

Understanding the Needs of Engineering Students: With Reference to Communication Skills

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Abstract

Engineering students are often taught English and communication skills to help them become employable. But the syllabus is often decided by the institute or teachers with negligible inputs from the students. With this study the authors have attempted to decode the areas of lacuna in communication skills of engineering students in a premier institution of India. This paper aims to understand the needs of the engineering students with reference to listening, speaking, reading, writing, vocabulary and grammar skills. It also suggests solutions to devise teaching- learning methods according to the needs of the students.

Keywords- Engineering students; communication skills; listening; reading; writing; speaking; vocabulary

1. INTRODUCTION-

In India, for decades engineering and medicine are the two most desirable career choices for the young generation. The craze for acquiring a seat in a premier engineering college can be judged by the whooping 12 Lakh students who prepare and take the all India test for admission in some 77 engineering colleges. It is often assumed that a course of 4 years and a lucrative job placement in any multinational company will help a young mind not only find a foothold in the professional world but will also establish him/ her as a person with great technical acumen. With this dream in mind 12 lakh aspirants and their parents strive intellectually and financially to book a seat in one of the premier engineering colleges of India. This involves taking strenuous coaching often in another city, training for engineering admission test from the 8th grade, sometimes dropping a year or two to get admission and financially paying hefty fees to coaching class. After many such difficulties the students take the much awaited centrally organised IIT JEE for admission in some premier engineering institutions.

Once admitted the students are introduced to engineering subjects and basic applied sciences. But along with the basic science subjects, learning English has been made compulsory in all engineering colleges. English and Communication Skills have been mainly introduced to enhance the employability skills of the aspiring engineer. On July 15, 2014, 10.49 pm IST *Times of India* published an article with the heading, "Only 18% Engineering Grads are Employable, says Survey". The article further elaborated that,

Less than one out of four engineering graduates are employable, a survey has found. The third edition of the National Employability Report, Engineering Graduates - 2014, released by a private employability solutions

company, revealed that though 18.33% of the engineers are employable, 18.09% actually get a job. Of the 1.2 lakh candidates surveyed across multiple states, 91.82% lack programming and algorithm skills, 71.23% lack soft and cognitive skills, 60% lack domain skills, 73.63% lack English speaking and comprehension skills and 57.96% have poor analytical and quantitative skills. [1]

A number of such studies prove that Indian engineers lack knowledge of English language and communication skills. This often creates road blocks in their career and labels some as unemployable. Most engineering class rooms in India are often a mixed ability classes for the English teacher as the students vary from those educated in urban to rural areas, from English medium students to vernacular medium; who are admitted on the basis of their knowledge in Science and never in English. Yet, the industries expect a sound knowledge of technical

subjects and good communication skills in English. To achieve this balance English has been compulsorily included in the curriculum in almost all colleges. A set syllabus often awaits the students who study it for one or more semesters to pass the course. In a number of cases the syllabus is designed without the consent of the students or without doing a thorough study of the needs of the students or the expectations of the industry. NIT Surat where this study was conducted is one of the premier engineering colleges of India which ranks as the 47th best engineering college of the country in National Institutional Ranking Framework of 2021 (NIRF). It offers 6 branches of engineering education at the graduation level where students are admitted after securing the required rank in IIT JEE mains. Students from all regions of the country take admission and join NIT Surat irrespective of their language. The medium of teaching and examination is English which makes it compulsory for all its students to use this language. The levels of difficulties of the students have never been understood and the variation in their individual competencies in this language often makes them alone in the crowd. Hence, in spite of their excelling in STEM subjects, which is evident by their admission in NIT, these students feel a lack of confidence and believe that they fall short of something extremely important for a successful career. This study was conducted by two English teachers who were teaching these students of and perceived an unspoken discomfort in some students, but were unable to identify the problem area in the mixed ability class. Hence, after a few discussions they realised multi-level language learners in their class had their specific individual weaknesses.

2. OBJECTIVE OF THE STUDY-

The main objective of this study is to understand the major weakness in their usage of English language. Taking Listening, reading, speaking, writing, vocabulary and grammar as areas of language acquisition, this study was conducted to find the weakest area and later suggest for emphasis in increasing activities and teaching in that area.

3. STATEMENT OF THE PROBLEM-

Since English is the mode of instruction in engineering colleges, it has been observed that most of the students are not competent enough to understand the syllabus that is devised for them in their technical subjects as well as the subject of English and Communication Skills. A number of the students are from that group who have had no access to English speaking and reading as they have been educated in their mother tongues. The syllabus of the engineering colleges should be framed by keeping in mind the needs analysis of the students who are going to study it. If the language competence of the students is analysed, it will be easy to impart technical knowledge to the students and will help them in refining their language skills. Based on this evaluation it becomes easy to devise innovative teaching methodologies that are appropriate for various age groups. The students in the classrooms face issues related to the English language. Many students don't understand the language, some are not aware of the vocabulary used by the faculty, many of them do not have exposure to the English language itself so they are totally clueless about what is going on in the class. Some students who have little exposure to the English language are not able to either speak it fluently or understand the technical terms related to a particular subject. These students feel depressed during their classes and do not gain confidence over the subject as they do not understand what the faculty speaks.

In the present day scenario it becomes difficult for the engineering students to learn speaking skills in the classroom. Most of the theory classes which are carried on through lectures have little scope to give the students a practice of speaking. Speaking sessions can be conducted during practicals / tutorials but due to lack of facilities like insufficient seating arrangement, headphones for every student, lack of a software for language labs are an impediment to this. Even if a teacher decides to organize reading sessions for practice but due to time constraint and a pressure to complete the syllabus does not make this feasible. The sessions for writing will be beneficial only if a teacher takes extra efforts to identify the common errors which a student makes in assignments and get it duly corrected by the teacher in the free time. Getting the feedback from peers is one of the techniques through which students can be encouraged to rectify their errors.

Thus it becomes evident that the four skills –LSRW – Listening, Speaking, Reading and Writing are very important for the students. A syllabus that fulfils all the requirements of LSRW should be devised. Through a survey we have tried to analyse the issues which engineering students face while learning English. After graduation these are the students who will be professionals in their technical fields, hence it is mandatory for them to learn and train themselves in the field of LSRW.

4. OBJECTIVES

1. To discuss the LSRW skills of students.
2. To identify the area of deficiency in engineering students.
3. To propose a revision in the existing curriculum by catering to the needs of the learners.

5. LITERATURE REVIEW-

Stressing upon the importance of English Language in the career of engineers Marc J. Riemer in his journal article “English and Communication Skills for the Global Engineer” published in Global Journal of Engineering Education, remarks, “Engineers can relate the same theories of Mathematics, of Mechanics and Technology, but the modern engineer must also be able to communicate effectively in a shared tongue. This is especially important given that engineering projects are now planned and implemented across national and cultural borders” [2]. He further argues that engineers need to work in international and transnational projects where English will be the major language of communication in business, science and technology. “In this age of globalisation, the number of international projects is increasing, and cross-cultural communication and collaboration is on the rise; this is particularly so for the now international practice of engineering”[2]. He also elaborates that teaching English to engineers can be challenging as “the content, methods and techniques[2]” have to be judiciously decided as the aim is to develop professional skills through the medium of communication skills in English. It becomes imperative for the teacher to plan, prepare supplementary material according to the level of the learners. Riemer opines that oral communication and presentation skills can be considered essential requirements for global engineers. He suggests using peer review and technology to enhance presentation skills. Apart from these he suggests role play, active involvement of the learner, team building exercises and most importantly emotional intelligence to be incorporated in the classroom process of facilitating communication skills of the engineers[2].

Marc J. Reimer in another article titled, “Communication Skills for the 21st Century Engineer ” adds a few other prerequisites for aspiring engineers. He adds listening skills, written communication skills, visual communication skills, interdisciplinary communication, emotional intelligence and empathy in the development of communication skills of the engineering students. But the focal point of his article remains “the necessity for effective English communication skills for engineers in the current globalised environment. A course in English for Specific Purposes (ESP) will enhance English language training and an engineering student’s communication skills” [3]. He emphasises upon the importance of preparing engineers for projects and workplaces which are international. In this he feels ESP will help in the “globalisation of education and internationalisation of practicing engineers” [3].

Mane Varsharani Shamrao in her paper “Importance of English Communication for Engineering Students from Rural Areas and Its Remedies” insists upon the importance of English language for engineers’ career and has identified some of the problems faced by students from rural areas of India. According to her, the socio-economic background of the student determines his/ her education as students with illiterate parents are mostly the sufferers. Besides, she considers lack of good English teachers and the flaw in the education system which focuses mostly in developing the reading and writing skills of the students, to be the other major reason for problems of engineering students in communicating in English.

She suggests a number of recommendations like: “Increasing the student talk time more than the teacher talk time”[4]; teaching functional grammar; providing technical dictionaries to students; using CALL and encouraging students to read journals, newspapers etc.

Reddy et al. in their conclusive paper, “Having Effective Communication Skills are Indispensable for the Successful Career of Engineering Students” state some problems in communication of engineering students without specifying the region or nationality of the engineers. In a generalised way they enlist lack of confidence, exposure to English, fear and psychological pressure as some of the reasons of poor communication skills of engineers[5].

In most of the countries where English is a second language the realisation of its importance in an engineers' life has led to many experiments and research. Teachers and researchers have studied and are recommending ways and methods to equip engineers with good communication skills in English. Even in countries where English is the first language, the importance of communication skills in English in the career graph of engineers, has led to many studies to identify and develop the problem area out of LSRW.

Halizah Awang, Zawawi Daud through their study have tried to prove problem based learning as a way to improve communication skills of the engineering students in Malasiya. According to them, "the combination of

communication skill and technical abilities will enable the students to be ready for industry needs when they graduate"[6].

Pia Lappalainen in her paper, "Communication as part of the engineering skills set" feels that with workplace becoming interdisciplinary and global engineers too have to be "adept in communication, collaboration, networking and lifelong learning, feedback provision and reception, teamwork, lifelong learning, and cultural understanding" [7].

In his paper "the importance of communication in the workplace" Alexander Choren shares his own experiences and stresses on the importance of being a good communicator. He adds, "You can be the best engineer in the world, but if you can't clearly explain your work, share your development process, and communicate your reasoning, you're of little value to your employer"[8].

Mohanty's [9] paper highlights the emphasis of good communication skills in the global market. It also provides an effective argument to stress how soft skills result in personal grooming and efficiency and productivity.

Hence in a number of countries communication skills of engineers is seen as a necessity and in order to make them employable for the global workplace, efforts are being made to develop their proficiency in English and Communication skills.

6. NEED ANALYSIS-

The above literature collected and analysed shows that the lack of communication skills in engineers has been identified as a problem by the researchers across the globe. Various methods and experiments have also been conducted to improve the proficiency of engineers. However, there is a clear dearth of studies which explore the needs of the students. Engineering classrooms usually have multiple competency levels, therefore without understanding the needs of the students, a remedy or method to improve communication skills will only mean imposing recommendations on the basis of the teacher's analysis and conclusion. Hence this study was conducted to understand the problem areas of the students, from the students.

7. METHODOLOGY-

This section highlights the method which has been chosen to conduct the survey on the lack of LSRW, Vocabulary & Grammar in the engineering students at SVNIT. The method is a questionnaire-based survey. The questions are designed in simple language so as to make the students clear and specific about their answers. The survey was conducted in a natural way, i.e during the classes of English & Communication Skills.

8. STUDENTS SAMPLE-

The questionnaire based survey was conducted with one of the divisions of B. Tech. The class was a mixture of students ranging from Gujarat, Maharashtra, UP, Bihar, J & K and many other states. On discussing with the students it was found that they genuinely faced a problem with the language and were finding ways to learn it.

They were from different branches like Mechanical, Civil, Computer & Electrical Engineering. First, all objectives about the survey were explained to the students. A watch was kept over them while they were filling the answers to the questions. The class took around 10 minutes to fill the questionnaire. Many of the students were excited about it as they had begun to understand the importance of the English language during their class of English & Communication Skills. They realized that knowing English holds great importance for their future. After the collection of the questionnaires many of them who had studied in vernacular medium discussed their problems like incapability to speak English fluently, lack of vocabulary, hesitation to speak due to fear of making mistakes and inquired about the steps to improve themselves. Questions were based on Listening, Speaking, Reading, Writing, Vocabulary & Grammar. They were designed to highlight the lacunas in the above 6 skills. Every skill had a question which had to be answered by the students. The aim of this question-based survey was to acquire the information with reference to the problems faced by the students in all 6 skills.

9. SAMPLE & NEEDS ANALYSIS

This section focuses on the research observations based on the questionnaire based survey among the sample of the 1st year B. Tech students. The questionnaire had 6 questions targeting the skills of Listening, Speaking, Reading, Writing, Vocabulary & Grammar. Each question was measured through the Likert scale based on 5 variants. The sample of questionnaire of the survey is attached below:

Sr. No	Evaluation Component	Question	Never	Sometimes	I am not sure/ I Don't know	Most of the time	Almost Always
1	Listening	Are you able to listen and understand any speech in English?					
2	Speaking	How confidently can you speak in English?					
3	Reading	Can you easily read and interpret/ understand any text written in English?					
4	Writing	Can you draft a paragraph on any given topic in English without making too many errors?					
5	Vocabulary	Are you able to speak in English without being short of words?					

<https://www.gapinterdisciplinaries.org/>

6	Grammar	Are you able to make sentences without making grammatical errors?					
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As can be seen in the sample questionnaire, the students were provided with a questionnaire to state their individual level of comfort/ discomfort in listening, speaking, reading, writing, vocabulary and grammar usage of English language. On a scale of 5 ranging from- never, sometimes, not sure, most of the time and almost always, they were asked to put a mark stating their individual assessment. The questionnaire was kept anonymous without any other probing questions.

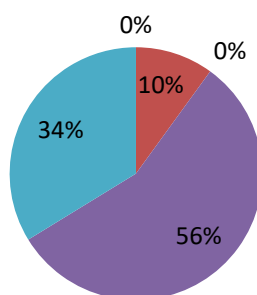
10. OBSERVATION- THE OBSERVATIONS RECORDED ARE AS FOLLOWS:-

Listening

In the first question where they had to answer whether they “are able to listen and understand any speech in English?” 56% of the students said that they can listen and understand what is said in English most of the time. As can be seen in Graph 1, none felt that English was incomprehensible to them and 34% were confident that they clearly understood when spoken to in English.

Listening

■ never ■ sometime ■ I am not sure
 ■ most of the time ■ always



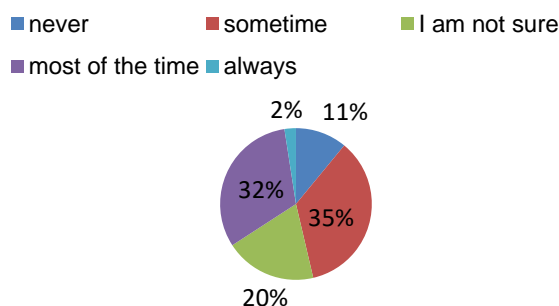
Particular	Total	%
Never	0	0
Sometime	8	10
I am not sure	0	0
Most of the time	45	56
Always	27	34
Total	80	100

Graph 1. Listening

Speaking

As for speaking skills, the researchers were surprised to find a mixed response as only 35 % felt that they could sometimes speak confidently in English, whereas 32% said they could speak confidently most of the time. A shocking 2% said they could always speak confidently while 11% honestly stated that they were never comfortable and confident. Interestingly, 20% of students were not sure of their speaking skills in English.

Speaking



Particular	Total	%
Never	9	11
sometime	29	35
I am not sure	16	20
most of the time	26	32
Always	2	2
Total	82	100

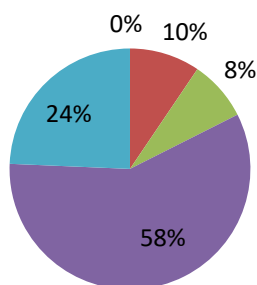
Graph 2 Speaking

Reading-

Reading skills are important for technical education, yet only a shocking 58% of students admitted that they could easily read and understand the text written in English and only 24% could always read and comprehend in English language. While only 10% of students admitted to their problem and accepted difficulty in reading and understanding in English, None of the students felt that they could never understand a text written in English language. Only % were confused and said they were not sure.

Reading

■ never ■ sometime ■ I am not sure ■ most of the time ■ always



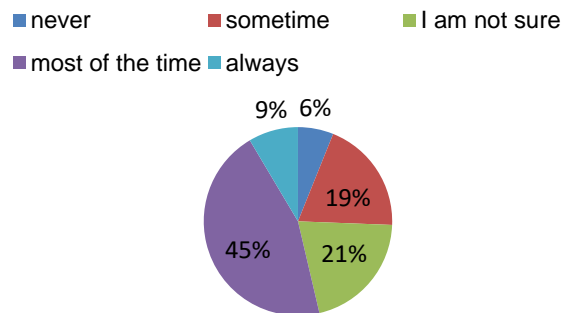
Particular	Total	%
Never	0	0
sometime	7	10
I am not sure	6	8
most of the time	43	58
Always	18	24
Total	74	100

Graph 3 Reading

WRITING-

Only 9% of students were confident that they could always write a paragraph on a given topic without any help. 45% said they could do it most of the time while 6% students admitted they could not write in English without any help, and 19% could sometimes.

Writing



Particular	Total	%
Never	5	6
sometime	16	19
I am not sure	17	21
most of the time	37	45
Always	7	9
Total	82	100

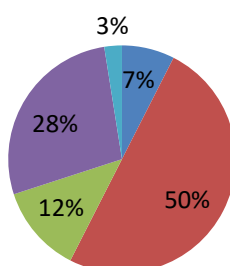
Graph 4 Writing

VOCABULARY-

Finding the right word to express oneself is important for good communication skills. The results showed that 50% of students felt they lacked adequate vocabulary and found themselves short of words. Surprisingly, only 3% never found their vocabulary limited while 7% students were clearly dissatisfied with their limited vocabulary. 28% were happy with their vocabulary as they could find the right word most of the time.

Vocabulary

■ never ■ sometime ■ I am not sure ■ most of the time ■ always

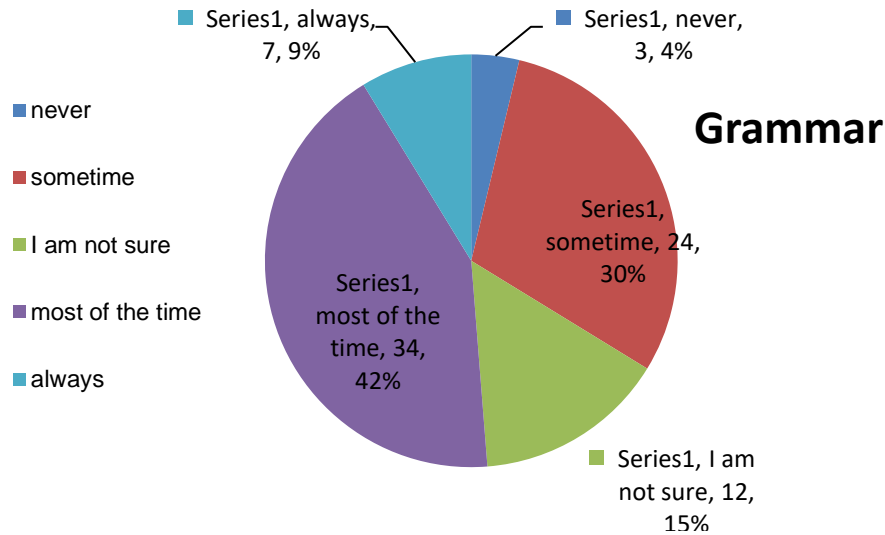


Particular	Total	%
Never	6	7
sometime	40	50
I am not sure	10	12
most of the time	22	28
Always	2	3
Total	80	100

Graph 5 Vocabulary

GRAMMAR-

English grammar did not pose difficulties for 42% students who could make sentences without any grammatical errors, while only 30% could sometimes do so and 15% were unsure. 9 % students were always confident of their language and 4% felt they could never make a sentence without any error.



Particular	Total	%
Never	3	4
sometime	24	30
I am not sure	12	15
most of the time	34	42
Always	7	9
Total	80	100

Graph 6 Grammar

11. CONCLUSION-

The findings of the study indicate that engineering students have different language competencies and weaknesses that need to be addressed by modifying the syllabus. The existing communication skills syllabus focuses more on the writing and examination related preparation. Hence the syllabus fulfils only the partial requirement of the students. The below mentioned needs are to be addressed immediately in order to improve the level of communication skills of engineers.

The researchers drew the following conclusions from the findings of the study:-

The aim of teaching English and communication skills to engineers is to equip them to communicate and handle tasks in workplaces that are now global. The analysis of the study shows that the syllabus and the teaching learning process partially fulfils this aim as it concentrates largely on writing skills and preparation for examination. Thus there is a need to modify the syllabus and the evaluation pattern.

Since students are from different linguistic, economic, and school backgrounds their language learning aptitude also differs. Some students who have studied in English medium schools in urban parts of the country pose a competition for the other students from rural backgrounds or from vernacular medium schools. The same syllabus cannot fulfil the needs of all students.

The pre designed syllabus aims at improving all four skills of the learners without understanding the different needs of the learners.

Proper need analysis of the students to understand their different abilities and weaknesses will help in designing a syllabus more suited to maximum learners.

The findings show speaking as the biggest weakness for most of the learners. These students who have outperformed thousands of other students to get admission in English lack the confidence to speak in English. Their confidence and performance suffers due to their hesitation in speaking in English.

As can be seen in the findings the students are comfortable in reading and comprehending a text or a document in English. They are also at ease with listening to lectures, discussions or instructions in English.

The results of the survey also show that writing skills have been reasonably developed in these students as most are accustomed to writing in this language while the others learn basic technical writing through practice. Although writing and grammar are not an easy task- it was not seen as a major problem area by most of the students. Interestingly, a whopping 42% were happy with their English grammar knowledge in written communication but were not confident about their speech.

Another reason for their lacuna in speaking skills is their lack of adequate vocabulary. Their limited vocabulary restricts them from expressing their ideas, thoughts and emotions clearly and effectively. Fluency remains a weakness for most of the students as they are not accustomed to use English in their day to day life.

Looking into the needs of the students the syllabus has to be re-designed so as to focus more on developing speaking skills as stressing mostly on writing for assessment simply trains students for the skills they have already been taught.

The researchers also suggest including communication related games, role play, discussions, and presentations in the syllabus.

Even vocabulary developing exercises should be inducted in the syllabus so that special efforts can be made to learn and enrich their language.

The findings reveal that the students have a clear idea of their weaknesses and requirements. If more emphasis is given to develop their speaking skills and if the teachers personally help them overcome the speech-related weakness, the students will gain self- esteem and will be confident in facing interviews, irrespective of their linguistic or economic or school background.

12. RECOMMENDATIONS-

As the majority of the students have a problem with speaking skills, the following steps can be taken to overcome and reduce them.

There should be more activities where students come forward and speak before the class. Interactive sessions can be conducted within groups so as to encourage participation of each student involved in the group. JAM (Just a Minute) sessions should be conducted for the students so that they have a grasp of diverse topics and are able to practice speaking through them. The students who cannot speak should be encouraged to speak without any bias towards them. Role plays can be organised while teaching. Short videos of Ted talks can be shown to students and then each student can come forward and summarise whatever they have understood. Presentations can be conducted to enable them to be effective in their speech.

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