) extended research in this area with an objective to study students’ and faculty members’ opinion about the institutional facility services offered by the higher education institute in Greece. The study adapted Service Quality instrument for the study. The instrument consisted of twenty two items measuring five dimensions namely (i) tangible (availability of facilities, equipment and personnel) (ii) responsiveness (willingness to help students and provide prompt service) (iii) Reliability (ability to perform promised service) (iv) empathy (individual attention to the students) and (v) assurance (trust and confidence). The data was collected from seventy faculty members and three hundred and thirty five students belonging to a technological education institute in Greece. The hypothesis stated that there is no significant difference among the views of students and faculty members regarding the service rendered by the institution. Independent sample t – test was calculated. The results found that faculty members’ views about quality are higher than that of students’ views. Based on the findings, the study inferred that the faculty members’ are more satisfied by the rendered services when compared to the students. The study concluded that the quality of educational institution could be
measured through the services rendered by it to their customers (students, parents and faculty members).

A study conducted by Kazilan et al. (2009) assessed the employability skill level of male and female students based on their area of specialization. The data was collected from four hundred and thirty six final year students belonging to various engineering specializations in Malaysia. Adapted questionnaire containing the attributes related to employability skills was used for the study. The hypothesis stated that there is significant difference among the students belonging to various specializations with regard to employability skills obtained. The data was analyzed using ANOVA. The findings revealed that students of electronic engineering possess more employability skills when compared to the students belonging to other engineering specializations. The second hypothesis stated that there are significant differences between male and female students with regard to employability skill level possessed. The data was analyzed using independent sample t – test. The findings confined that female students possess better employability skills as compared to that of male students. The study concluded that possession of employability skills play a major role in gaining employment of the students.

Saravanan (2009) extended research in this area with an objective to study the perception of students and placement officers regarding ‘employability’. The study has also made an attempt to explain how these skills could be applied to the work environment. The study involved two groups of respondents, the placement officers and the engineering students. Through the interview pattern, the data was gathered from fifteen students and fifteen placement officers in India. Qualitative analysis was carried out. Based on the comments given by two groups of respondents, the study identified the importance of seven skills that play a major role in enhancing employability of the students. The study also discusses about its application in the work environment. Seven skills namely (i) communicative skills which enable professionals to deliver idea clearly in the work place (ii) critical
thinking skill which develop an ability to make situational judgments to the problem (iii) team working skill which enable an individual to maintain inter personal relationship with others (iv) lifelong learning skill which helps to update knowledge (v) entrepreneurship skill which develop an ability to deal with people and identify job opportunities (vi) ethics, moral and professionalism skill which enable to understand economic crisis and ethical responsibility and (vii) leadership skill which develop an ability to lead others in the work environment. The study suggested two models for incorporating these skills in the engineering curriculum being followed here. First model is ‘stand-alone subject model’ in which student pursuing engineering course if interested in developing skill could be given an opportunity to study skill development course as an additional course and is in no way related to the main courses. Second model is ‘embedded model’ in which soft skills will be incorporated in the teaching and learning activities across the curriculum. This model involves activities such as questioning, class discussion, brain storming team work, presentation, role play, project, field work and site visits etc. The study recommended that the identified skills need to be incorporated in Indian engineering curriculum to enhance employability of students.

Chatterjee et al. (2009) carried out research with an objective to identify the qualities that the students consider it as important during lecture sessions. The data was collected from one hundred and ninety five students belonging to various departments of Indian University. The questionnaire consisted of various attributes related to the quality of teaching with eight parameters namely: (i) academic excellence and knowledge in the subject (ii) personality, behavior and appearance (iii) ability to teach and mode of presentation (iv) providing updated information (v) availability in the department beyond class hour for discussion on academic matters (vi) regularity and punctuality (vii) ability to communicate and impress student and (viii) ability to guide professionally and academically after passing out from the departments. The respondents were asked to rate the parameters
according to their level of importance of which five represented ‘most important’ and one represented ‘least important’. The hypothesis stated that there is difference among students’ groups with regard to perception and expectation towards teachers’ teaching quality. To identify the gap between students’ perceptions and expectations, Service Quality tool was used. The result found that gap between expected service and perceived service vary among various students groups. The attribute ‘ability to guide professionally and academically’ was considered to be most important by professional students’ whereas the nonprofessional students gave importance to ‘ability to teach and mode of presentation’. The study also reported that the parameters such as subject knowledge, ability to teach, mode of presentation and ability to provide upgraded information was considered to be important by majority of the students. The study concluded that teachers’ role in teaching play a major role in the improvement of students’ performance.

Barone and Franco (2009) conducted research to study the satisfaction level of students regarding the facility services rendered by educational institution. The study objective was to propose a methodology for designing the quality of university course. The study proposed a methodology named ‘Teaching experiments and student feedback’. The methodology involved four control factors such as (i) responsiveness (teacher making students to work in lab to facilitate theoretical contents) (ii) tangibles (mode of teaching method) (iii) assurance (teacher using case studies for better clarity) and (iv) empathy (interaction between the course teacher and students’). Each of these control factors or variables was assigned by two levels +1 and -1 (the positive sign +1 stands for ‘satisfied’ whereas the negative sign -1 stands for ‘dissatisfied’). Longitudinal study method was used. Totally fifty three first year students of environmental engineering during the academic year 2004 – 2005 at the University of Palermo, Italy were the respondents for the study. The study made use of service quality feedback tool to measure students’ satisfaction level.
Collaborator of the project (CP) was assigned to distribute and collect feedback forms from the students’ and teachers were instructed not to be in the class when the students’ fill the feedback forms. Students’ selected as a sample for the study was termed as ‘students – evaluators’ sample’. The data was analyzed using ordinal logistic regression analysis for establishing the sign of control factor effects. The findings revealed that the control factor ‘tangibles’ had negative value whereas all the other control factors had positive value. It was found that the students are in need of simpler course material for each course which they could make use of it during the lesson time as well as for studying. Based on the findings, the students of academic year 2005 – 2006 were given course material and the same feedback tool was used to evaluate their satisfaction level. The result revealed that when compared to other control factors, students were very much satisfied by the control factor ‘tangibles’ whereas the control factor ‘empathy’ had a negative value. Students’ were in an opinion to improve teacher and students’ interaction. The study concluded that Teaching experiments and student feedback methodology can be used in universities/ educational institutions to measure teachers’ teaching effectiveness and students’ satisfaction level.

A similar study conducted by Shekhar et al. (2010) focused in identifying students’ perceptions and expectations regarding the institutional facilities offered by the engineering education institutions in India. The data was collected from two hundred engineering students belonging to various institutions in India. The study adapted service quality instrument for the study which consisted of twenty two attributes related to five dimensions namely (i) tangible (availability of facilities, equipment and personnel) (ii) responsiveness (willingness to help students and provide prompt service) (iii) reliability (ability to perform promised service) (iv) empathy (individual attention to the students) and (v) assurance (trust and confidence). The hypothesis stated that there is significant difference between the perceptions and expectations of students regarding the quality of services rendered by engineering education institution. To measure the gap between expectation and perception of the students, service quality tool was used. The result
found the negative quality gap between perception and expectation which meant that students’ are not satisfied with the services offered by the institution. Through factor analysis, the study identified five important factors to improve the quality services in educational sector which are (i) professionalism which include skill development along with guidance and counselling, good evaluation system, expert lectures and industrial training during the study (ii) integrated education which includes multi-tasking skills (iii) facilities which includes lab equipments and technologies (iv) responsiveness which includes instructional aids, learning materials and prompt services and (v) empathy which include student staff interaction for enhancing quality in engineering education institutions. The study concluded that these identified factors would minimize the gap between perception and expectation of the students.

Nilson (2010) carried out research with an objective to study engineering graduates’ perception about the employability skills they feel to be important before they get employed and also to study graduates perception regarding the employability skills they consider to be important for survival in the job after they get employed. The data was collected from twenty masters’ level engineering graduates of information technology from Sweden. Semi – structured interview pattern was used. The respondents were questioned related to employability. Longitudinal qualitative method was used in which twenty graduates were interviewed during the year 2002 when they were in the process of seeking job and the same graduates were interviewed once again when they were working during the year 2004 – 2006. When they were interviewed during the year 2002, the findings revealed that they considered computer programming skills as the most required hard technical skill for gaining employment. In addition to that they also gave preference for other skills such as communication skill, interpersonal skill and leadership skill. The findings during the year 2004 – 2006, revealed that the graduates gave much preference for professional development and learning skill which includes competencies such as ability to find and sort information, learning ability, analytical thinking, critical
thinking, flexibility and adaptability to withstand and survive in the job. The research concluded that for the entry level jobs, employability skills are considered to be important and for survival on the job individual graduate should take self interest in developing professional competency.

Further, Shukla (2012) conducted research with its objective to assess the employability skills obtained by engineering students of Bhopal, India. The data was collected from two hundred and ninety one engineering students. Adapted questionnaire was used for the study. The questionnaire consisted of various attributes related to employability skills. Three point rating scale of which three representing ‘good’ and one representing ‘poor’ was used. The hypothesis stated that there is relationship between students’ core skills (technical skills, computer literacy, hands in laboratory, subject knowledge, understanding of concept, facts, principles and theories, breadth of knowledge, applying knowledge to practical situation and up to date subject knowledge) and high order thinking skills (learning, reasoning, creativity, problem solving and decision making). Pearson’s correlation coefficient was calculated to study the relationship. The findings revealed that students’ who are good in their core skills are not found to be good in their high order thinking skills. The second hypothesis stated that there is relationship between personal skills (self – confidence, self – awareness, self – control, responsibility, commitment, adoptability, flexibility, self-directed, team spirit, interpersonal skills, leadership skills, co – operative, initiative and proactive, integrity and emotional resilience) and basic academic skills (reading, writing, mathematics and science). The findings revealed that students who are good in their personal skills are also found to be good in their basic academic skills. Based upon the findings, the study inferred that the students have not obtained the adequate employability skills. For enhancing the employability of graduates, the study suggested that engineering education should be modified by introducing practical industry oriented curriculum.
Pradela (2012) extended research on this area with its objective to investigate the aspiration of students and to identify the factor which is responsible for enhancing the employability of graduates. The data was collected from six hundred and forty nine final year secondary school students and graduates belonging to general, technical and vocational education programmes in Poland. To study the aspiration of the student, the questionnaire consisted of parameters related to personal details and academic details of individual students. Descriptive analysis was done. The findings revealed that majority of the students would like to enter into the job market without continuing their higher studies. Based on the literature review the study highlighted the fact that only very few universities in Poland offer career service programme to their students and most of the universities have failed in doing it. Career service is a programme which enables students to understand their own abilities thereby preparing them to enter into the job market. Thus the career service serves as a platform between the graduates’ and employers’. The study suggested that despite teaching, the universities should also render career services for enhancing graduates’ employability level.

Students are found to be lacking in their employability skills though they are aware of job market needs. The suggestions made in the reviews should be taken into consideration by both the educational institutions and engineering students to improve the job opportunities.

2.3 FACULTY MEMBERS’ PERSPECTIVE

The quality of faculty members as well as the teaching pedagogy play a major role in preparing students for job interviews. The research studies wherein faculty members were used as respondents are reviewed below.

Belagodu (2013) conducted research with an objective to study faculty members’ perception regarding the employability skills possessed by the engineering students. The data was collected from one hundred and fifty
faculty members working in various engineering colleges of Bangalore, India. Adapted questionnaire was used for the study. The questionnaire consisted of various attributes related to employability skills. The respondents were asked to rate their level of agreement with Likert’s five point rating scale of which five represented ‘strongly agree’ and one represented ‘strongly disagree’. The descriptive analysis revealed that the faculty members perceived students to be good in their theoretical knowledge and to be poor in practical knowledge, technical skills and soft skills. The study concluded that the educational institutions should mainly focus on imparting the adequate competencies to the students. The study recommended consultative session between industries and institutions to develop employability status of the students.

Benjamin (2009) carried out research with an objective to identify the view of teachers and career guidance staff about Career and Personal Planning Curriculum (CAPP) implemented at the schools in Canada. The aim of Career and Personal Planning Curriculum is to enhance employability skills among students at their school level. Four schools from two regions, east side (Oak Hill and Pinetree) and west side (Elmwood and Cedar Valley) in the city of Vancouver were selected for the study. Eight teachers/career guidance staff from these four schools were used as the respondents. The data was collected using one to one interview method. The respondents were questioned about the teaching approach they use to make the students employable. Additionally the study also used career education material, career advice pamphlets and career workbooks available at the schools to draw inferences for the study. Qualitative analysis was made. It is found that the east side school teachers follow structured time table and lesson plans to develop employability skills of the students. Teachers of east side schools emphasize more on soft skills such as personal planning skills, communication skills, teamwork and cooperative skills. On the contrary, west side school teachers are found to conduct career fairs in which the students will be asked to take part in career developing activities such as resume
writing, answering to the subject related interview questions, creating business card, and resolving conflicts. Teachers tend to focus more on these activities to develop cooperation and team working skills among students. Though the east side schools and west side schools follow different pattern to teach employability skills, their common objective is to build a strong foundation to the students. The study concluded that the Career and Personal Planning Curriculum facilitate students in developing generic skills and attitudes required in the job market. The study recommended that the career education programmes should be in line with the employment and career opportunities available to the students.

Teaching approach that focus more on enhancing the expected competencies facilitate students to be employable in the job market.

2.4 EMPLOYABILITY EXPECTATION – REALITY GAP

It is very important for an educational institution to prepare students as per the expectations of industries. If the graduates do not possess the required employability skills, they fail to meet the expectations of employers thereby resulting in increased unemployability statistics. The research studies recommending the need for ‘industry – institute collaboration’ for minimizing the gap between industries and educational institutions are reviewed in the literature given below.

Sardana and Arya (2003) assessed the importance of industrial training for engineering students from the perspectives of students’, faculty members’ and industry supervisors’. The data was collected from eighty seven final year engineering students, forty three supervisors of reputed industries and eighty three faculty members working in various educational institutions in India. Three adapted questionnaire was used for the study. The questionnaire consisted of attributes related to technical skills. The respondents were asked to rank the items of which one representing ‘the best choice’. The hypothesis stated that industry – institute interaction fills
the gap between institution and industry, education and training and theory and practice. The data was analyzed using Spearman's rank correlation coefficient. Through the findings from students' questionnaire, it was inferred that students have gained practical knowledge through industrial training. From supervisors' questionnaire, it was inferred that industrial training would be very helpful for students in developing practical knowledge, problem solving skill and field work experience. In faculties' questionnaire, the respondents were asked to rank the technical skills that they think to be important for the students to gain employment. The findings revealed that the faculty members give importance to the technical skills such as designing, experimental, innovating, field work, analytical skills and research skills. Through the findings from supervisors' questionnaire, the study also reported that graduates are found to be lacking in the skills that are expected by the employers. The study suggested that educational institutions should prepare students as per the job market requirements. The overall research findings confined that students' are benefitted through industrial training, as they are getting exposed to the real life work environment. The study concluded that industrial training plays a major role in enhancing the employability of graduates thereby bridging the gap between the industry and the institution.

Cranmer (2006) extended research in this area with an objective to study the role of higher education in enhancing employability skills of their students. The data was collected from sixty academic teaching staff and ten line managers in England. The respondents comprising of sixty teaching staff belonged to eight universities (four pre – 1992 and four post – 1992) of different regions in England. Pre – 1992 universities were internationally distinguished and research – intensive university. Whereas post – 1992 universities are those whose mission is to serve the local community. Structured interview pattern was used for the study. The hypothesis stated that there is significant difference between the skills obtained by graduates and the skills that employers expect from the graduates. Qualitative analysis
was made. Based on the comments given by the faculty members, the study inferred that teaching staff were found to emphasize more on subjective theoretical knowledge rather than practical knowledge. Similarly, ten line managers working in various departments such as biology, business studies, computing, designing and history were interviewed. Through the qualitative analysis it was inferred that employers are found to be dissatisfied with the job related knowledge and skills possessed by the graduates. The study highlighted the fact that there is a mismatch between the skills possessed by the graduates and the skills required by employers. The study suggested that employers should also be involved while designing the course curriculum which would facilitate in minimizing the gap between employers’ and graduates’.

Further, Nair et al. (2009) assessed the competency gap between the engineering graduates and the employers. The research has used employer survey conducted in Monash University, Australia during the year 2007. Employers who have recruited at least one Monash University graduate were the respondents for the study. Totally one hundred and nine employers working in various engineering related companies were the respondents. An adapted questionnaire was used for the study. The questionnaire consisted of twenty three attributes related to employability skills. Employers were asked to rate each attributes in terms of their importance and their satisfaction level towards the graduates recruited by them from Monash University. To study the employers’ level of importance, Likert’s five point rating scale of which one representing low importance and five representing high importance was used for studying employers’ satisfaction level towards engineering graduates of Monash University. Five point rating scale of which one representing low satisfaction and five representing high satisfaction was used. The hypothesis stated that there is significant difference between the employability skills possessed by Monash University graduates and the skills that employers expect from them. The descriptive analysis revealed that employers rated five attributes such as
oral communication, written communication, capacity to learn new skills, cooperation and team working and interpersonal skills as the most important employability skills for engineering graduates to gain employment. The study also reported that graduates were found to be lacking in the skills that are expected by the employers. To assess the difference between importance and satisfaction level of employers, gap analysis was calculated. The findings revealed that there exist highest gap between importance and satisfaction in three attributes namely oral communication skills, interpersonal skills and written communication skills. In the mean way, the smallest gap existed for two attributes namely broad back ground knowledge and general business knowledge. The present study recommended 3 – Dimensional Global Engineering Competencies model proposed by Patil and Codner, 2007. The model included three dimensions namely (i) Global skills such as Global, political and societal issues, cross and multi-cultural issues, international labour market and work place imperatives, international business economy and world market, and engineering solutions in global context, (ii) Soft skills such as general knowledge, communication skills, managerial and organisation, negotiation and inter personal skills, ethics, leadership and listening, financial management and budgeting, safety and sustainability, (iii) Hard skills such as fundamental knowledge, expertise in engineering subject, and engineering competency, engineering design and problem solving, project management skills and research and development skills. The study suggested that engineering and technology programmes should concentrate on the three dimensions mentioned in the model which would help students in enhancing employability. The study concluded that the competency gap between the graduate and employer could be minimised by teaching the engineering graduates as per industrial requirements.

Hernandez March et al. (2009) analysed the cause of mismatch between the industry and educational institution. The objective of the study was to investigate the basic competencies required for employment
irrespective of students’ specializations and to explore the cause for mismatch between the university education and industry demands. In order to study the most expected knowledge and abilities by employers, eight hundred and seventy two employers of Spanish companies belonging to various business fields of large and small sized enterprises were used as the respondents for the study. Adapted questionnaire was resorted to for data collection. The questionnaire consisted of attributes related to vocational and generic competencies. The respondents were asked to rate using five point rating scale of one representing ‘lowest’ and five representing ‘highest’. The descriptive analysis revealed that vocational competency which include theoretical and practical knowledge and interpersonal skills are considered to be the most expected skills by employers from recent graduates belonging to all the field of study. One of the hypothesis stated that there is significant difference among the industries in terms of the employability skills preferred from the graduates. The descriptive analysis was carried out which revealed that the small companies give low preference to foreign language abilities and high preference to problem solving skills. Whereas large companies are found to give high preference to a single attribute ‘willingness to work through continuous learning’. Another hypothesis stated that there is mismatch between the skills obtained by the graduates and the skills that the employers expect from the graduates. To find the difference, gap analysis was calculated. The highest difference gap occurred for the competencies such as decision making, negotiating and reaching agreements, organization and leadership, problem solving, time management, teamwork, and working under pressure. On the contrary, the lowest gap occurred for the competencies such as oral and written communication and computer skills. Likewise the data was also collected from forty HR professionals working in various large and small organizations of all the business units. In depth interview pattern was used for the study. Qualitative analysis was done. The findings revealed that majority of them are found to be dissatisfied with the graduates’ practical knowledge, whereas the theoretical knowledge of the graduates was found to be satisfactory. To minimize the gap between
educational institution and industry, the study recommended joint participation between industries and universities to develop practical knowledge of the students. The study concluded that educational institutions should map out the type of competencies that are expected from the companies belonging to all the business fields and should prepare the students accordingly.

Wickramasinghe and Perera (2010) extended similar research in this area with an objective to study the employability skills that the graduates’, university lecturers’, and employers’ of Sri Lanka think it to be necessary for entry – level graduate jobs in the field of computer science. The data was collected from twenty six employers of software development firms registered under Sri Lankan Association for software industry, fifty four graduates who are employed in these software development firms and twenty two lecturers from six universities who took lectures for these graduates. Three self – administered survey questionnaires were used for three kinds of respondents. Five point rating scale of which five representing ‘very high’ and one representing ‘very low’ was used. The questionnaire consisted of competencies related to employability skills. The respondents were asked to rate the level of importance for each skill. One of the hypothesis stated that there is significant difference between the perceptions of three groups of respondents regarding the skills that they think to be important for entry – level graduate jobs. The data was analyzed using ANOVA. The findings revealed that employability skills such as problem solving skill, self confidence and team working skill was considered to be important by all the three groups of respondents. Whereas learning skills was found to be given high importance by graduates’ and employers’ and positive attitude towards work was given high importance specifically by female graduates’, employers’ and university lecturers’, while male graduates’ were found to give much importance for creative and innovative thinking skill and lecturers’ are found to give more importance for oral communication skill. The second hypothesis stated that there is significant
difference between male and female graduates’ with regard to the employability skills obtained by them. The data was analysed using independent sample t – test. The findings revealed that the female graduates are found to possess high employability skills than the male graduates. Additionally the study also focused on investigating the efforts taken by universities and employers in imparting skills to the students. Based on the findings, the study inferred that universities focus on revising curriculum, organizing industry – related lectures, job fairs, industry placement, mock interviews/ test and university industry consultative sessions for developing employability skills to their students. The employers are found to develop employability skills of the graduates by conducting training programmes and events. The study suggested that industry – institute consultative sessions would minimize the gap between industries and institutions.

Further, Mandal and Banerjee (2012) conducted research in this area with an objective to study stake holders’ perception towards quality dimensions in an educational sector. Through the questionnaire pattern, the data was collected from faculty members of twelve private engineering institutions and executives of eleven industries in India. Totally one hundred and twenty nine faculty members and one hundred and thirty one executives were the respondents for the study. The questionnaire consisted of thirteen items related to the quality of engineering education. The hypothesis stated that there is gap between the perception of faculty members and industry executives regarding the quality of an engineering program. The data was analyzed using independent sample t – test and Leven’s test. The findings revealed the gap between faculty members and executives. To test the gap, the respondents were asked to rank the factors. The data was analyzed using ranking method. The findings revealed that the quality dimensions were ranked differently by the two groups of respondents. Faculty members ranked one for ‘degree of industry readiness of the program’, ranked two for ‘degree of industry focusness’ and ranked three for ‘quality related to
program and pedagogy’ whereas the industry executives ranked one for ‘quality related to program and pedagogy’ and ranked two for ‘degree of industry readiness of the program’ and ‘degree of industry focusness’. This revealed the gap between the perception of faculty members and industry executives. To reduce the gap between faculty and industry executives on ‘degree of industry focusness of the engineering program’, the study recommended academia – industry interactions. The study recommended on – the – job training and guest lectures to the students to minimize the gap between faculty and industry executives on ‘degree of industry readiness of the program’ and finally to reduce the gap on the quality related to ‘curriculum and pedagogy of the program’, the study recommended joint workshop where the faculty as well as executives can provide inputs for the development of engineering program. The study concluded that the perception gap between faculty and executives can be bridged by the above mentioned recommendations.

The recommendations made in the reviews should be incorporated in the curriculum and executed as best practice to fill in the gap between industries and institutions.

2.5 EMPLOYABILITY CONTEXT – HIGHER EDUCATION

Most of the research studies conclude that the quality of teaching – learning process would strengthen the employability status of engineering students. The following studies supports the fact that certain educational institutions do consider sustainable competences and personality development of students equally important, as these components become a contributing factor to finding employment. Necessary initiatives to enhance the skills and threshold competencies of students have been taken up by such institutions across different countries. The following studies discusses this issue.
Gereffi et al. (2008) carried out a research with an objective to investigate the quality of engineering education globally through examining the competencies possessed by engineering graduates belonging to three countries namely United States, China and India. The statistical report prepared by the Department of Education in United States, the Ministry of Education in China and the National Association of Software and Service Companies in India was used for the study. The dataset included the number of engineering, computer science, and information technology degrees granted from the year 1994 to 2006 in each country. Engineering graduation data was used to get the valid results for the study. Additionally, field research and interviews were also conducted in India and China to gather information. National reporting agencies of education and multinational companies that hire engineering graduates from top ten universities in China and India were interviewed. The growth of engineering education at bachelor’s level is found to be high in all the three countries. In United States, engineering degrees output was 103,000 in the year 1998-99 to modest growth of about 129,000 in the year 2005-06. Whereas in India the output was 68,000 in the year 1998-99 to rapid growth of 220,000 in the year 2005-06. China holds the fastest growth with its output more than doubled in the last four years from 252,000 in the year 2001-02 to 575,000 in the year 2005-06. A survey was conducted by Mckinsey (global institute) in which 83 companies operating all over the world participated during the year 2005. The report revealed that the employable percentage of engineers was 80.7 percent, 10 percent and 25 percent in United States, China and India respectively. The report revealed that the multinational companies were unable to find qualified engineers in developing countries. Engineering graduates from less ranked institutions are found to face serious unemployment problems in China and India. The present study identified two working typologies namely dynamic engineers and transactional engineers. Dynamic engineers are those who are highly innovative, have problem solving skills and are globally competitive. Whereas transactional engineers are those who possess technical knowledge but are not experts in the
specific field. The study inferred that the higher education system in United States is dynamic. Graduate engineers in United States are globally competitive. In contrast, engineers are found to be transactional in developing countries like China and India. Hence majority of engineering graduates belonging to these countries fail to compete globally. Engineering schools in United States are tend to focus more on innovation, entrepreneurship, high technology management, and inter personal professional training. The study highlighted that the qualities that would make an engineer employable in India or China may not be adequate to hold a job in United States. This is because of economical differences between the developed and developing countries. It is found that the multinational companies are tend to hire graduates from top-tier universities in China and India. The study concluded that the higher education system in United States focus more on quality rather than the quantity of students. Hence these graduates are more likely to be dynamic and highly employable with their four year engineering bachelor’s degree in the job market. The study recommended India and China to limit the quantity of institutions and concentrate more on quality to produce dynamic engineers.

Further, Pillai et al. (2012) focused on studying the effectiveness of industrial training programme conducted by the University of Malay, Malaysia. The study also aimed at identifying the employability skills that the students obtained through the training programme. Despite theoretical teaching, the University of Malay offers industrial training programme to the students which is facilitated by the centre for industrial training and relations, Malaysia. Through the industrial training the students are exposed to the real life working environment and get an opportunity to interact with the industrial experts of their specializations. The data was collected from one thousand and thirty students from thirty nine degree programmes who attended the industrial training programme during the year 2008 – 2009. The questionnaire consisted of various attributes related to the employability skills. The respondents were asked to rate the benefits and skills they gained
through the industrial training programme with five point Likert’s rating scale of which one represented very poor and five represented excellent. The students rated themselves to be very good in team working skill followed by problem solving skill, analytical skill, interpersonal skill, creativity and innovation, self-confidence, self-motivation, time management, leadership skill, dependability and presentation skill respectively. Similar survey was conducted among the organizations which offered training to those students of Malay university during the year 2008 – 2009. Two hundred and thirty nine industrial experts were the respondents for the study. The respondents were asked to rate the performance of the students during the training period with five point Likert’s rating scale of which one represented very poor and five represented excellent. The descriptive analysis revealed that majority of the employers rated good for the students’ performance during training session. The study concluded that the industrial training programme is highly helpful in preparing the students to compete in the job market. In addition to curriculum teaching and project internships, the study recommended universities of other countries to practice the industrial training programme pattern to enhance students’ employability.

‘Quality education’ is found to occupy a predominant position in studies related to students’ employability. With this view point, Cai (2013) extended research in this area with an objective to develop a frame work to assist higher education providers in improving its quality. Through the theoretical review of earlier studies, the study highlighted the fact that educational output could be measured by graduates’ performance in the work field. It is evident that the new entrants to the job are not up to the expectations of employers in the work environment. The study constructed theoretical frame work consisting of various components which include (i) interaction between the employers and universities – which would be helpful in shaping employers’ expectations regarding the skills that need to be possessed by the graduates, (ii) improving initial signaling effects – refer to the universities which make employers to know about their curriculum,
teaching – learning process and career service efforts to improve students’ employability and (iii) public learning – refer to an individual being rated with more than one expert in the same field. The study suggested the universities to train students with global issues, make them to be aware of other countries culture, improve the personal and professional self – image of the students, develop communication skills, motivate students to be self-confident and develop an attitude to adapt and deal with different situations. The study concluded that the components of frame work would serve as a tool in providing quality education.

2.6 SELF CONFIDENCE

Self confidence is one’s judgement of their own capacity to perform specific task (Bandura, 1990). Consistent performers work with an objective in mind. They seem to be confident in accomplishing the end results. They have a better understanding of their own strengths and weaknesses and that of others. Self-confident individuals are intrinsically motivated. A sense of self confidence comes through personal experience and previous accomplishments. These individuals are self-directed in setting goals and attaining them (McAuley, 1992). Research has also shown that positive self-talk instills a sense of confidence in one’s self (Girodo and Wood, 1979).

In a study conducted by Stankov et al. 2014 confidence was found to significantly predict achievement. It is evident that the students having a better confident level excel in academic performance and placements. The research studies underlying the concept of ‘self confidence’ and its role in strengthening students’ attainment of success is discussed below.

Kniveton (1998) focused in this area of research. The study objective was to test the academic performance of boys when they work in groups and to study its impact on their self confidence level. Experimental method was used for the study. Totally ninety six boys studying second year of a range of ‘A – Level’ courses were the respondents for the study. They
were put in twelve groups and were informed to take part in memory experiment. They were presented with five narratives played on a tape recorder which lasted for twenty minutes. The narrative was not related to the study material. The respondents were asked to listen to the narratives. Among the five narratives, three were randomly chosen and the respondents were divided into eight groups of twelve each. The respondents were tested under three conditions. First condition in which the boys were given an opportunity to do rehearsal by working in pairs and were tested in pairs. Second condition in which the individual was given an opportunity to do rehearsal for presenting the material alone and then were tested in pairs and third condition in which the boys were not given an opportunity to rehearse and were simply tested either alone or in pairs. Further the respondents were tested under six experimental conditions. First condition in which the boys were not given time to prepare and they were asked to take part in the test individually. Second condition in which the boys were not given time to prepare but were asked to take part in the test as a group. The respondents who fall under these two conditions were conducted test through the questionnaire which was prepared based upon the narratives consisting of twenty five questions with five point rating scale ranging from ‘probably incorrect’ to ‘doubtful to certain’. Third condition in which the respondents were given time to prepare individually and were asked to take part in the test individually. Fourth condition in which the respondents were given time to prepare individually and were asked to take part in the test together as a group. Fifth condition in which the respondents were asked to prepare along with their group members and then were asked to take part in the test individually and sixth condition in which the respondents were asked to prepare along with their group members and then were asked to take part in the test together as a group. The respondents falling under the experimental conditions from three to six were given thirty minutes time and were asked to write comprehensive about the narrative. Depending upon the experimental conditions the respondents either took part individually or in groups. Based upon the correctness of the answers, the respondents were given scores.
The hypothesis stated that there is significant difference in the performance level of the respondents falling under different experimental conditions. Descriptive analysis was carried out. The overall research findings confined that when the respondents were asked to take part in group their self confidence level was also found to be high and as a result they performed good. The study suggested that students should be given an opportunity to work in groups which would be highly helpful in enhancing the self confidence level of students. The study concluded that high self confidence level would result in increased performance.

Further, Hanton and Connaughton (2002) focused in this area of research with an objective to study the relationship between anxiety symptoms, self confidence and performance. Structured interview pattern was used as a data collection method. Purposive sampling technique was used for the study. Totally, twelve swimmers were the respondents for the study. The participants were categorized into two groups of six respondents in each group. One group was named as ‘elite group’ which consisted of the respondents who participate and take part in international tournaments. The other group was named as ‘sub elite group’ which consisted of the respondents taking part in the games at national level. Through the interview the respondents were asked to express their thoughts and feelings they have before they take part in the competitive match. Qualitative analysis revealed that the people having an ability to control emotions and experiencing anxiety symptoms with positive thoughts would result in increased self confidence level and improved performance, whereas the inability of emotional tolerance and anxiety symptoms with negative thoughts would result in decreased self confidence level and poor performance. The study concluded that the thoughts are highly related to the self confidence and performance level of an individual. The study suggested that the emotional tolerance and good positive thinking would result in increased self confidence level and improved performance.
Al-Ahmadi and Oraif (2009) the research objective was to investigate how the memory capacity is related to the thinking aspects and confidence level of the students. Totally, eight hundred and nine students studying senior secondary school in the year ten, eleven and twelve in Emirates were the respondents for the study. Experimental method was carried out. The students were examined by conducting scientific thinking test and physics understandings test and they were rated based upon the scores obtained by them in the test. The hypothesis stated that there is significant relationship between scientific thinking ability and working memory capacity. To test the hypothesis correlation analysis was calculated. The findings revealed the positive relationship and the students below sixteen years of age scored less in scientific thinking test than the students of above sixteen years of age. The study also identified that the students of below sixteen years of age feel scientific thinking to be difficult. Whereas the students of above sixteen years of age scored good in the scientific thinking test, as they feel it easy and have interest and good thinking about the test. Based upon the findings the study inferred that the thinking aspects are related to the memory capacity of an individual. Learner finding difficult to study could score poor than the learner studying with ease. Similarly another experiment was conducted in Saudi Arabia. The data was collected from two hundred and thirty seven female students studying first year in the university. The respondents were asked to take part in the survey consisting of various attributes measuring working memory capacity of the student and forty items measuring the confidence level of students on five aspects namely (i) academic, (ii) athletic, (iii) attractiveness, (iv) popularity and (v) life styles. The study hypothesis stated that there is significant relationship between confidence and working memory capacity. The descriptive analysis revealed the positive correlation between confidence and working memory capacity. The study findings revealed that the student possessing good memory capacity could have increased academic confidence level. The study concluded that the memory capacity, thinking aspects and confidence have significant relationship with one another. Good memory capacity and positive
thinking towards learning would enhance academic confidence level of the student.

A study carried out by Cech et al. (2011) projects certain valid findings on the behavioral and intentional persistence of engineering students. The three independent variables selected for the purpose of the study were family commitment, self-assessment of skills and professional confidence. It was proved that professional confidence significantly predicts the behavioral and intentional persistence of students.

Further, Nicholson et al. (2013) extended research with an objective to study students’ expectation about teaching and learning offered in higher education. The study also examined the role of their confidence level in predicting academic performance. The data was collected from one hundred and thirty four students studying under graduation in psychology. The questionnaire pattern was used for the study. The questionnaire consisted of seventeen items related to academic confidence level of an individual student with five point rating scale of which one represented ‘not at all confident’ and five represented ‘very confident’. Students’ expectations regarding teaching and learning was measured by thirty six items with five point rating scale of which one representing ‘strongly disagree’ and five representing ‘strongly agree’ was used. One of the hypothesis stated that there is significant relationship between the students’ expectation towards teaching - learning and students’ performance in end semester examination. The data was analyzed using Pearson’s correlation coefficient. The findings revealed that students who expected to take responsibility of their learning achieved higher marks in their end semester examination. On the contrary, the students who expected lecturers and other teaching staff to take responsibility of their learning was found to perform worse in the end semester examination. Another hypothesis stated that there is significant relationship between academic behavioral confidence level of an individual student and students’ performance in end semester examination. Correlation analysis was made. The findings revealed that students’ having higher
academic behavioral confidence about their grades, studies and attendance was found to achieve higher marks in their end semester examination, whereas confidence over verbalizing (asking course related question to the teaching staff during lecture time) was not found to have relationship with students’ performance in end semester examination. The study also focused on studying the effects of students’ expectation and confidence level. The data was analyzed using regression method. The findings revealed that performance in end semester examination is highly predicted by students who are being confident of themselves and taking responsibility of their learning. The study reported that the students’ being more confident and taking responsibility of their learning score higher marks in end semester examination. The study concluded that students with high confidence level would perform better than the students with low confidence level.

To study the role of confidence in predicting students’ academic achievement, Stankov et al. (2014) conducted a research with an objective to examine the relationship between non cognitive variables (academic self-beliefs and other variables related to achievement) and to study its role in predicting academic achievement of the student in mathematics. The data was collected from five hundred and ninety eight students studying secondary three from five schools in Singapore. Questionnaire pattern was used as a data collection method. The questionnaire consisted of thirteen items related to non – cognitive variables. Non – cognitive variables were divided into two groups namely: (i) student variables measuring students’ self-beliefs about their cognitive performance such as confidence, self-efficacy, self-concept and mathematics anxiety and (ii) variables measuring psychological dimensions such as depression and anxiety and wellbeing etc. was used in the questionnaire. Likert’s rating scale with four point, five point and eleven point rating scales was used for measuring various attributes. The hypothesis stated that there is significant relationship between the non – cognitive variables used in the study. To test the relationship, Pearson’s correlation coefficient was calculated. The findings of the study revealed that
the variable confidence has the highest correlation with the variable self-efficacy and the variable self-efficacy is found to have the second highest correlation with the variable mathematics accuracy. To study the predictor of achievement in test performance, regression analysis was done. The findings revealed that the variable confidence is the most important predictor of achievement. The confidence ratings of the students served as a tool for self-monitoring their performance. The overall study findings confined that students with high confidence are found to perform good than the students with low confidence. The study concluded that the variable confidence is an important factor in education and it plays a major role in predicting students’ academic achievement.

These reviews clearly indicates the role of ‘self confidence’ in influencing an individual to accomplish the task and attain success.

2.7. CONCLUSION

Teachers/ students’ counsellor/ placement officers and family members are also considered to be major stake holders in studies dealing with employment of students. A lot of research studies have already been carried out in the past by involving these stakeholders as respondents (Cranmer, 2006; Hernandez March et al. 2009; Benjamin, 2009). Hence the current research focuses exclusively on the perception of students regarding their employability evaluation considering both their internal individual factor as well as the external institutional factor.

While a number of research studies has been carried out to understand employer’s expectations from graduates, no study has been carried out to understand students’ perception regarding the level of knowledge, skills and ability they possess. Additionally the perception they have regarding the role of educational institutions in enhancing their employability status has also been identified as one of the research gaps. The current research further investigates the dependencies of variable with
each other. KSA with SC, TTIC with SC, TTIC between KSA and SC and also SC with placement status. These logical relationship was found to be missing in previous research works. An attempt has also been made to understand the perception of HR professionals towards the personal qualities possessed by graduates belonging to two different types of educational institutions, Private Self-Financing Engineering Colleges and Private Deemed Universities. The conceptual frame work of the study is given below for clear understanding.

![Conceptual Framework](image-url)