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## Soft Skills:
## A Professional Development Curriculum to Enhance the Employability of Engineering Students


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**Abstract**

The issue of employability of professional students has become very serious and critical in many countries including India. The biggest challenge facing institutions of technical education is to develop employable skills, enhance knowledge and make engineering students more attractive to employers. Though the standard of academia has been steadily moving ahead, the updating process of curriculum with respect to soft skills is not as fast as expected by the

industries. Hence a framework is needed to develop creative and innovative ways to give the engineering students a competitive edge. Thus, the purpose of this paper is to develop a professional curriculum to enhance the employability of engineering students, especially identifying modules of soft skills with the perspective of the employers, placement professionals, corporate trainers and observations from the newspapers and job websites on job opportunities. The authors studied related research papers and held a series of discussions with the experts of soft skills. The findings and discussions suggest that (i) Engineering institutions should recognize the importance of soft skills, (ii) Integrate important modules of soft skills in the engineering curriculum, (iii) Integrate higher-order skills and (iv) Work together with employers of the region or sector to understand the particular demand for skills.
**Keywords** - Engineering education, soft skills, curriculum, modules and components

## 1. Introduction

Currently, employability is the buzzword among the engineering students. During the last decade, the opportunities for engineering students in various sectors have increased multifold globally. Current technological and economic changes have created a challenging context for engineering students. The real key to the effectiveness of engineering students is their ability to put their domain knowledge into effective practice and soft skills have a crucial role to play for the effectiveness. The challenge for technical institutions is to work out a healthy balance between the wholeness of knowledge and skill sets that cater to current technological demand. In many countries including India, the issue of incorporating soft skills into the curriculum taught to engineering students in technical institutions has gained momentum in recent years.

The twenty-first century industry has experienced tremendous changes due to advances in technology; consequently, the 'old way' of doing things may be effective but not efficient (Redmann, 2004). The National Business Education Association (2001) indicated that the shortage of skills confronting today's dynamic workforce goes beyond academic and hands-on occupational skills. Various survey reports pointed out that over 75 percent technical graduates are not ready for jobs; among the half a million technical engineers who graduated in 2011, only 17.45 percent are fit for employment. Therefore, the best way to prepare potential employees for the future workforce is to develop not only technical but also human-relation capabilities.

Most students are not 'industry ready' because they lack communication skills and other skill sets. The survey of Agarwal, 2011 reveals that even though India produces more than 0.5 million engineers annually, only 17.45 percent of them are employable for the IT services sector. The research shows that approximately 54 percent engineers are rejected because they are not soft-skill trainable in a short period of time. The issue is that post-secondary education today focuses on syllabi alone and industries seek beyond what a syllabus is capable of teaching like communication and creative skills, and team spirit.

The present system concentrates only on the transfer of knowledge and not on developing skills. According to Narayanan (2007), the current situation is that, in terms of availability of talent, the numbers are good. The problem lies in the suitability of people. The industry has moved forward rapidly and technology also has changed but the educational institutions and the curriculum have not changed as rapidly as expected. The need to revise or eliminate outdated curriculum and develop new programs to meet emerging work trends is a seemingly endless occurrence (Shetty, 2010). Reform curricula to increase the share of tasks where the student or a team of students lead their own problem identification, experimenting, and solving using engineering knowledge and methodologies (Andreas Blom & Hiroshi Saeki, 2011).

Richa Tewari (2012) states that a change is required in designing the curriculum, which should be oriented more towards equipping the student to manage and excel at the work place. Narayanan (2007) implies that the teachers of English at professional colleges should undergo a paradigm shift and cease to be mere teachers of grammar and structure; they are expected to play the role of communication and soft skills trainers. Instead of outsourcing the soft skills training it is recommended to bring soft skills within the curriculum. The present English course in the engineering colleges develops communication skills alone. The other aspects of soft skills can be brought into the curriculum irrespective of the subject (Goeran , 2010). The Workforce Profile defines about 60 soft skills (Phani, 2007) and includes some of the important skills: adaptability, team skills, attitude, integrity, positive work ethics, interpersonal ethics etc. and 60$^{th}$ one is communication skills.

Curriculum development is one of the key factors related to meaningful and successful program improvement. Curriculum development can be defined as the systematic planning of what is taught and learned in university as reflected in courses of study and university programs. These curricula are embodied in official documents (typically curriculum 'guides' for professors) and diligently being implemented by each academic discipline. Some universities have initiated soft skills as part of their curriculum, for instance, Anna University, India introduced the courses, HS1301- Communication and soft skills laboratory for third B.E / B. Tech students and 'Communication skills lab' (GE1352) for the pre-final year students. Most of the B Schools introduced soft skills curriculum in India and the arts and science colleges have introduced as one of the course.

Hence educating engineering students with the comprehensive soft skills would be of great importance for the employability and for the country's development. A large economic sector, such as information technology, infrastructure, manufacturing, automobile, power, water, pharmaceutical etc. rely critically upon technical skills as well as soft skills. This paper provides an important new site for the professional curriculum development to enhance the employability of engineering students' especially identifying modules of soft skills with the perspective of the employers, placement professionals of engineering colleges, soft skills trainers of corporate and training organizations that associated with the engineering colleges and observations from the newspapers. Distinctively, the study answers to the following three questions.

1. Which skills do employers consider important when recruiting new graduates?
2. What would be in relevant soft skills curriculum in order to develop the employability of engineering students?
3. What are the topmost ten soft skills to be identified for the professional development?
4. What are the components and activities of soft skills?

The paper is structured as follows. The second section briefly summarizes similar studies. Section 3 describes the methodology of the data collection. Section 4 shows descriptive statistics of survey respondents. Section 5 presents findings with analysis of the collected data. Finally, section 6 summarizes and discusses implications for soft skills curriculum in order to develop the employability of engineering students.

## 2. Previous Employers' Surveys and Related Literature

This section reviews a selected set of previous employer surveys and related literature on skills that guided the design of this employer survey. A number of employer surveys have been conducted for graduates of different academic disciplines, e.g., Engineering education, business administration, economics, psychology, etc. Many of these surveys aim to identify which skills are demanded by employers and to examine how the supply of skills matches labour market demand. Noel-Levitz (a higher education consulting firm) and Utah State University developed a comprehensive and well-designed instrument for employer satisfaction surveys. The objective of the survey was to measure the employer satisfaction for benchmarking purposes (Kleinke, 2005). Seventeen universities participated in the survey in 2004. A survey instrument was mailed to 297 employers of the graduates, of which 112 employers responded (38% response rate).

The questionnaire focused on graduates' knowledge, general skills, and specialized skills. Employers rated graduates' knowledge and skills on a five-point scale in two aspects: satisfaction with the specific skills of the graduate and the importance of each of those skills. The survey found that employers were on average *very satisfied* with the knowledge and skills of the graduates (average rating of 4.0 on a five point scale). The survey instrument was found useful especially in that it asked both importance and satisfaction levels of knowledge and skills. This structure was incorporated in our survey instrument.

Lattuca et. al., (2006), assessed the impact of accreditation based upon student learning outcomes as introduced by the Accreditation Board for Engineering and Technology (ABET) in the mid-1990s. The expected student learning outcomes of both ABET and the National Board of

Accreditation (NBA) in India is similar due to common membership of the so-called Washington Accord, which mutually recognizes engineering degrees across 12 member-countries, (Washington Accord, 2007). Since many questions in our employer survey were drawn from the NBA's learning outcomes, our survey results are to some extent comparable with the above study's outcomes. Lattuca et. al., (2006) surveyed 1,622 employers. The employers were asked information on the characteristics of desired employees and three basic issues: (i) the preparation of recent engineering graduates, (ii) whether or not the skills of the graduates had increased, and (iii) the importance employers attach to each of the 11 EC2000 learning outcomes. The study found that the majority of employers agreed that, overall, graduates were adequately or well prepared for the profession. Further, many employers reported that the skill set of the recently hired graduates had improved compared to those in 1990s, in particular for so-called soft skills.

Academy for Education Development (AED) (2008) carried out an employer survey in Egypt, with the objective of providing recommendations to the Ministry of Higher Education on how to improve the quality of middle technical colleges' graduates. A sample of 240 companies was selected based on stratified sampling technique (by size: small, medium, and large). AED sent surveyors to companies for personal interviews. 92 companies fully completed the survey questionnaire (38% response rate). The survey found that the level of skills demanded by employers had increased, mainly because: (i) higher levels of technology, (ii) increasing competition, and (iii) increasing concerns about the quality of products. The survey also indicated that companies prioritize soft skills including personality (honesty, punctuality, etc.) And what they labeled basic skills (literacy, problem solving, management, etc.). The AED's employer survey was especially helpful for our employer satisfaction survey to determine relevant questions about employer characteristics. Data availability on employers' characteristics enabled us to scrutinize the survey results disaggregated by employers' characteristics.

In addition to the survey instruments above, we refer to several papers applying different analytical tools for data from employer surveys. Paranto and Kelker (1999) analysed employers' satisfaction with job skills of business college graduates in a regional university in the US. They examined which skills employers perceived important when hiring business graduates. 346

employers were identified in the survey by the university's placement office. They are mostly in rural areas in the upper Midwest of the US, and hired business graduates during the 1990-94 period. 136 employers responded (39% response rates). By using factor analysis, 18 variables (skills) were reduced to four major factors, namely specific skills, core skills, personal characteristics, and communication skills.

Soft skills are essential professional skills and these are also known as the non-technical, intangible, people, corporate, emotional intelligence, employability, life, generic, key, essential, and transferable skills. Perreault (2004) defined "soft" skills as personal qualities, attributes, or the level of commitment of a person that set him or her apart from other individuals who may have similar skills and experience. James and James (2004) accepted that soft skills are a new way to describe a set of abilities or talents that an individual can bring to the work place. Soft skills distinguish certain career attributes that individuals may possess like the ability to work on a team, communication skills, leadership skills, customer service, and problem solving skills. Employers value communication and interpersonal skills specified that one who communicates effectively, gets along with others, embraces teamwork, takes initiative, and has a strong work ethic is considered to have an accomplished set of soft skills.

These prior works guided us in developing the survey methodology analysis for this employer survey in South India.

**3. Survey Methodology**

The main objective of the study is to identify important soft skills and explore the possibilities of incorporating some essential skills which engineering students need in the workplace. With this objective, the authors studied related literature and gathered and analysed information on soft skills curriculum and to gain realistic insights into learner needs and industry expectations. The necessary data for the study have been collected through an

interview schedule. The researchers prepared two different interview schedules, one for the employers and the other for the placement professionals of engineering college. Over 15 employers and 15 placement professionals and trainers were contacted for the collection of data. The collected details were analysed and interpreted objectively. About the sample, it is necessary to mention that the placement professionals such as placement officers and soft skills trainers of engineering colleges are those who arrange for training and campus interview for the students.

The questionnaire design builds upon three sources: the expected Outcome based Accreditation (OBE) process used for accreditation by the National Board of Accreditation (NBA), previous employer surveys, and consultations with employers. The questionnaire has been prepared with 25 different skills employers were asked to evaluate the importance level of each of the 25 skills on a five point scale.

The NBA, India‘s only official accreditation body for engineering education, has established 12 Program Outcomes. The NBA is a provisional member of the Washington Accord—an international agreement between accreditation agencies for engineering education in 18 countries. Therefore, NBA‘s program outcomes (expected learning outcomes for graduates) are based upon the internationally agreed upon set of the skills and knowledge that graduates are expected to possess at the time of graduation. The ‘Outcomes Based Education’ of NBA is:

1. *Engineering knowledge:* Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
2. *Problem analysis:* Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
3. *Design/ development of solutions:* Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.

*4. Conduct investigations of complex problems:* **U**sing research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.

*5. Modern tool usage:* Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling of complex engineering activities with an under- standing of the limitations.

*6. The engineer and society:* Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.

*7. Environment and Sustainability:* Understand the impact of professional engineering solutions to societal and environmental contexts and demonstrate knowledge of and need for sustainable development.

*8. Ethics:* Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

*9. Individual and team work:* Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.

*10. Communication:* Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.

*11. Lifelong learning:* Recognize the need for and have the preparation and ability to engage in independent and life- long learning in the broadest context of technological change.

*12. Project management and finance:* Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Ten out of the 12 NBA Program Outcomes were included in the questionnaire (some in an abbreviated form). Thirteen skills from previous employer surveys, notably from Kleinke (2005) were added. These were in particular skills often referred to as *soft skills* or *core skills* or

*employability skills*, such as integrity, self-motivation, team skills, etc. Communication in English and entrepreneurship skills as per request of employers and placement professionals were added.

Definition of skills and a common understanding of what a skill is, pose problems for comparability and interpretation. Since the survey has to be relatively short to ensure an acceptable response rate, the questionnaire did not define each skill. In most instances, an additional explanation of examples is provided in parentheses. However, it is possible that employers may have perceived the meaning of the skills differently. In addition, some of the skills overlap in the sense if a person possesses skill *a*, then they are strongly expected also to possess an element of skill *b*. One such example is *Self-motivated* and *Self-discipline*. However, there is no widely accepted categorization of skills that are exhaustive and non-overlapping. Hence, an overlap is unavoidable in the authors' view. Obviously, each employer has different perceptions and expectations toward engineering graduate skills.

The questionnaire 1 (Annexure A) has a list of soft skills that engineering students are typically expected to possess at graduation. Employers were requested to rate on a scale from 5 (extremely), 4 (very), 3 (somewhat), 2 (not very) and 1 (not at all) how important each skill is for an engineering graduate to be an effective employee (importance level). The authors conducted training methods survey (Annexure B) with soft skills trainers of various training organisations and industries located in India and collected the details about the training methods adopted. The researchers observed over 30 job advertisements of newspapers and job websites on job opportunities and listed out the key skills required by the employers. The data were analysed qualitatively and quantitatively.

## 4. Results

### 4.1 Survey Report of the Employers, Placement Professionals, Trainers and Observations of Job Websites

The authors had a series of interviews with the employers during 'campus drives', and 'common placement drives' held in the engineering colleges. The employers represented different sectors like software, electronics, electrical, automobile, infrastructure, business and BPO companies. The employers had been given the brief details about the existing curriculum of communication skills laboratory with the list of soft skills, definition and objective of the programs offered by the Technical Universities.

By using factor analysis, 25 variables (skills) were reduced to three major factors, namely, core employability skills, professional skills and communication skills. The authors conducted a factor analysis of the 25 individual skills to group the individual skills into a small number of skill groups (factors). We have grouped the skills because it is reasonable that a common latent factor (skill/ability) partially drives the importance and satisfaction ratings of a group of individual abilities. For instance, employers often talk about the importance of soft skills. There is hence a notion that a set of interpersonal skills are related into one group and that this group of skills is important. However, soft skills are often neither well defined nor backed-up by empirical evidence to ensure that the individual skills referred to as soft skills form one group.

Factor analysis is one of the ways to test this notion of soft skills and empirically define the individual skills that make up soft skills. Further, the identification of a small number of factors allows us to identify commonalities in demand and supply for skills, and structures the findings and provides a limited set of overall findings. Factor analysis fits exactly the above goal of reducing the number of variables into overall groups. It is a statistical procedure to find the latent variables that explain the attributes of common variables in the observed variables.

Factor analysis is a statistical procedure to find the latent variables (or factors) that explain attributes underlying common variables in the matrix. In other words, it is to identify the interrelationships among a large set of observed variables and then, through data reduction, to group a smaller set of these variables into dimensions or factors that have common

characteristics (Nunnally & Bernstein, 1994). Therefore, it is sometimes used as a data reduction technique.

Factor analysis is widely used in social science, especially in psychological researchers and business surveys. Psychologists, for instance, conduct empirical researches on the relationship between personality traits and job performance. They examine numerous personal traits and categorize them into five representative personal traits by using factor analysis. Those five personal traits are called Big Five that represents an overall pattern of all personality traits. Recent papers have examined the link between these traits and income (Borghans et. al., 2008). By using factor analysis, 25 skills listed in the questionnaire were grouped into three factors using the importance ratings.

The level of importance attached to each skill reveals employers' valuation of, and demand for, that's skill. Table 1 below summarizes the importance level of each skill under the three factors as perceived by the employers. All skills are on average rated from 3.5 (half way between somewhat important and very important) to 4.5 (half way between very important and extremely important). Hence, all skills in the questionnaire are rated as important.

Table 1 Survey report of the employers

| **Core Employability** | **Mean** | **Professional skills** | **Mean** | **Communication skills** | **Mean** |
|---|---|---|---|---|---|
| 1. Reliability | 4.48 | 1. Problem solving ( Critical and reasoning) | 4.08 | 1. Communication in English | 4.26 |
| 2. Integrity | 4.42 | 2. Leadership | 4.07 | 2. Written communication | 4.07 |
| 3. Teamwork | 4.41 | 3. Creativity/innovation | 4.07 | 3. Reading | 4.04 |
| 4. Willingness to learn | 4.40 | 4. Interpersonal abilities. | 3.93 | 4. Spoken communication | 4.02 |
| 5. Entrepreneurship | 4.35 | 5. Negotiation | 3.84 | 5. Etiquettes (Email, telephone). | 4.01 |
| 6. Self-discipline | 4.26 | 6. Professional ethics, values and attitude. | 3.83 | 6. Presentation skills. | 4.00 |
| 7. Self-motivated | 4.22 | 7. Multicultural | 3.51 | 7. Nonverbal | 3.95 |

| | | | | | |
|---|---|---|---|---|---|
| | | management | | Communication (NVC) | |
| 8. Flexibility | 4.15 | 8. Contemporary issues | 3.71 | | |
| 9. Understand /take directions | 4.14 | | | | |
| 10. Empathy | 3.92 | . | | . | |
| Average | **4.27** | Average | **3.91** | Average | **4.01** |

The first factor largely consists of personal characteristics. The skills with high factor loading are reliability, integrity, teamwork, willingness to learn, entrepreneurship skills, self-discipline, self-motivated, flexible, understands and takes directions for work assignments, and empathy. This factor is named *Core employability skills*, since these skills do not occupy specific, but cuts across, occupations. Other studies refer to this set of skills as generic, catalytic, core and/or employability.

The second factor is essentially comprised of career specific skills, of which the following are the skills with high loading; problem solving, leadership, creativity/innovation, interpersonal abilities, negotiation, professional ethics, values and attitude, multicultural management and contemporary issues. Following HR-literature and other employer surveys, we call this factor as *Professional skills*. In the engineering education literature, this set of skills is also referred to as non-technical skills.

The third factor is fundamentally connected to communication in English, written communication, reading, spoken communication, etiquettes (Email, telephone), presentation skills and nonverbal communication (NVC). Communication skills fall in the third factor with relatively higher loadings. Therefore, the third factor is named *Communication skills.*

The three names of the factors do not necessarily represent all skills in respective factors, but these three names do represent the majority of skills with high loadings. It should also be noted that naming factors are a mere poetic, theoretical, and inductive leap (Pett, et. al., 2003). Therefore, it is important to look into the composition of these three factors and understand actual skills explaining each factor. The three factors obtained from factor analysis are similar to

other studies using factor analysis. For instance, as presented in Table 1 from section 2, Paranto and Kelker (1999) grouped skills into four factors namely, specific skills, core skills, personal characteristics, and communication skills. The factor, core employability skills, corresponds to core and personal skills, and professional skills to specific skills, and communication skills to communication skills. This similarity with empirical findings from other employer surveys increases our confidence of the above categorization of skills. The three skills group identified by the above factor analysis partly corroborates one of the most used learning classifications, the Bloom's taxonomy (1956). Bloom's taxonomy suggests the existence of three domains of learning. The term *learning* is synonymous to the term skill as used in this paper. The three domains are:

1. *Cognitive skills* involve knowledge and the development of intellectual skills,

2. *Affective skills* include the manner in which we deal with things emotionally, such as feeling, values, appreciation, enthusiasm, motivations, and attitudes, and

3. *Psychomotor skills* encompass physical movements, coordination, and the use of motor-skill areas.

The types of skills that our factor analysis categorizes under the core employability skills mostly belong to the affective domain in Bloom's taxonomy (integrity, self-discipline, reliability, and team-work). The types of skills categorized under the professional skills all belong to the cognitive domain in Bloom's taxonomy (applying, remembering knowledge, and understanding, analysing, evaluating, and creating). The skills categorized under the third factor communication skills are more employers based demanded skill sets, as discussed above, and do not correspond to a specific domain in the Bloom's taxonomy. In Bloom's taxonomy communication skills are mostly classified as part of the affective domain. This partial match of our identified skills categories with the Bloom's taxonomy provides further confidence in the use of the three skills group in the rest of the paper.

Using these three categories of skills (Core employability, professional skills, and communication skills), the remaining part of this section responds to the three research questions on importance, satisfaction, and skill gaps.

*Core employability skills* show the highest level of importance on average. The high importance level of reliability and teamwork is consistent with the qualitative feedback from employers received during the pilot surveys. Many employers specifically look for engineers who are reliable and can effectively work with team members. Employers rated p*rofessional skills* the lowest on average among the three factor skills. This may be partly because employers think that engineering related skills can be partly remedied through in-house training even after graduation while c*ore employability skills* would require a longer timeframe to be acquired.

Communication in English is ranked the most important skill under c*ommunication skills*. This could be explained in English being the preferred language in many economic sectors and firms. Azam, Chin, and Prakash (2010) also find that employers demand English skills. Specifically, they estimate, based upon a large household survey, that English communication skills increase the hourly wages of men by a whopping 34%. The return mainly accrues to young highly educated workers (such as engineers). As Indian economic activities go global, better command of the English language is desired. In addition, the high ranking of communication in English could be partially attributed to the fact that there has been an increasing demand for Indian engineers in the software and information technology-enabled services (ITES) sectors that provide services in English to customers in the United States and the United Kingdom (Ferrari and Dhingra, 2009). Large-size firms consider communication in English more important than medium and small-size firms. Firms with foreign capital have higher importance mean scores than those without foreign capital. The IT sector has relatively higher scores than other sectors.

**5. Components of Employability Skills**

Reliability is very much needed for all the employees since the 21st century is going through many corporate and technological changes. Many employers specifically look for

engineers who are reliable and can effectively work with team members. Corporate trainers suggest that project kind of assignments can be given to the engineering students and they should be trained to complete the tasks related to their domain areas in a time frame.

To understand that integrity is a concept of consistency of actions, values, methods, measures, principles, expectations, and outcomes and in ethics, this is honesty and truthfulness or accuracy of one's actions and develop all these concepts in the workplace. Asking the students to remember and talk on an occasion where they showcased honesty and integrity will be an apt activity, HR Managers suggest. You need to cite the source shown in blue and then list the source under the list of references at the end. Kindly note that the blue items take the readers directly to the website/s. It is better for you to summarize the information in your own words and then cite the source. Kindly note this suggestion is applicable to all materials you may have used from other sources.

***Team work*** is building up of good interpersonal relationships. This has various dimensions such as ability to understand group dynamics and work effectively within a team and work together to reach common goals, define leadership, recognize styles, personalities and internalize. Students can be asked to address on 'Qualities of a good leader' and 'Leadership styles'. They can discuss on the roles of the leaders and team players. Forming the students' groups and assigning some tasks like creating a group e-mail id, preparing PowerPoint presentations and so on will be effective. Such suggestions are given to employers during interviews.

***Willingness to learn*** is probably the most important part of managing one's career and, as one keeps climbing the ladder, the breadth of the profession, domain, technical experience, managerial capability, and leadership direction abilities matter significantly. Employees need to learn these consistently and constantly and update the current technologies to survive and sustain and achieve top position on their own, without any external force or support but with thirst thrust from the inner heart. The recruiters say updating knowledge and skills are pivotal and with this

knowledge students can interact with the industrialists and they can also access different sources such as websites of the organisations.

***Role play*** - working in pairs and enacting the situation, sharing the experiences in the social networks, etc., will be valuable assignments.

***Entrepreneurship*** is the practice of starting new organisations and new businesses generally in response to identified opportunities. The engineering students need to be motivated and trained to become successful employers rather than employees. The training cultivates enthusiastic vision, new ideas, strategies to change the vision into reality, skills to meet the challenges of risks, skills to prepare the business plan and it's execute the same and finally to become a positive thinker.

***Self-discipline*** means deliberately aligning our energy with our values and priorities. This is one of the more important attributes a person needs to master. Corporates expect every employee to possess such quality without the need of or dependence on any external force. The students need to be developing self-discipline in their early stages, the trainers insist.

***Self-motivation*** is an ability to do what needs to be done, without influence from other people or situations. People with self-motivation can find a reason and strength to complete a task, even when the task is very challenging, without giving up or needing another to encourage them. The aspects of self- motivation need to be developed and inculcated, the trainers suggest.

When one wants to work for international or national companies, he or she has to be flexible. ***Adaptability*** is the ability to fit into a situation under changed circumstances. Adaptability has the same meaning as flexibility. A flexible person is one who can adapt to any situation or arrangement. The students need to be given such corporate exposure during internship programme. The human resource practitioners are keen to include such activities.

***Undertake/take direction*** is another important quality. To take upon oneself the responsibility for a task or performance, etc., is very much needed for any entry level engineers.

***Empathy*** is the ability to mutually experience the thoughts, emotions, and directions or instructions of others. In the corporate context, when one works for any project, empathy is very important. Identifying another's situation, feelings and motives will be helpful during any activity in the industry. Many employers emphasized the importance of empathy.

**6. Interview with Placement Professionals**

The majority of the placement professionals say that the soft skills are very much essential for the students to succeed in the campus interviews. According to some placement professionals, the students who do not have requisite skills set are getting rejected at the time of their campus interviews. They also say that in most of the leading engineering colleges soft skills training are being outsourced. Soft skills training and personality development programmes are conducted once every year for 2 to 3 days. Only this much is done by the training outfits.

**7. The Majority of the Placement Professionals Say that the Following Seven Soft Skills Are Essential**

1. Communication skills
2. Critical thinking and problem solving skills
3. Team work
4. Lifelong learning and Information management skills
5. Entrepreneurship skills
6. Ethics, morality and professionalism
7. Leadership skills

The placement professionals suggest that the soft skills training has to be incorporated in the curriculum and it should be spread over all the four years of their B.E. /B. Tech degree program. This will enhance the students' performance in the campus interviews. They strongly feel that soft skills should be integrated with the existing curriculum. Both the technological

skills and soft skills are equally important for a successful engineering professional. Moreover, this will be highly helpful in their career growth and sustainable employment.

**8. Survey Report of the Trainers of Corporates and Training Organisations**

The main objective of the questionnaire (see Annexure B) administered to placement professionals and trainers was to get the views of corporate trainers on what skills engineering students should have in order to get placed in well-established and reputed IT companies or core engineering companies and on the role of English language teachers in imparting the skills to engineering students. The corporates like Infosys, WIPRO, Intel (eLite Program) and CISCO conduct soft skills training programs in the engineering colleges. The trainers from various industries and training organizations were identified through the websites of the engineering colleges. Fifteen out of 28 placement professionals and trainers responded to the questionnaire. Eight trainers have had more than 5 years of training experience and four of them have had more than 10 years of experience in the field. Their areas of specialization include Quantitative Aptitude, technical and business solving, logical ability, coding, decoding, salesmanship, communication skills, group discussion, leadership, interpersonal skills, team building, human resource development, and attitude development.

The authors had a series of structured interviews with members of the placement professionals' team and a few HR managers. During the interviews with them, the authors asked what skills engineering graduates need in order to achieve placement in reputed IT companies or core engineering industries. Most of the trainers had mentioned communication, team and interpersonal skills as important skills for engineers. A summary of the skills (and qualities) mentioned by them are given in the order of priority.

The questionnaire 2 (Annexure B) was given to the trainers to mention the importance of soft skills, to get the employability status as soon as the engineering students complete their degrees successfully. Trainers were requested to rate how important each skill is for an engineering graduate to become an effective employee (Importance Level) on a scale from 5

(extremely) to 1 (not at all). The survey report of the importance of soft skills (See Table 2) is given as below:

Table 2 Survey reports of the trainers

| S.NO. | Soft skills | Mean<br>Scale from 5 (extremely) to 1 (not at all) |
|---|---|---|
| 1 | Communication skills (Oral, written and non-verbal). | 4.63 |
| 2 | Problem solving/Critical thinking skills. | 5.54 |
| 3 | Team skills. | 4.45 |
| 4 | Adaptability | 4.31 |
| 5 | Interpersonal skills. | 4.27 |
| 6 | Innovation /resourcefulness | 4.17 |
| 7 | Learn to update | 4.00 |
| 8 | Negotiation/ conciliation | 3.94 |
| 9 | Seminar/Presentation skills. | 3.88 |
| 10 | Professional ethics. | 3.71 |
| 11 | Etiquettes (Email, telephone). | 3.43 |
| 12 | Self-evaluation | 3.12 |
| 13 | Multicultural tolerance | 3.02 |
| 14 | Self-esteem | 2.91 |
| 16 | Group dynamics | 2.83 |
| 17 | Resume preparation | 2.77 |
| 18 | Interview skills | 2.61 |
| 19 | Time management | 2.56 |

Over 80 percent of trainers of corporate and training organisations focus on the modules related to selection criteria of employers and especially on communication skills, interview skills, group discussions, presentation techniques, resume building, telephonic interview and personal grooming. In addition to these modules, they prefer to train the employees on

professional speaking and writing skills, problem-solving skills, reasoning (verbal), positive work ethics, interpersonal skills, and team building skills for better employability. Countries like India produce over two million engineering graduates every year. The employers are keen on selecting the best performers as their employees. To train and make high potential candidates, the trainers conduct need analysis and they assess the strengths and weaknesses of the candidates initially. Based on the requirement, the trainers design the training programme and conduct the training sessions. Their preference will be communication skills, problem-solving and team skills. 'We believe strong communication in English alone will get the job in India', one of the soft skills trainers stated. As regards Critical Thinking and managing crucial issues, college training placement professionals insist on training the fresh candidates to undergo micro projects so that the candidates will definitely pursue proper engineering streams.

**9. Analysis of Job Advertisements**

Job advertisements play an important role in helping job seekers to apply for the right jobs. A typical job advertisement has these main sections: company details, the position advertised, job responsibilities, required skills and remuneration. One-hundred job advertisements (posted on the Internet and appeared in different newspapers in India and abroad) were analysed. The advertisements were selected based on the criteria that the advertisements were addressed to engineering graduates and that they should state clearly what they expected of the candidate: qualifications, experience, job responsibilities and especially skill sets required, etc.

The Table 3 below shows the required top 10 skills for engineering students as demanded by the advertisements. The analysis of job advertisements helped the researchers gain an insight into the target needs of engineering students. The skills set specified for various job positions should be incorporated into the soft skills curriculum in order to develop engineering students' employability skills.

Table 3 Importance: Which skills do employers demand in engineering graduates in their job advertisements?

| S. No | Skills | The importance of skills demanded by employers % |
|---|---|---|
| 1 | Ability to communicate | 95.72 |
| 2 | Problem solving skills | 92.14 |
| 3 | Interpersonal skills | 89.88 |
| 4 | Current trends/innovation/creativity | 83.56 |
| 5 | Leadership / team building skills | 81.00 |
| 6 | Negotiation / persuasion skills | 75.21 |
| 7 | Willingness/desire to learn | 72.49 |
| 8 | Grooming and multi culture awareness | 68.90 |
| 9 | Self-motivation and discipline | 65.73 |
| 10 | Ethics/ values | 64.23 |

Table 3 shows the main trend of employers demand in engineering colleges and responses on the importance of soft skills. Communication Skills (95.72 %), Problem Solving (92.14%) and interpersonal skills (89.88%) have the order of first preference for the employers. So, the communication skills appear as the most needed skills in the working environment. Current trends/innovation/creativity, leadership/team building skills and negotiation/persuasion skills contribute at an average mean of 79.92%. The descending order rate was willingness/desire to learn (72.49%), grooming and multicultural awareness (68.90%), self-motivation and discipline (65.73%) and ethics/values (64.23).

**10. Main Outcomes**

**A Professional Development Curriculum**

Based on the above survey reports (Questionnaires 1, 2 and observation of job description), the authors have identified the topmost 10 skills. Authors grouped these skills together because a common latent factor (skill/ability) partially drives the importance and selection criteria ratings of a group of individual abilities. For instance, employers often speak about the importance of soft skills. There is hence the opinion that a set of interpersonal skills may be related and these may form a group and that this group of skills is important. However, soft skills are often neither well defined nor backed-up by observed evidence. So, the individual skills one tends to group together as related soft skills may not really form a single cohesive group.

Factor analysis is one of the ways to test this notion of soft skills and experimentally define the individual skills that make up soft skills. Further, the identification of a small number of factors allows us to identify commonalities in demand and supply for skills, and structures the findings and provides a limit set of overall findings.

**11. Factor Analysis**

By using factor analysis, 25 skills listed in the questionnaire were grouped into three factors using the importance ratings. The level of importance attached to each skill reveals employers' valuation of, and demand for that skill.

Table 4 below summarises the importance level of each skill under the three factors as perceived by the employers. All skills are on average rated from 3.5 (half way between ―Somewhat important and ―very important) to 4.5 (half way between ―very important and ―extremely important). Hence, all skills in the questionnaire are rated as important.

Soft skills for employability show the highest level of importance on average. The high importance level of integrity and problem solving skills is consistent with the qualitative feedback from employers received during the on campus drives. Many employers specifically look for engineering students who are reliable and can effectively work with team members.

Table 4 below presents the resulting groups (factors) of skills generated by factor analysis summary of ranking of importance of skills (see Table 4)

Table 4 Summary of ranking of importance of skills

| S.NO | SKILLS | Demand of Skills | | | Ranking of Importance of Skills |
|---|---|---|---|---|---|
| | | % Employers Survey | % Trainers Survey | % Job advertisements Survey | Average |
| 1 | Ability to communicate | 85.2 | 92.74 | 95.72 | 91.22 |
| 2 | Problem solving skills/critical thinking | 81.6 | 90.82 | 92.14 | 88.18 |
| 3 | Leadership / team building skills | 84.4 | 89.0 | 81.00 | 84.80 |
| 4 | Interpersonal skills | 78.6 | 85.40 | 89.88 | 84.62 |
| 5 | Current trends/Innovation | 81.4 | 83.40 | 83.56 | 82.78 |
| 6 | Self-motivation and discipline | 88.4 | 82.40 | 65.73 | 78.84 |
| 7 | Negotiation / persuasion skills | 76.8 | 78.80 | 75.21 | 76.93 |
| 8 | Willingness/desire to learn | 68.0 | 80.0 | 72.49 | 73.49 |
| 9 | Ethics/ values | 76.6 | 74.20 | 64.23 | 71.64 |
| 10 | Self-esteem/ multi culture awareness | 70.2 | 60.40 | 68.90 | 66.50 |

Table 4 shows a summary of the ranking of the importance of soft skills. All the three emphasize the ability to communicate is most important among top ten soft skills. Being a prospective engineering graduate, he or she should know and have problem solving skills and he or she should possess critical thinking to enter and sustain him or herself in the industry. Achieving the status of a leader is everybody's dream and so building up team skills will support

the organisation. Without interpersonal skills, no one can build better relationships. Self-motivation and self-esteem are perceived to be the great qualities of the employees. To climb the ladder in the industry, one should know the current trends. When conflict arises, one should know how to negotiate with the stakeholders. One has to learn willingly and should always desire in his or her mind to attend to the simple to hard tasks. Ethics and values play pivotal roles in the industry. Self-esteem and multi-cultural awareness are expected by the local as well as international companies to build up self-confidence and to understand various diverse cultures. The industry expects that all these modules to be integrated in the engineering curriculum. The students need to be trained during degree courses and the corporates expect well qualified final products.

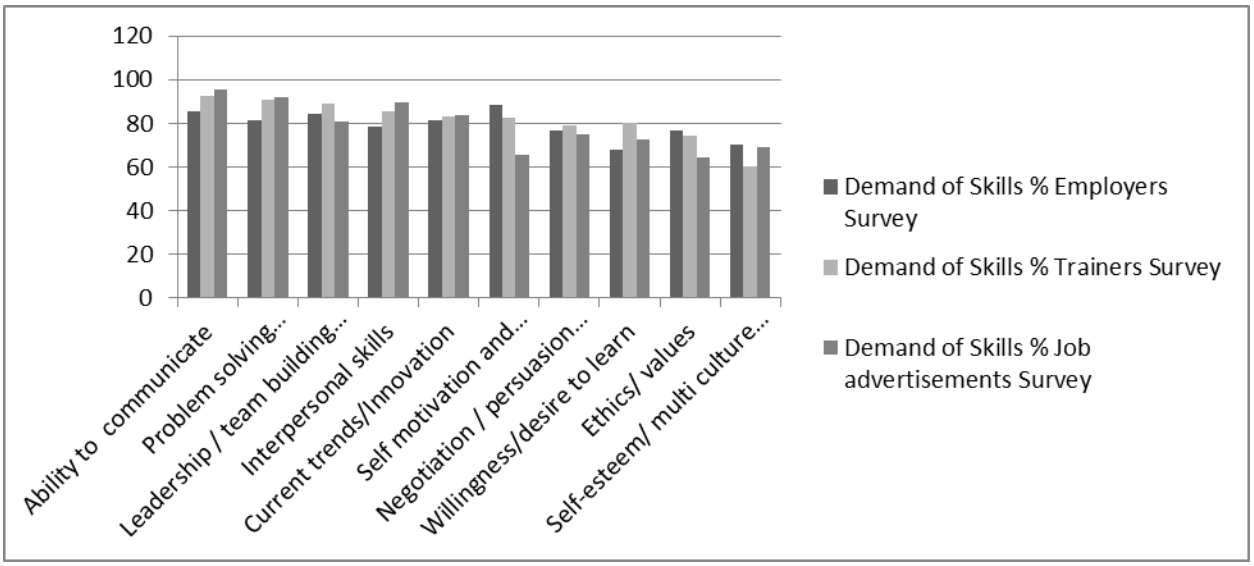


Fig.1 The summary report of importance of soft skills

Employers and trainers value communication in English and ability to communicate is the highest priority in India. Due to LPG (Liberalization, Privatization and Globalization), Indians have more opportunities to access jobs across the world using their competence in English. English is crucial to an employee's ability to work smarter in Indian context. When the employees work as a team which is usually diverse in terms of language and cultural identities of the members, communication skills build and sustain effective relationships that will result in mutual gain. 'Communication skills have become extremely important in all types of

occupations especially the highest significance for entry-level success in the workplace' says one IT Employer during personal interview.

Clear and concise communication will be supportive and project managers expect these from their team members to have all the dimensions of communication skills. Jaderstrom and Schoenrock (2008) noted that clear, concise communication is vital for success in the global business environment. According to Davis and Brantley (2003), the ability to effectively communicate permeates every aspect of life and applies to all disciplines. Lehman and DuFrene (2008) defined communication as "the process of a common system of symbols, signs, and behaviour. Other words used to describe the communication process include expressing feelings, conversing, speaking, corresponding, writing, listening, and exchanging." Davis and Brantley (2003) agreed that essential basic communication skills include the ability to speak, signal, listen, write, and read. Further, Lehman and DuFrene stated that attending meetings, writing reports, presenting information, explaining and clarifying management procedures, coordinating the work of various employees, and promoting the company's image are all described as ways to communicate. Communication skills are listed by numerous executives as prime requisites for obtaining and retaining employment (Hartman & Lemay, 2004). Davis and Brantley (2003) concurred that the ability to communicate is essential for success in career growth and personal relationships.

When recession happened in 2008, most of the companies downsized the number of their employees and some employees were alone retained. The reason behind this was the employees with communication skills survived in the industry. Lehman and DuFrene (2008) asserted that regardless of the field, communication skills are important to all twenty-first century job applicants. Twenty-first century businesses have placed enormous emphasis on the ability to communicate (Employers Value Communication and Interpersonal Abilities, 2004). Communication-based interactions promote personal and work-related associations (Job Market for the Class of 2002, 2002). In the business arena, employers rate communication skills as the number one attribute for recruits. Davis and Brantley (2003) indicated that basic communication skills are keys to success in the twenty-first century workforce. Hoggatt (2003) revealed that

twenty-first century businesses and companies are adamant that "the value of good communication skills is no longer a matter for debate" (p. 30).

**12. Technical Communication**

Researches over the decades repeatedly indicated that technical communication is a skill needed for engineering and business graduates. Current studies yielded similar results. In our study of employers, 91% of the respondents listed communication skills as crucial skills for employees. They insist upon the institutions to create conducive environment to develop verbal, written, business communication skills right from the first year. The Faculty Members also need to converse in English in all the situations and this will facilitate the students to listen and pursue later stages.

**13, Integration**

According to Lehman and DuFrene (2008), the integration of teams, committees, and groups is vitally important to the twenty-first century workforce. Dupin-Bryant (2008) added that the use of groups or teams has become fundamental in today's business world. Winter, Neal, and Waner (2005) concurred that the use of teams and group work in business is extremely important. Lehman and DuFrene asserted that teams are able to achieve more collectively than they could individually by combining efforts and expertise. One of the most desired skills in potential employees is the ability to work on a team (Good for the Workplace and the Classroom, 2004). Olivio and Kuschke (2001) added that it is essential for individuals to possess the interpersonal skills to work well with others and to be able to function competently as a member of a group or team. Lehman and DuFrene (2008) defined team as "a small number of people with complementary skills who work together for a common purpose" (p. 32).

**14. Formation of Teams**

Teams can be formed to solve particular problems, or as permanent groups; regardless, they play a key role in the twenty-first century workforce (Good for the Workplace and the Classroom, 2004). According to Lehman and DuFrene, different types of teams can be formed

that are specific to the task; some teams are permanent, high-powered, and self-managed, while other teams meet only long enough to solve specific problems. Teams generally form to accomplish tasks; therefore, there is a knack for creating a successful work environment for a group of employees that otherwise would not collaborate (Employers Value Communication and Interpersonal Abilities, 2004). Lehman and DuFrene reported that the use of teams has increased in recent years. Winter et. al., (2005) observed that many times team members have different ideas and different personalities. Employers are seeking workers that can effectively manage teams with diverse characteristics (Winter et. al., 2005).

**15. Simulating Team Experiences**

In fact, companies scrutinize potential employees by having them simulate team experiences during interviews (Good for the Workplace and the Classroom, 2004). According to Lehman and DuFrene (2008) a group must go through a developmental process, sometimes involving conflict, in order to function as a team. Furthermore, Winter et. al., found that if conflict is handled appropriately, it can be an effective tool for the development of the team. According to Lehman and DuFrene, (2008) organizations are prevalently utilizing teams to solve problems more so than ever before. The four stages of team development are: *forming, storming, norming, and performing. Forming* is when team members become acquainted with each other and the assigned task. S*torming* is dealing with conflicting personalities of different team members and creating new ideas. *Norming* involves developing strategies to promote team goals and achievement of those goals. *Performing* is when the team is working together at optimal performance and achieving goals (Lehman and DuFrene, 2008, p. 60).

According to Glenn (2007), "the global economy is the new reality and the world is the new workplace" (p. 9). The NBEA maintained that global issues have exaggerated almost every aspect of life (PCBEE Statement No. 74, 2004). Statz (2005) reported that business graduates must understand how to function in the global marketplace. Dlabay (2003) defined globalization as "the process of expanding business activities in order to gain a worldwide perspective". Cook, Cook, and Yale (2005) contended that the globalization of the twenty-first century marketplace

has created a blending of cultural customs and practices that makes exact rules for business etiquette impossible.

**16. Demands of Intercultural Communication**

According to Scott (2002), culture is composed of the learned, shared, interrelated, and unifying beliefs, values, and assumptions that guide the beliefs and behaviour of a group of people. Successful business people recognize the uniqueness of international settings and embrace the idea that many organizations are now part of a global economy (2005). Differences like culture, age, gender, and education are all factors to consider. Furthermore, labour statistics report growing proportions of minorities and women in the workforce, while the proportion of white males declines (Leman & DuFrene, 2008). The NBEA contended that in order to be successful in the global business environment, a multi-cultural perspective is crucial (PCBEE Statement No. 74, 2004).

Many companies from the United States have begun to conduct business with international companies; therefore, understanding how to effectively communicate with people from other countries is fundamental for success (Lehman & DuFrene, 2008). According to Statz (2005), business transactions across borders, direct foreign investments, licensing, franchising, and management contracts are some of the international business issues that twenty-first century employees will encounter. Glenn (2007) contended that ethics are an important aspect of conducting international business. Cook et. al., (2005) reported that it is important to realize that not all people from the same country or culture act the same. Dupin-Bryant (2008) assessed that as companies continue to expand internationally, they will face major challenges.

**17. Demands of Diversity**

According to Lehman and DuFrene (2008), a major strategic force that influences communication in the global marketplace is diversity. Glenn (2005c) concurred and added that because it is multi-generational, multi-cultural, and multi-national, diversity is not always immediately obvious. Lehman and DuFrene defined diversity as “Your ability to communicate

effectively with both men and women of all ages and with people of other cultures or minority groups" (p. 23). As the population of the United States becomes more diverse, it is particularly important to relate well to people of different cultures (Employers Value Communication and Interpersonal Abilities, 2004). Amyx, Bristow, and Luehlfing (Amyx, 2005) claimed that diversity is continuously growing and changing; consequently, customer needs, behaviour, and values must be addressed by successful companies. Diversity has impacted the United States as a world leader because changing demographics require businesses to face ethnic diversity in the workplace (Lehman & DuFrene). The United States, once defined as a *Melting pot*, according to Lehman and DuFrene is now better described as a *mosaic* where "small distinct groups combine to form the U.S. population and workforce" (p. 24).

### 18. Components and Activities of Soft skills

The authors worked with the placement professionals, corporate trainers and requested them to explore the components of soft skills and identify them. The authors designed components of soft skills, sub-skills and activities as follows: (See Table 5A, 5B and 5C)

Table 5A I Communication skills- Description of sub-skills, topics and activities

| Description of sub skills | Details of Topics | Activities |
|---|---|---|
| **1. Listening skills.**<br>To understand the process of listening, differentiate between hearing and listening, analyse the differences between effective and ineffective listening, know the differences between active and passive listening, identify barriers to listening and understand listening comprehension skills in the work environment | **The listening process**<br>- Hearing and listening<br>- Types of listening<br>- Listening with a purpose<br>- Barriers of listening<br>**Improving listening comprehension**<br>- Listening comprehension<br>- Effective listening strategies<br>- Team listening<br>- Listening and note taking | • ***Listening*** to the radio (FM) for 30 minutes<br>• Listening to a panel discussion on television<br>• Listening to a specific dialogue in a television/ movie//video clipping<br>• Listening to any lecture in the college<br>• Listening to a group discussion in the college<br>• Listening to the telephone |

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| | | conversation |
| **2. Reading skills**<br>To understand the reading process, identify the purposes of reading, know to differentiate between efficient and inefficient reading and grasp techniques to improve reading speed and update the current technology for professional development. | **The reading process**<br>- Reading- a communicative process<br>- Reading with a purpose<br>- Active and passive reading<br>- Reading a speed<br>**Reading strategies**<br>-Reading skills<br>- Scanning and skimming skills | • ***Reading comprehension***<br>• Reading and marking true or false<br>• Reading the passage and noting down reading speed<br>• Scanning the passage and answering within 30 seconds<br>• Skimming and finding the central idea of the passage<br>• Reading flow chart, pie chart and table and answering the questions |
| **3. Professional speaking skills**<br>a) Ability to understand the speech process realises the importance of conversation skills, improve fluency and self-expression and learn the use of body language.<br><br>b) Ability to communicate effectively include public speaking, negotiation, knowledge-sharing; understand non-verbal behaviours, communicate on the telephone, teleconferences and video conferences and master four channels of communication: downward, upward, horizontal and diagonal communication. | **The speaking strategies**<br>- The speech processor<br>- Conversation and oral skills<br>- Improving fluency and self-expression<br>- Body language<br>**Phonetics and spoken English**<br>- Basics in phonetics<br>- Pronunciation guidelines<br>**Speaking techniques**<br>- Developing word accent and stress<br>- Voice quality<br>- Developing correct tone | • ***Speaking practice*** exercises with communicative functions<br>• Making an oral presentation in English<br>• Preparing the check list on body language<br>• Pronunciation exercises using audio/video clippings<br>• Using language lab software and improving pronunciation |
| **4. Professional writing**<br>Ability to understand corporate writing skills for preparing reports, proposals, instructional manuals, | **Business and official letter writing**<br>Sales letters<br>Resumes and job application | • ***Writing practice of different letters***<br>• Studying the layout of a business and official letter |

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| writing memos, notices, official correspondence email etiquettes and communicating grammatically | writing<br>Business memos<br>E-mail message writing<br>Reports writing , proposals and technical articles | • Writing sales letters<br>• Resume design and styles<br>• Writing practice of effective job application and Job application<br>• Writing e-mail<br>• Learning of memos, reports, proposals and technical articles |
| **5. Seminar presentations**<br>To overcome stage fear, the ability to analyse audience needs, structure powerful presentations, develop effective presentations, body language, use audio-visual aids and power point presentations. | **Presentation skills**<br>- Difference between oral presentation and seminar presentation (Power Point presentation)<br>- Planning and presentation<br>- Structure of presentation<br>- Checklist for presentation | • ***Preparing and presenting PowerPoint presentations***<br>• Paper in preparation<br>• Practice sessions<br>• Observing and reporting presentations<br>• Mock presentations |
| **6. Group discussions**<br>To know the nature and the importance of group discussion, understand the characteristics, learn to identify areas of evaluation in the selection, know how to participate, chalk out strategies for making individual contributions know how to exchange opinions and suggestions. | **The difference between group discussion and debate**<br>Characteristics of Group discussion strategies<br>Group interaction strategies<br>Dos' and Don'ts<br>Group discussion topics<br>Evaluation | • ***Brain storming sessions***<br>• Mock sessions group discussion<br>• Discussing problems among the small group members<br>• Giving opinions on the topics<br>• Studying case studies and discussions<br>• Preparing the checklist before group discussion<br>• Preparing the list of topics<br>• Self-evaluation |
| **7. Interview skills**<br>To understand the nature of the interviewing process, know the characteristics of job interviews, | **The Interview process**<br>- Characteristics of the job interview<br>- pre-interview preparation | • ***Mock interview sessions***<br>• Self-analysis<br>• Analysing skill sets<br>• Research the organization |

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| identify pre-interview preparation techniques, know the different types of interview questions and how to answer frequently asked questions, understand how to project a positive image during a job interview and know alternative interview formats | techniques<br>- Interview questions<br>- Stage fright elimination<br>- Identifying job openings | and submitting as an assignment<br>• Preparing frequently asked interview questions<br>• Self-evaluation<br>• Checklist |
| **8. Job readiness**<br>To build resumes and job applications, interview questionnaire and image conscious. | Preparing resumes and curriculum vitae<br>- Cover letter<br>- Grooming | • ***Developing the interview file*** and submitting<br>• ***Visuals on body language***<br>• Viewing the mirror-appearance and dress code |

Table 5 B II Professional Skills - Description of sub-skills, topics and activities

| **Description of sub skills** | **Details of Topics** | **Activities** |
|---|---|---|
| **1. Self-Management**<br>Ability to balance the work and life. To develop the personality, personal attitude, capability and personal objectives towards success. | Self-assessment<br>Self- awareness,<br>Self-motivation,<br>Self-discipline<br>Self-direction and<br>Self-confidence | • Real life examples<br>• Preparing questionnaire and checking |
| **2. Essentials of Language**<br>Recap- Vocabulary, word parts, confused words, homophones fluency building, grammar for communication and letter writing.<br>Overview of Parts of Speech | Business vocabulary based word formation with prefixes and suffixes, Synonyms and antonyms.<br>Verb patterns, subject-verb agreement and tenses.<br>Voices, 'What/how' | • Practicing a variety of sentences.<br>• Forming words using prefixes and suffixes and finding the meanings and opposites. |

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| | questions and question tags<br>British and American vocabulary,<br>Editing (Punctuation, spelling and grammar) | • Finding verb patterns of the sentences.<br>• Changing sentences from the active voice to passive voice and vice versa.<br>• Preparing work sheet of 'What /How' questions and responses.<br>• Preparing tables and studying British and American vocabulary<br>• Editing features |
| **3. Goal Setting- Professional objectives**<br>To learn SMART, groups and personal goals, priorities , professional goals- short term and long term, action plan and achieve for success | Immediate, short time, long term<br>SMART goals<br>Strategies to achieve goals | • Preparing personal goals<br>• Preparing professional goals<br>• Discussion on goals with the friends circle |

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| **4. Time Management**<br>Ability to prioritize assignments and mange time effectively | Types of time<br>Identifying of time wasters<br>Time management skills | • Real life /professional situations<br>• Preparing the schedule for weekdays/ weekend days<br>• Preparing schedule for 24 hours with priorities<br>• Reviewing and reporting |
| **5. Interpersonal relationship skills**<br>Ability to build cordial relationships and develop dynamic interaction among team members and clients. | Focusing the message<br>Magnifying the listener's attention<br>Penetrating barriers<br>Listening actively. | • Audio and video listening |
| **6. Critical thinking skills**<br>Ability to expand and improve thinking skills such as explanation, analysis and evaluate discussion and to think beyond | What is creative thinking?<br>How creative thinking is useful in industries? | • Project report<br>• Asking the students to write a paragraph on both good and bad of the themes. e. g<br>• Computers, global warming |

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| **7. Positive attitude**<br>Ability to recognize the value of a positive attitude, understand how to maintain a positive attitude, cooperate with coworkers to create positive experiences for customers and demonstrate a positive attitude | Difference between attitude and behaviour<br>Relationship of thinking, behaviour and attitude.<br>How to change attitude and behaviour | • Discussion on difference between attitude and behaviour<br>• Role plays showcasing on different personalities and their attitude and behaviour. |
| **8. Persistence and perseverance**<br>Ability to overcome challenging situations and obstacles and maintain the same energy | Studying on determination | • Asking the students to prepare and submit ***an essay*** on their professional determination. |

Table 5 C III Soft skills for employability- *D*escription of sub-skills, topics and activities

| **Description of sub skills** | **Details of Topics** | **Activities** |
|---|---|---|
| **1. Honesty/integrity**<br>To understand that integrity is a concept of consistency of actions, values, methods, measures, principles, expectations, and outcomes and in ethics, this is honesty and truthfulness or accuracy of one's actions and develop all these concepts in the workplace. | The values of honesty and integrity.<br>How integrity helps one to climb the ladder? | • Stories<br>• Asking the students to remember and talk on an occasion where they showcased honesty and integrity. |

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| Please give citations for blue-marked items. | | |
| **2. Problem solving skills**<br>Ability to make decisions; develop creative, innovative, and practical solutions, showing independence and initiative in identifying problems and solving them within stipulated time. | What qualities should one possess in order to solve problems?<br>What are some of the steps involved in problem solving?<br>What are the characteristics of an effective solution? | • Quiz/puzzles<br>• Working for some case studies<br>• Working in groups and discussing the situations |
| **3. Leadership and Team building**<br>Ability to understand group dynamics and work effectively within a team and work together to reach common goals, define leadership, recognize styles, personalities and internalize | Qualities of a good leader. Leadership styles, decision making, negotiation skills<br>What is a team?<br>What are the skills required to work in a team?<br>How will you develop these skills in yourself? | • Discussing on the roles of the leaders and team players.<br>• Forming the groups and assigning some tasks like creating a group e- mail id, preparing power point presentations and so on.<br>• Organizing various group discussions |
| **4. Willingness to learn**<br>To understand that learning is probably the most important part of managing one's career and as one keeps climbing the ladder, the breadth of the profession; domain; technical | Updating knowledge and skills<br>Accessing different sources<br>Motivation towards learning<br>Upgrading skills<br>Visiting industries and learning<br>Accessing websites and equipping | • Action learning<br>• Role play- working in pairs and enacting the situation<br>• Sharing the |

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| experience; managerial capability; and leadership direction abilities matter significantly and learn consistently and constantly and update the current technologies to survive and sustain and achieve top position and without any external force and thirst from the inner heart. | | experiences in the social networks |
| **5. Assertiveness**<br>Ability to express opinions or desires strongly and with confidence, know the techniques for assertiveness, learn to become more assertive and improve assertive behaviour. | What is assertiveness?<br>How is assertiveness different from aggression?<br>What are the characteristics of an assertive person?<br>Why do employers prefer assertive candidates? | • Role plays – situations of personal and professional life on assertiveness. |
| **6. Adaptability**<br>To understand the contemporary organisations and rapid changes and willing to work accordingly and possess the flexibility and ability to respond to rapid changes. | What is adaptability? How adaptability is a survival skill in an organisation?<br>Who needs this skill most in an organisation/?<br>How is knowledge of human relations an important dimension of adaptability?<br>How do you maintain your self-respect and yet adjust with others? | • Studying case studies. e. g<br>• With the advancements in personal computers and the widespread use of computers and laptops for office purpose, the job of the typist has become a thing of the past. Find out |

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| | | from some middle level and senior level managers how the change has affected their companies. Have typists been forced out of jobs or have they upgraded their skills? |
| **7. Change management**<br>To understand that change management is a structured approach to shifting/transitioning individuals, teams, and organisations to accept and embrace changes to a desired future state. | Mission change, Strategic changes, operational changes, technological changes and changing the attitudes and behaviours of personnel. | • Quiz/puzzles<br>• Studying and taking notes on change management.<br>• Preparing ***work sheets*** for change Management |
| **8. Diversity management**<br>Getting along with others in a multi-cultural work environment, respect for others' faith and belief systems and avoiding racial/cultural discrimination at the workplace. | Learning on multi-cultural environment.<br>Learning about Multi National Companies | • Action learning<br>• Preparing the list of dos' and Don'ts of diversity management. |
| **9. Professional ethics**<br>Ability to build trust; to internalize honesty and integrity | Understanding the economy crisis, the environment and social cultural aspects | • Assigning the students to present oral presentations |

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| | professionally. | on professional ethics |

**19. Findings with Analysis of the Collected Data**

Equipping and working out engineering students with a comprehensive and deep set of skills that are in demand would be of great importance for the employability for the nation's development. Large economic sectors, such as IT, infrastructure, power and automobile, water, rely critically upon soft skills. Only through these skills, one can explore and excel technologies. This employer survey provides important new insight on which specific skills are important for employers and where the engineering students currently fall short.

**20. The following findings are important:**

1. The curricula of academia focus mostly language and grammar in the first year of engineering education. Technical English is more of an examination based rather than application oriented. There is little opportunity of providing oral presentations, interactions and small group discussions in the language classrooms. The third year B E/B. Tech students should have exposure of seminar skills, group discussions and interviewing skills. These skill sets need to be provided to compete in the competitive world.

2. The employers expect end products directly from the academia. Recruiting as mediocre candidates and train those for three to six months would be a tedious and economically not feasible for most of the industries.

3. To match with the requirement of the industries and to make a number of employable candidates, an exclusive curriculum of soft skills needs to be introduced. The articulation should be followed like corporate. The evaluation system needs to be revamped to have more exposure and practice rather than a written examination oriented.

## 21. Suggestions

Training on soft skills becomes more relevant in a country like India where the education system does not delve into personal development. Soft skills' training is essential because we do not have it in our academic curricula. Therefore, corporate houses have to take up the task of grooming employees who are the link between the company and the external world, so that they are able to present themselves better. Instead of outsourcing the soft skills training it is recommended to bring soft skills within the curriculum.

The present English course in the Engineering colleges communication skills alone. The other aspects of soft skills can be brought into the curriculum irrespective of the subject. More thrust has to be given for role play, group discussion, seminar, presentation, questioning, brainstorming, book reviews, interaction etc. This will initially be more challenging i.e. Bringing a thorough change in teaching methodology in the existing system but if we bring this sort of change in the existing curriculum this will result in enhancing the skill set of the students and their personality as a professional. Soft skills training need not be confined only with English curriculum but also it could be extended to all the other subjects also. Initially it would be more challenging but it would be like by the learners. This will bring in lot more changes in the learning as well as teaching. The entire teaching should be learner centred approach rather than teacher centred. The industry people do not want to spend their time on soft skills training again instead they expect the candidates who are industry ready. In such a case the necessary changes have to be made in the teaching methodology and curriculum as well as meet the expectations of the corporate. A lot of time and money spent by the corporate can be saved by introducing necessary changes in the curriculum teaching methodology.

## 22. Implications for Soft Skills Curriculum

Several implications flow from these results

- Experiential learning opportunities involving collaborative projects with the industries need to be provided.

- Blogs need to be used to enhance written communication.
- Multidisciplinary competency development is needed.
- Opportunities have to be given to relate to real-world problems and ability to see the larger picture.
- In the age of globalization, Language teachers need to undergo a paradigm shift and change their teaching methodology that will suit the needs of candidates.
- The teachers should be willing to come down to the level of students and instill confidence in the latter.
- They should assess the present and future language needs.
- They are expected to play the role of soft skill trainers as facilitators.
- The soft skills training programme need to be introduced right from first year.
- The ratio between technical skills and soft skills can be 80 % and 20 % respectively.

This is possible only if curriculum designers become aware of the real needs of the future professionals of the world. There should be more representative of the industries, finishing schools and soft skills trainers during curriculum framework. The curriculum has to be updated at least once in three years.

**23. Conclusion**

In this paper the authors have conducted two surveys on professional development curriculum design and methods of teaching of modules. In a survey format and interviews, a sample of employers, employers and soft skills trainers of the corporate and training institutions were asked to reflect on the curriculum framework and pedagogical approaches with the perspective of the industries and businesses. Research results indicate that (i) recognize the importance of soft skills, (ii) integrates soft skills into the engineering curriculum (iii) refocus the assessments, teaching-learning process toward higher-order skills; and (iv) interact more with employers to understand the particular demand for skills in that region and sector.

Further the employers insist that the University and industry collaboration are important in order to produce graduates, as required by industries. Collaborations will reduce the mismatch between what the industry wants and what the university can produce. Basically, it bridges the gap between University's curriculum and the relevant industry employability skill, by closely partnering to enhance graduate competency. The examples of university industry collaboration are scholarship for students, fellowship grant for a research post-graduates, and research grants for university research work. They insisted that the teaching methods are also needed to be shifted to training especially in face to face practice sessions rather than delivery or any other conventional methods. Teachers have a crucial role in efforts to enact the new curricula that are being developed.

Therefore, it is most important for the engineering colleges have teachers with up-to-date knowledge and skills to design, implement and deliver new curricula. The needs of the engineering students for industry are continuously changing. In order to meet the requisites of the industries, the teachers need to be trained and update their industrial exposures and settings. Identifying the soft skills, articulating and assessing time to time are essential to providing curricula and pedagogy that promotes continuous improvement and demonstrates accountability.

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## ANNEXURE A

### Employers' importance level of soft skills survey

1. Which of the following soft skills do you consider important when hiring new engineering graduates? Please rate on a scale as

**1 Extremely important, 2 Very important, 3 Important, 4 somewhat important and 5 Not important**

Questionnaire 1 for Employer Importance Survey

| Modules | Rate IMPORTANCE for |
|---|---|

| | successful Performance of the job | | | | |
|---|---|---|---|---|---|
| | 5. Extremely | 4. Very | 3. Somewhat | 1. Not very | 1. Not at all |
| **Reliability** (can be depended on to complete work assignments) | | | | | |
| **Empathy** (understands the situations, feelings, or motives of others) | | | | | |
| **Willingness to learn** (lifelong learning) | | | | | |
| **Teamwork** (interpersonal relationships) | | | | | |
| **Entrepreneurship** (able to convert a new idea or invention into a successful innovation and establish enterprises) Please check the blue-marked item with citation. | | | | | |
| **Presentation skills** (able to *Present the topics* via speech and various additional *means)* | | | | | |
| **Flexibility** (responds well to change) | | | | | |
| **Self-motivated** (Ability to do what needs to be done, without influence from other people or situations) | | | | | |
| **Leadership** (A person who is in charge or able to in command of others.) | | | | | |
| **Self-discipline** (exhibits control of personal behaviour) | | | | | |
| **Contemporary issues** ( able to understand issues and resolve) | | | | | |
| **Understand /take directions** ( able to listen and take directions) | | | | | |
| **Creativity/innovation** (identifies new approaches to | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| problems) | | | | | |
| **Communication in English** ( ability to communicate in English) | | | | | |
| **Interpersonal abilities** ( ability to interact others) | | | | | |
| **Negation (** | | | | | |
| **Multicultural management** (able to recognize and accepting the differences) | | | | | |
| **Problem solving** (Critical and reasoning) | | | | | |
| **Professional ethics, values and attitude** (able to encompass the personal, organizational and corporate standards of behaviour expected of professionals) | | | | | |
| **Written communication** (able to write words, letters, emails, and manuals etc.) | | | | | |
| **Reading** (able to decoding symbols in order to construct or derive meaning) | | | | | |
| **Spoken communication** ( able to speak in all the situations) | | | | | |
| **Etiquettes (Email, telephone)** (able to communicate when using email and telephone). | | | | | |
| **Integrity** (understands/applies professional and ethical principles to decisions) | | | | | |
| **Nonverbal Communication** (NVC) (able to communicate through gestures, body, face, eye, touch etc.) | | | | | |

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**ANNEXURE B**

**Placement professionals and Trainers' importance level of pedagogies of soft skills survey**

1. Which of the following soft skills do you consider important when hiring new engineering graduates?

Please rate on a scale as

**1. Extremely important, 2. Very important, 3. Important, 4. Somewhat important and 5. Not important.**

**Questionnaire 2 for Trainers**

| S.NO. | **Pedagogies of soft skills** | Rate IMPORTANCE for successful performance of the job | | | | |
|---|---|---|---|---|---|---|
| | | 5. Extremely | 4. Very | 3. Somewhat | 2. Not very | 1. Not at all |
| 1 | Emotional Quotient. | | | | | |
| 2 | Problem solving/Critical thinking skills. | | | | | |
| 3 | Etiquettes (Email, telephone). | | | | | |
| 4 | Self evaluation | | | | | |
| 5 | Interpersonal skills. | | | | | |
| 6 | Professional writing skills like memo, report, letters etc. | | | | | |
| 7 | Communication skills (Oral, written and non-verbal). | | | | | |
| 8 | Team skills. | | | | | |
| 9 | Self esteem | | | | | |
| 10 | Professional ethics. | | | | | |
| 11 | Time management. | | | | | |
| 12 | Seminar/Presentation skills. | | | | | |
| 13 | Multicultural tolerance | | | | | |
| 14 | Personal grooming | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 16 | Interview skills | | | | | |
| 17 | Resume preparation | | | | | |
| 18 | Group dynamics | | | | | |
| 19 | Adaptability | | | | | |

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