

Challenges in strengthening the Communication and Behavioral skills for greater employability of engineering students: A study of NCR Delhi (India)

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Abstract- Engineering education in the last few decades, has been growing incredibly in importance and reputation due to certain skills, technical knowledge and proficiencies that are imparted to the passed out graduates for their employability. It is an accepted fact that India has an immense potential to be a global technology leader. Since independence, the initial focus of government policy was to develop good engineering institutes and provide engineers required for developing the economy. The setting up of the Indian Institutes of Technology, the Regional Engineering Colleges (and their subsequent conversion to the National Institutes of Technology), were targeted at achieving this objective. Indian engineers established their reputation for advanced engineering and design skills. Engineering in India is also a preferred option for bright students at the 10+2 level. This has resulted in a spurt in the students intake of engineering colleges primarily in the private sector. Despite this, industry leaders whine about the absence of quality engineers for their industry. Also accompanied by major unemployment rates amongst graduating engineers. Curiously enough, graduates are ready for taking up their jobs, but according to the industry, who will provide them employment for their skills, knowledge and the composite professional values that they bring with them, and in fact they are not considered 'job-ready' at all. The low employability is on account of several factors, out of which poor communication and behavioural skills are identified to be two of the most critical skill attributes. An in-depth analysis has been carried out by developing two detailed structured questionnaires administered on 55 HR Heads from the industry to confirm and ascertain the industry's perspectives about these skills and on 20 TPOs/Directors to find out engineering colleges' understanding about these skills including the challenges and barriers they face in this process and also to identify possible solutions. The results clearly indicate mis-match between industry's and institutes perspective on soft skills. The important finding of the study is to develop conducive environment and follow practical/ activities based approach to impart soft skills to engineering graduates.

KeyWords- Employability; Communication; Behavioural Skills; Domain Knowledge; Soft Skills; Attitude; Challenges; Barriers and Values

1. INTRODUCTION

A strong base of engineering education is essential for national development and for strengthening the industry, economy and the quality of life of people. As India strives to compete in the globalised economy and emerge as a world leader, it becomes imperative for institutions of higher learning to nurture trained and skilled manpower and professionals who can meet the changing requirements of the society, economy and the world. The role of engineering education in such circumstances becomes important to supply trained and skilled manpower for different sectors of the economy; use resources of the economy efficiently, bring technological advancements and innovations in the economy and finally raise the level of competitiveness in the economy. It is only through this we can strengthen our manufacturing base and can make Make in India a reality. Through quality engineering education we can provide

employment to masses and raise the standard of living of the people.

1.1 Growth and background of engineering education

Engineering education in India has a long tradition, the beginning of which goes back to ancient time. A recent research reveals that around the year 1000, China and India accounted for about half of global GDP, and also about half of the global population. That situation began to change from the 15th century, gradually at first and then at a rapid pace during the 19th and 20th centuries. Even as recently as in 1820, the two countries still accounted for about half of global GDP, and about 57 per cent of world population. But by 1950, their combined share declined to only 9 per cent of global GDP (Nayyar, 2015). Therefore, it can be safely concluded that India had a strong manufacturing base right up to 1900 and only in 20th century it started weakening. The strong manufacturing

base only suggests existence of strong engineering/ skill base of its workforce, though may not be in the formal sense as we take it today. The foundation for modern engineering was laid down in the year 1847 when Thompson's College of Civil Engineering in Roorkee was established, which in later years is converted in to IIT Roorkee. This was followed by the establishment of Calcutta College of Civil Engineering (1856), Poona College of Engineering and Industrial School, which now is named as Guindy College of Engineering (1858), Victoria Jubilee Technical Institute, Bombay (1887), Jadavpur College of Engineering and Technology (1908), Indian Institute of Science at Bangalore (1909), start of engineering branches in mechanical, electrical and metallurgy engineering at BHU (1917), Indian School of Mines at Dhanbad (1926),

Birla Institute of Technology and Science at Pilani (1929), Harcourt Butler Technological Institute, at Kanpur (1929), Department of Chemical Technology, University of Bombay (1934) and Delhi College of Engineering (1941), which later became Delhi Technological University in 2009. These were the notable engineering institutes created in India during the pre-independence period.

The post-independence period saw the establishment of engineering institutions like IIT Kharagpur (1950), IIT-Bombay (1958), IIT-Madras/IIT-Kanpur (1959), IIT-Delhi (1961) and further 11 IITs were established since 2008; NITs evolved from Regional Colleges of Engineering (established in 1960s) and were upgraded to NIT status in 2002; and IIITs at Gwalior, Allahabad, Bangalore, Hyderabad, Jabalpur, Kancheepuram, and Delhi were established in 1997 and subsequently. Important institutions such as Institute of Armament Technology at Pune (1952), Birla Institute of Technology at Ranchi (1955), Thapar Institute of Engineering and Technology at Patiala (1956), School of Planning & Architecture at Delhi (1959), and Teri School of Advanced Studies at Delhi (1998) were established to strengthen the engineering education in the country. From the above discussion it is clear that in the pre and post

independence period serious efforts were made to create institutions for quality engineering education in the country. The liberal policy of AICTE and the Government's decision to allow private institutions in engineering field has resulted in significant expansion in engineering education. As per AISHE 2015-16 data, the total number of 5671 institutes were offering different engineering programmes to 9,23,873 students enrolled in the year 2015-16. The sanctioned intake however was much higher- 18,40,077 students, indicating actual enrolment to the level of 50 percent. The data for engineering colleges operating in U.P. & NCR, Delhi in the year 2015-16 shows the similar trend. The total number of 466 colleges were offering different engineering programmes to 74,182 students with the sanctioned intake of 1,69,241 indicating actual enrolment of just 44 percent. The low percentage of actual intake in engineering colleges at all India level as well as in U.P. & NCR, Delhi reflect the poor use of infrastructure both hard and soft resulting in poor quality of education being imparted to students. This also dents the viability of the institutions offering these programs. This is a situation generally observed in tier-3 colleges operating in U.P. & NCT, Delhi. This also creates the condition in which faculty is not sure about their continuation in a particular college thus prompting them to search jobs in other nearby institutions. These factors adversely affect the employability of the engineering graduates. Thus it is clear that on the one hand the number of engineering institutes and the students have increased substantially, on the other the employability of the graduating students has declined significantly.

1.2 Research studies indicating low employability

As per AICTE latest data of past few years, low placement of students is evident, irrespective of enrolment- high or low. The data in Tables 1 & 2 gives a fair idea of how many engineering institutes have come up in India over the past few years, their students' enrolment and placement.

Table-1: Statistics on Engineering Students in India

Academic Year	Engineering Institutes (AICTE)	Total Enrolment	Students Placement
2012-13	6098	1747860	412041(23.57%)
2013-14	6218	1789699	451707(25.23%)
2014-15	6385	1729411	511402(29.57%)
2015-16	6432	1638994	519243(31.68%)

Table-1, clearly indicates the poor placement of the students. Only 1/4th of the students enrolled have been able to get the job in different organisations in the country. The

situation is not different in NCR Delhi as is reflected in Table 2.

Table-2: Statistics on Engineering Students in Delhi NCR

Academic Year	Engineering Institutes (AICTE)	Total Enrolment	Students Placement
2012-13	33	11510	4126(35.84%)

2013 -14	36	12717	4916(38.65%)
2014-15	34	13692	5239(38.26%)
2015 - 16	36	11993	5041(42.03%)

Table-2, shows that nearly 40 percent of the students enrolled have been able to get the job after completing their engineering education in NCR Delhi .The percentage is slightly higher than found in country, probably due to better job opportunities in the region. The more recent AICTE data indicate that more than 60 percent of the eight lakh engineers graduating from technical institutions across the country every year remain unemployed. This is a potential loss of 20 lakh man days annually (TOI, March 18, 2017).

The reasons for low employability can be traced to the internal structure of the India's technical and higher education. Ordinarily graduates that the country's higher education system churns out (produced mechanically and in large quantities), are unfit for the new jobs opportunities being created. It is therefore not surprising that graduate unemployment rate at 19.6 percent is significantly higher than the overall rate and more than 60 percent of graduates perform jobs that do not require graduate skills.

There is a need for the industry, government and academia to formulate a strategy for engineering and science education in India. We need to have a mechanism to identify important areas and disciplines that should grow and develop policies and institutions that facilitate this. There needs to be a high-level think tank that reviews the higher engineering and science education system in India providing direction for future growth. It is important to understand the actual trends in numbers, placements, salaries, employability, research output and compare and benchmark performance with other institutions. A comprehensive understanding of the reality should form the basis of policy changes that ensure that the engineering education system meets the changing needs, on an ongoing basis, of the industry and society.

To sum up , in overall terms, India does not have a problem of supply of graduates; essentially the problem lies in the uneven quality of the graduate-ship and soft skill mismatch, and a small number of people on one hand and the rapid economic growth, investment boom and accompanying structural changes on the other hand, has aggravated the situation in certain segments, bringing into focus the necessity of higher education and skill development in recent years. Now with a slowdown, with media reporting job losses and inadequate placements, people are voluntarily opting for further education and skill up gradation. Thus skill shortages are not general, but specific and often temporary and cyclical. The solution may, therefore, not lie in large scale expansion of higher education, but in identifying the shortages and finding contextual and specific solutions while building the adaptive capacity in the system. The linkage between higher education and the employment market are tenuous.

Addressing the problem of unemployment and underemployment of graduates on the one hand and the problem of skill shortages on the other, require interventions that make the connections between higher education and the jobs more relevant and efficient.

1.3 Need to Address the Requirements of Job Market

Globalization has compelled industries to produce standardized, calibrated quality products and employees and it is here, that institutes can help industries of the region in providing easy access to these essentials. In the current scenario, we spend huge amounts on producing a large number of unemployable youth who hold university degrees. They are not educated unemployed, but 'unemployable' graduates. The same sentiments were shared by Dr. APJ Abdul Kalam when he said, "It is not unemployment that is the major problem; it is the question of unemployability that is the major crisis in this competitive arena..." After a student completes college, employers told us how frustrating it is to get the right people for available jobs. Construction companies do not get adequately trained masons, carpenters, blacksmiths, electricians, etc. Offices cannot get good stenographers, computer operators, accountants, etc. Factories and workshops cannot get mechanics and technicians. These graduates do not possess employable skills even if they are considered educated.

In times of rapid change, institutions have to become more responsive to changing employment markets and students interest. Unfortunately, universities are not particularly innovative institutions and they are not well suited to quickly pulling together whatever resources are needed to respond to a new problem or challenge. This problem is more serious in India due to the structural rigidities of the system, near absence of competition between institutions, and mindset problems. Unified education and training systems are best suited to respond to changes in the job markets. This would require building pathways between the skill building vocational and the higher education sectors through a national qualifications framework and re-branding of skill development.

After a student completes college, his/her academic skills are tuned. But joining and sustaining in a corporate environment is a different ball game altogether. Employability skills in general include basic communication skills like reading, listening and writing while advanced levels of communication skills include influencing, negotiation and persuasion skills, etc. Apart from communication skills, the knowledge of industry verticals, career progression paths, workplace ethics, critical thinking and effective time management makes

one more readily and effectively employable in the industry.

Employable skills are a relatively new and often talked about term these days. Everyone is stressing on the need for employable skills in young graduates, be it the academicians, the industry or the government. The other skills over and above the academic skills such as spoken and written English, interpersonal skills, the art of communication, situational behavior and so on, play a most vital role in helping the student or candidate to seamlessly fit into the workplace. Absence of these may hamper the candidate's prospects at the interview stage itself or to get a job at all.

There are a plethora of reasons behind the low employability of graduates in India. Not many of them are due to the paucity of jobs; rather it is due to the lack of proper resources. Recent surveys, studies and reports on the employability of Indian graduates reveal extremely startling revelations. "The National Skills Report 2014" prepared by CII, People Strong and Wheebox has stated that two-thirds of our skill pool are not fit to be employed. The essence of other reports by FICCI and E&Y, Aspiring Minds, NSDC, Accenture, CII and KPMG in India also highlight similar deficits. The main purpose of a university education in 21st century has to be 'Work Readiness'. Employability has to be considered as a key factor in curriculum design and university experience. There is a need for embedding employability in the student life cycle and training programs. Universities are also supposed to develop mechanisms for engaging with prospective employers of their graduates through fostering and developing professional networks; interfacing and engaging employers in the curriculum development, review and develop the knowledge of employers about the work of students.

1.4 The Recruiter's Perspective

While some studies indicate clearly that there is an issue of low employability skills, the organisations who recruit are the ones directly affected by the lack of employability skills. Therefore, the recruiter's perspective is an important consideration. The recruiters are interested in passing out graduates who possess sufficient knowledge, skills and values required for efficient discharge of managerial functions. Hiring people with the desired job-readiness skills shall help to a significant reduction in the time, effort and money spent in the training of fresh recruits and in managing attrition as only those who are interested in that field will take up the job.

1.5 Importance of Communication and Behavioral Skills in Employability

Out of a few identified areas that have a mismatch, the level of communication and behavioral skills and their gap seem to be one major impediment for the graduates' employability. Predominantly, poor communication and behavioral skills have been pointed out to be the reason behind dipping employability.

Therefore, came up the need of an in-depth analysis to find what prevents them from having stronger communication and soft skills (i.e. behavioral skills), that the engineering graduates lack, eventually barring them from attaining their career objectives. It covers skills in verbal and non-verbal communication, language proficiency, and ability to manage time, presentation skills, team building skills, and social & interpersonal skills at the workplace. Accordingly, in this research paper our endeavour is to identify communication and behavioral skills required for higher employability and also to identify reasons for the low level of these skills in engineering graduates, which in turn is affecting their employability. The paper also aims to identify the challenges in the process of imparting communication and behavioral skills to the engineering graduates by the institutes and also to explore the possible effective solutions to the barriers in the process.

2. LITERATURE REVIEW

Important studies have been examined to explore the different dimensions of communication and behavioral skills essential for higher employability of the graduating students. The findings of some of these studies are as under:

Banerjee & Muley (2008) in their paper titled "Engineering Education in India" emphasised on industry – academia partnerships to make engineering education practical. They suggested the following in this context : (a) Industry's recognition of the need for skilled post-graduates (M.Techs./PhDs) for research, development and design. (b) Industry role in defining key research areas and potential research problems. (c) Academia to be responsive to industry's future manpower and their special training needs. During the industry feedback workshop in May 31, 2008, several industry representatives highlighted the high costs incurred in training fresh engineering graduates before they are equipped to handle the jobs they were recruited for. While engineering education is not intended to equip students for specific jobs, the basic skill set and analytical capabilities required for most of the engineering jobs should be provided. Two expert advisors, Messrs. A. Abbot, formerly Chief Inspector of Technical Schools, Board of Education, England and S. H. Wood, Director of Intelligence, Board of Education, England, were invited to advise the government on certain problems of educational reorganization and particularly on problems of vocational and technical education. They recommended major reforms in the educational system by suggesting a complete hierarchy of vocational and technical institutions parallel to that of institutions imparting general education. The Apprentices Act of 1961 was approved by the Central Government in consultation with the Central Apprenticeship Council. Then came a voluntary scheme known as "Program of Apprenticeship Training" that was arranged by the Ministry of Education,

GOI. The object of this scheme was to provide practical training facilities to unemployed engineers and diploma holders (Polytechnics) in order to furnish them for gainful employment in industry. The National Policy on Education (NPE) 1986 amended in 1992 lamented on the poor equipment of education in our country, lambasted the defect of the existing system and charged the system pointing out that 'little consideration was given to the employability of university graduates and or the absorptive capacity of the job market.' The apex body in charge of the higher education in India, the University Grants Commission (UGC) took note of the emerging demands for 'a whole range of new skills'. At the severe criticism of the NPE and acting on the understanding of the ground realities, the UGC established Curriculum Development Cells (CDC) for 27 subjects, mandating them for 'modernizing the courses and restructuring them into unit courses and to develop alternative models with a strong emphasis on learning.' The UGC also identified 35 vocational and 76 subjects with an 'emphasis on providing knowledge and skills required for entry into gainful employment, particularly self-employment.' But evidently, these are not enough. F. Elizabeth Gray (2010) has found general dissatisfaction with regard to listening and speaking skills possessed by accountancy graduates. Apparently, further research needs to be undertaken for identifying more effective pedagogical approaches. Attentive listening (*samyakshravan*) is the true art of communication. *Samyakshravan* means no thinking inside, no thought process but only focused listening. In the Upanishads, there is a reference that if whole body is listening, only then one can understand '*Mahavakyas*'. Lord Mahavira extolled the virtues of *shravan*. He taught his disciples to be *shravakas* and *shravikas* those who became perfect in the art of right listening. (Mittal, 2006). An international comparative study mentions excellence which mirrors the issue of quality and stems from various aspects of the engineering education system. For instance, only about 25 percent of technical graduates are suitable for employment in the offshore IT industry, and 64 percent of employers hiring fresh engineering graduates are only somewhat just satisfied or worse with the quality of the new hires (NASSCOM and McKinsey 2005; Blom and Saeki 2011). The sector suffers a severe shortage in high-quality faculty. It is estimated that India produces 1,000 Ph.Ds in engineering per year (World Bank 2010). It is widely recognized that the affiliation system often represents an impediment to overall quality development in engineering in India because affiliated colleges do not fully exercise academic, financial, and management autonomy under the system. Thus, one university has more than 600 affiliated colleges (World Bank 2011b). Because of the large number of affiliated colleges, the quality in planning, regulation, and supervision is usually not maintained by the affiliated universities. As a result, curricula are often obsolete, the skills taught are usually not matched with the demand or local needs, and the number and quality of

faculty are frequently not sufficient. It further goes to mention that for engineering education, data on gender and subject-based school enrollments, the number of applicants, the number of graduates, employment following graduation, and salaries are available according to the level of educational attainment. For employability and skills, data on employer satisfaction and employment rates are provided. The analysis concludes that there is a growing demand for engineers, especially in the manufacturing sector, but that the supply of engineers who are duly skilled is insufficient.

Another issue is that students still seem to lack practical (research and internship) experience, as well as exposure to certain soft skills that are emphasized in the U.S. model of engineering education. For example, only a small share of engineering students appear to be participating in faculty research projects, engaging in meaningful internships, or taking leadership or interdisciplinary courses. Furthermore, four-year students are generally known to complete a rather concentrated, classroom-oriented course schedule in the first three years, but then spend much of their last year searching for jobs.

Internationally, academia and practitioners agree that students' writing and oral communication skills are two major areas which need greater attention in the university curriculum (Albrecht & Sack, 2000[1]; Henderson, 2001[10]; & Simons & Higgins, 1993), and a considerable body of scholarship has sought to make informed recommendations to the curricular offerings at university level education (see, e.g., Henderson, 2001; Sin, et al., 2007; & Usoff & Feldmann, 1998)[25]. Thomas (1995)[24] criticizes the real-world application of the texts and approaches used to teach business communication in higher education; similarly, D'Aloisio (2006) [7] argues for the need to relate university education to the specific communication competencies required incorporate settings. Several authors have identified need for developing communication skills, both oral and written, by technical professionals, as in their absence, full potential may not be harnessed. Developing proficiency for communication in English – oral and written is thus a formidable challenge for business schools. Students with soft skills like positive attitude, effective communication, time management, team spirit, flexibility, etc. have much greater chances of success in the tough corporate world compared to students who lack in them (Saravanan, 2009)[21]. Gupta, D.P. & Dewanga, Arvind suggested in their paper titled Challenges Before Engineering Education in India that there are large number of practicing engineers in the Indian industry. They need to be acquainted with the newest tools and techniques. Many engineering institutions offer continuing education modules for industry professionals. The requirements for continuing education and skill up-gradation of the industry needs to be identified by industry leaders and professional bodies in consultation with academic institutes. The importance of lifelong learning and professional development needs to be

emphasized. Unfortunately, at present barring a few exceptions, organizations do not take technical training/continuing education seriously. Flexible continuing education modules drawn up in consultation with industry will be useful and will also build bridges for enhanced academic-industry interactions. Short-term residential courses can be supplemented with distance education and web based follow-up lectures. These will be taken seriously by the participants if they are given importance by the top management and considered with due weightage in the employee's future career growth. In the workplace, a study by Purcell and colleagues (2002)[19] highlighted the particular importance some employers place on generic skills (such as communication skills and team-working). The findings of McQuaid, (2006) [15] suggest that professional qualifications, "soft" verbal skills and using speculative applications to employers were significantly related to job search success. Gracia, L. (2009)[8], has recognized, sandwich participation and employer's involvement in course design and delivery are positively associated with an occupation-based measure of the quality of initial employment found by graduates. The more number of researchers suggested the introduction of "Sandwich Courses" (also called "Co-operative Courses) under

which a student spends specified period alternately in an educational institution and in the industry. Each period of study in the institution is matched closely with the corresponding period of industrial work so that the entire course becomes a coherent composite of theory and practice. The system of sandwich courses is applicable to the training of various types of students e.g. degree course engineering students, diploma course technicians, craftsman etc. However, the pattern of sandwich course is changed according to the nature of training and the role which the student is likely to play in industry or in the socio-economic setup of the country on completion of education. Industry-oriented and practical programs are offered in selected polytechnics, developed into centers of excellence, i.e., Indian Polytechnic Institutes (IPIs) to meet the specialized demand for middle level supervisory technical personnel of manufacturing industries. In addition to giving an opportunity for diploma holders to obtain higher qualifications, this program also provided the much-needed multi-skilled manpower to industry. Such polytechnics, besides playing a leading role in strengthening the diploma-level education, are also acting as model institutions.

The important studies on the research problem in hand and their findings are summarized as under:

Table 3: Summary of the Literature Review

Year	Author	Findings/Suggestions
1936-37	Messrs. A. Abbot, and S. H. Wood,	Suggested a complete hierarchy of vocational and technical institutions parallel to that of institutions imparting general education
2008	Banerjee & Muley	Key factor in improving the engineering education in the country has to be a new model for industry – academia partnerships
2012	Dr. D.P.Gupta & Arvind Dewanga	The requirement for continuing education and skill up gradation of industry needs to be identified by industry leaders, professional bodies in consultation with academic institutes and engineering colleges.
2010	F. Elizabeth Gray	General dissatisfaction with regard to listening and speaking skills of graduates
2006	K.M. Mittal	Attentive listening (<i>samyakshravan</i>) is the true art of communication
2000 2001 1993	Albrecht & Sack, 2000; Henderson, 2001; & Simons & Higgins, 1993	Academia and practitioners agree that students' writing and oral communication skills are two major areas which need greater attention in the university curriculum
1995	Thomas	Questioned the real-world application of the texts and approaches used to teach business communication in higher education
2001 2007 1998	Henderson, 2001; Sin, et al., 2007; & Usoff & Feldmann, 1998	Considerable body of scholarship has sought to make informed recommendations to the curricular offerings at university level
2006	D'Aloisio	Argued for the need to relate university education to the specific communication competencies required in corporate work settings
2009	Saravanan	Students with soft skills like positive attitude, effective communication, time management, team spirit, flexibility, etc. have much greater chances of success in the tough corporate world compared to students who lack in them.
2002	Purcell and colleagues	Highlighted the particular importance some employers place on generic skills (such as communication skills and team-working) and personal attributes (such as resilience and commitment).
2006	McQuaid	Suggested pointed that professional qualifications and soft verbal skills are significantly related to job search success.
2009	Gracia, L	Recognized that sandwich participation and employer involvement in course design and delivery are positively associated with an occupation-based

		measure of the quality of initial employment found by graduates.
2014	Rao, M.S.	Identified that the students must review and reassess the requirement of the recruiters. He further revealed that those who are better equipped with hard and soft skills are likely to survive and succeed professionally.

Keeping the above studies in view and taking their thread forward, our study set out a few objectives directed towards the recruiters and Directors/TPOs to find out their perception on communication and behavioral skills, their importance, challenges before the institutions, hurdles they face and possible solutions to the problem.

TPOs /Directors perspective: The earlier studies on the subject amply pointed out that the skills are important for employability and the students in general lack these needed employability skills. We therefore need to assess the situation as it prevails at the institute level. The role of TPO/Director in contributing their views on the employability skills required by the industry becomes important to identify if there exists a gap in the perception of industry and academia. TPOs/ Directors primarily understand the industry expectations and arrange soft and hard infrastructure to impart skills as per industry requirements to engineering students. The engineering departments under TPOs / Directors supervision help students to align their energies and efforts as per the industry standards and expectations, thus minimizing the gap between the campus and industry. The TPOs / Directors therefore play a crucial role in understanding the industry requirements and crafting the soft skills curriculum to best groom the graduates in consonance with the industry requirements.

3. RESEARCH OBJECTIVES

The main purpose of the present study is to identify the challenges faced by engineering colleges in strengthening the communication and behavioral skills base of the engineering graduates required by the industry.

Table-4: Cronbach's Alpha and KMO Statistics

Cronbach's Alpha	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.
0.799 (N=24)	0.524

Table 2 shows that the value of Cronbach's Alpha is 0.799 which is greater than 0.7, a score that is accepted to indicate the reliability of the data. The value of KMO is 0.524 which is greater than 0.5 indicating that data is valid for factor analysis.

5. RESULTS AND DISCUSSION

The first set of survey with the industry HR Heads gave us a set of communication and behavioral skills they demand in engineering graduates. The survey revealed the following skills in order of their priority: active listening; proficiency in writing; effectiveness of verbal communication; reading and comprehension; presentation and oratory; leadership qualities; decision making and problem solving; organizational loyalty, ethics and integrity; working in teams; conflict management;

Specifically, the study has set forth the following research objectives:

1. To study the requirement of communication and behavioral skills needed from engineering graduates by the industry in jobs and businesses.
2. To understand the challenges faced by institutes in order to better train the engineering graduates in communication and behavioral skills.
3. To suggest ways for bridging the gap between the required and available skills in terms of curriculum and methodology/pedagogy.

4. RESEARCH METHODOLOGY

The proposed research work is exploratory in nature and relied more on primary sources of data to achieve the research objectives. A structured questionnaire was developed to get the necessary inputs from the industry and the Directors/TPOs of colleges to arrive at the conclusions w.r.t. the set objectives for the study. It is a study based on the viewpoints of 20 Directors/ TPOs of colleges and 55 HR/ Industry Heads selected randomly to get their viewpoints, on the skill requirement. The study also made use of secondary sources of data such as reports of various business associations/chambers/houses like CII, ASSOCHAM, FICCI, NITI AYOOG, Knowledge Commission and Ministry of Human Resource Development, to supplement or co-relate the findings arrived at by using primary data. To analyze the collected data, the study made use of appropriate statistical tools and software. We checked reliability and adequacy of the data by putting them through Cronbach's Alpha test and KMO Test of Sample Adequacy.

negotiation and persuasion; relationship building and networking; service orientation; positive attitude; time management; delegating work properly; flexibility and adaptability; social and emotional intelligence; innovation and entrepreneurial drive; crisis management; stress management; innovative and critical thinking; ability to understand and resolve problems; receiving and giving appropriate feedback.

Out of the above list of identified skills, the industry gives maximum priority to the following 5 skills and demands these most from engineering graduates:

- i. Ability to understand and resolve problems
- ii. Active listening
- iii. Crisis and stress management
- iv. Decision making ability
- v. Presentation and oratory

The next step, we took was to find out what the academia's perception was w.r.t the skills. So, we approached the Training & Placement Officers (TPOs) & Directors of Colleges regarding which skills they rank and perceive as the most important communication and behavioral skills their students must have for better employability. Curiously enough, all the 4 most important skills they feel their passing graduates must possess do not necessarily match with the top 4 skills the industry pays most attention to. That gives us the biggest cause of the skill gap or mis-match in the perception of industry and academia. The academia and TPOs feel the top skills to be imparted and/or possessed by graduates are:

1. Positive attitude
2. Verbal communication
3. Working in teams
4. Active listening skills

Of these 4 skills, (which Directors and TPOs think most important) the industry only has active listening skill as common to both groups. Except active listening that is common, it is clear that there is a difference in the thinking of how the necessary skills are perceived by the academia and what the industry actually wants.

That clearly leads us to answer the basic question as to why there is a gap. Obviously, when there is a gap as revealed by the conducted surveys, we now need to address how to bridge this gap. However, before knowing how to bridge this gap, we tried to find out the challenges that are faced by the institutions to effectively impart these required employability skills to the students.

5.1 Challenges Faced while Imparting Soft Skills

The study has identified the major challenges faced by the engineering colleges in the process of imparting the soft skills to students. The important challenges identified include:

The curriculum followed is not comprehensive enough to cover the different components of communication and inter-personal skills as discussed in this paper. This possibly is due to the fact that experts from industry are not involved in the process of curriculum design.

Today in most of the universities and institutes there are course(s) on communication & behavioral skills/life skills. But in all places these courses are not a compulsory part of the curriculum and in many are of audit course types and hence are neglected both by institutes and students.

Methods used by faculty to impart communication and behavioural skills needs serious re-thinking. Students from backward and rural areas have weak foundation for these skills and simple lecture methodology without active participation involving them into the process cannot give the desired outcome. Further, different components of soft skills can not be taught by a single method. A variety of methods i.e. Cafeteria approach have to be evolved and faculty have to be trained regularly for this purpose. So regular training and up-gradation of faculty on soft skills needs to be ensured.

Imparting of these skills to students requires sufficient time. Different subjects compete with each other for time in the curriculum. Therefore, the best way would be to create a fundamental environment for learning these skills – reading newspapers, participation in diverse activities like discussions, debates etc. Through this, learning would be automatic and only minimum external interventions would be required.

Another cause is that the trained and talented experts move on to the corporates for professional trainings or corporate trainings instead of being in the academia, largely due to better compensation and working conditions in the corporate sector than in academics.

5.2 Recommendations to bridge the skills gap

One of the important objectives of the present research is to answer the question as to how to bridge the existing skills' gap i.e. difference between what industry requires and what students' possesses. Important suggestions given by Directors/ TPOs to minimize the gap are as follows:

- To make learning more experiential and practical, there is a need to increase students' exposure to industry in the form of industrial visits, projects with industry and industry – institute interaction meetings.
- Imparting these skills through a well designed course which is a compulsory part of the curriculum by involving different stakeholders especially the experts from industry.
- There is a need to use innovative methods to involve students in the learning process. Methods like simulations, role plays, scenario writing exercises, presentations, projects and case studies from industries, which can all be used to impart these skills. Students' progression on soft skills should be continuously monitored and remedial classes must be arranged to meet the deficiency and thereby bridge the skills-gap.
- New innovative courses like entrepreneurship skills, digital marketing, team building, cross-cultural and interpersonal management etc. can be introduced to add to the skillbase of the students.
- Educational institutions should continue to develop partnerships with employers to advice on the skill needs for their students. With all of these partners helping, individuals can obtain the skills they need for engaging and getting well-paid work, with a progressive career to look forward to.
- There should certainly be a strong mentoring system in which every student has a dedicated mentor to help, guide and orient on their skill levels, map the target and the road to reach individual goals and create a thirst for learning and acquiring skills in each young and aspiring mind.

5.3 Barriers faced in order to cultivate and deliver better skill development

We also probed Directors/TPOs to know the constraints they face in imparting these skills to the students. The results are summarised as under:

1. The curriculum prescribed is so rigid that there is hardly any scope for adding, deleting or modifying it.
2. Limited availability of skilled and trained faculty having experience of working in industry.
3. Lack of management support to fund risk taking entrepreneurial ventures.
4. Un-willingness on part of students to learn these skills, as these are not part of regular curriculum.
5. Infrastructure related constraints - lack of special training & development cells with adequate training tools like psychometric testing tools, soft skills labs, research labs and personality testing labs., so essential for improvising soft skills of the students.

Table 5: Summary of Findings

Challenges	Barriers	Suggestions
Lack of comprehensive curriculum to cover these skills.	Rigid curriculum with no scope for addition, deletion, or modification.	Curriculum should be developed by involving different stakeholders especially the experts from industry
Courses on soft skills are not compulsory part of the curriculum.	Course on development of soft skills has to compete with other courses for its inclusion in the curriculum.	Imparting these skills through a well-designed course which is compulsory part of the curriculum.
Lack of use of innovative methods to teach these courses.	Lack of funding for entrepreneurial ventures by the institute .	More industrial visits, projects, and industry interactions. The curriculum must be practical and holistic, including use of simulations, role plays, scenario writing exercises, case studies and presentations.
Limited availability of time to teach these courses.	Infrastructure related problems- lack of special Training & Development Cell, Personality Testing Labs and Communication Labs with softwares.	Introduction of new innovative courses like entrepreneurship skills, digital marketing, team building, cross –cultural management etc. for additional knowledge and skills.
Non- availability of trained and talented experts having industrial experience to teach these courses.	Non - availability of trained and skilled faculty.	Engaging faculty having rich exposure to industry and strong base in soft skills.
Weak foundation of students to learn these skills in a limited time.	Students' unwillingness to learn as the course is not a part of regular curriculum.	Mentoring system to help, guide and orient every student on soft skills.

6. CONCLUSION

The results of the study reveal that the communication and behavioral skills required by the industry are not matched by the skills possessed by the engineering graduates. The study has identified the possible areas of intervention by engineering colleges to take remedial steps for strengthening the soft skills of the students.

Many factors contribute to the low employability of engineering graduates of which insufficiency of communication and behavioural skills are the most significant and important. The study indicates that adding one or more course(s) on communication and behavioural skills will not serve the purpose. The need is to create a conducive environment in the campus to support curricular and extra-curricular activities for holistic and automatic learning.

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