International Journal on Arts, Management and Humanities **1**(1): 1-6 (2012)

ISSN No. (Online): 2319 – 5231

Communication Skills for Engineers in Global Arena

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ABSTRACT

As globalization and competitiveness become the benchmark of any MNC, it becomes obviously important for employees to be equipped with good communication and soft skills. Therefore engineering graduates require an ever increasing range of skills to maintain relevance with the global environment of the era. Increasing pressures and challenges arising from the broadening roles of engineers has enhanced the need for the Indian engineers to acquire good English communication skills. Good English Communication Skills are a vital element of an engineer's profession and the lack of such skills only undermines the image of an engineer. A number of engineering faculties in universities fail to address this need for the introduction of such courses. There is a growing expectation that universities should directly meet the needs of industry standards and deliver global engineers who are not only competent in technical skills but also in non-technical skills such as communication skills. In the present scenario professional engineers certainly need effective and impressive communication skills. There is a great need to frame course material and develop methods and strategies to enhance various skills of communication of engineering graduates. This paper reviews the importance of these skills for engineers with an emphasis on how such communication courses can be designed and incorporated into the engineering curriculum. The different methods of teaching communication skills and its assessment are discussed in the paper for enhancing communication of technical students.

Key Words: Communication, Engineering curriculum, Strategies.

INTRODUCTION

To be successful in any field one need to know and understand how to communicate effectively. Communication is the most important function a human being performs in his/her life .Communication like birth, death growth and decay is a part of individual life as well as organizational existence. Its importance is self-explanatory and is an experience of all as well. Communication skill is essential for an Engineer who aspire to carry out his professional practice in the global arena. The rapid globalization of the world's economy has placed a significant impact on the way Indian engineers work. The role of engineers in society is changing and places new pressures and demands on engineering faculties in the Universities around the world. Engineering education requires a more outward look with the ability to produce graduates who would be able to lead the engineering profession with its increasing pressures and challenges arising from the broadening roles of an engineer. Engineers are required to perform not only in technical capacities but also in the non technical capacities.

Engineering communication skills basically constitute several core elements such as the fluency in English language and the fundamentals of visual communication. Evidence indicates that communication skills have helped humankind develop into the advanced societies. However, these skills have become stifled in the very discipline that has brought so many advancements, and that is engineering. There is ample evidence that graduate engineers lack the required standard of communication skills, particularly when compared to the needs of industry internationally [1, 2]. This can also be determined when considering related disciplines offered at universities (eg business). The

Dean of Engineering at Duke University stated that: *engineers who are adept at communications have a considerable advantage over those who are not. (3).*
Furthermore, this lack of communication skills only serves to undermine the whole profile of the professional engineer.
Globalization directly influences industry's needs; a global engineer must be able to easily cross national and cultural boundaries. This in turn directly affects engineering education. A common code for communication is required. Those education institutions, which meet the language requirements for the new global engineer, will be ready to face the new millennium.
H.P. Jensen states that employers want:*a number of new competencies, with an emphasis on an increased ability to communicate…and good foreign language skills* [1].
This is reinforced in N. Grunewald's study of competencies required by the *engineer of tomorrow*, which includes hard skills like good foreign language skills. He goes further to claim that cross-disciplinary language skills are not sufficiently taught [2]. This indicates a lack of a direct fit between graduate skills and those required by industry. 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.

Need of English communication skills
There is a clear 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. It will also aid in the globalisation of education and the internationalization of practicing engineers. The English language has become a major medium for communication across borders globally; a deficiency in this area may result in barriers for graduates' professional development. ESP focuses the learner's attention on the language and communication requirements in a particular professional field. The concept of ESP achieves more in the education of engineering students by focusing the learner's attention on the particular terminology and communication skills required in the professional field.. Teaching English to engineers is a delicate and demanding matter in terms of content, methods and techniques, and deciding which are appropriate for this particular area of engineering and English. That is, the aim in such an interdisciplinary course is to develop and master relevant communication and professional skills, using English as a means and a kind of mediator in shaping future engineers. To achieve this goal, ESP teachers have to plan the course they teach and provide the materials for it.

COMMUNICATION SKILLS

A report from Melbourne, Australia, stated that employers now seek graduates with skills beyond the standard paper degree; this includes an excellent level of skills in:
Communication
Decision-making
Teamwork
Other areas identified in the report included competencies in business acumen, marketing and public relations. Having the knowledge was not as important as getting the work done in the most effective manner. Employers gave considerable value on graduates acquiring a diverse set of skills in differing work environments [4]. However, the report also found that most graduates felt that they had gained analytical and problem solving skills, subject-specific knowledge, research and improved decision-making abilities through their degrees. Yet despite this, much fewer felt that their Graduate degree provided:

- Oral communication skills.
- Awareness of the social implications of their discipline's developments.
- Management skills.
- Understanding of others some of the methods point of view and other cultures.
- Confidence and competence to work in international environments [4].

Notably, oral communication skills were considered very important in the graduates' new work environments, but this was in the face of the low level of oral communication skills imparted during their studies. However, neglecting learning opportunities can engender a shallow level of understanding in the graduate if see the broader picture. The burgeoning importance placed on oral communication skills by employers has been echoed internationally for a decade or more and across disciplines.

Knowledge and technical know-how are clearly important, but these must be presented with an excellent standard of communication skills, particularly oral. Indeed, oral communication and presentation skills are considered one of the best *career enhancers* and to be the *single biggest factor in determining a student's career success or failure* [5]. Their relevance was emphasized recently with the statement that:
Skills such as problem solving, communications, interpersonal skills and critical and independent thinking should be fostered in engineering education, not just because they are qualities that employers look for but because they should be part of any tertiary education(6).

DEVELOPING COMMUNICATION SKILLS

A review of literature indicates that oral communication has been identified as a *learnable skill* [5]. Furthermore, communication skills development has been demonstrated through the use of various methods such as class discussions and others. While the study of famous speeches, learning oral communication theories and techniques from textbooks will still be beneficial, it should be noted that the literature has indicated that experiential methods have generally yielded better results than purely didactic means. Some of the methods are discussed here for enhancing communication skills in a more practical way.

Presentations

A recent research found that 78% of a sample of practicing engineering graduates stated that they were required to give oral presentations as part of their work, and quite often this was on a regular basis. Group projects and presentations encourage and enhance the interpersonal skills of the student members and should be emphasized early in the education curricula. This should be considered in particular as teamwork is recognized as a core skill in industry, and communication with team members needs to be effective. Presentation as a group task enhances interpersonal skills. Nowadays business organizations pay attention on presentation skills of a professional.

Role-play

As knowledge of communication theory does not necessarily parallel skills in practice, it is important to immerse students in similar work environments. Context-specific enactments, or role-play, can focus the student's attention on the different types of communication required with various groups in potential future work situations. By engaging the students directly in active learning, they learn *by doing*. It is important to utilise pseudo environments to simulate meetings with clients/developers/peers/etc, as this will also allow students to interact with different levels of technical intensity, as well as engaging in non-technical communications. Oral communication skills are needed not just for internal company matters, but also when dealing with external issues.

Peer Review

Peer assessment has been shown to provide many advantages and disadvantages. Advantages include getting students to think about the exercise more deeply, recognize others' viewpoints and how to give constructive criticism to peers. Disadvantages include potential bias, reluctance to give low marks for poor work from their peers and the need for clearer guidelines. However, such disadvantages can be countered by utilising group-based marking, rather than individual, increasing marking guideline specificity, and limiting the impact of the peer review exercise with regard to the overall unit grade.

Video

Video/audio grading shown to be improve presentation skills in students, with one prime example given where student presentations were filmed and then graded with dubbing from the teacher and a feedback sheet .Importantly, this provides relevant educational feedback to the student so that he/she can actually see and hear the positives and negatives of his/her presentation.

Modern Technology

Current technology should be utilized, or at least demonstrated to the students, so that they are aware of what is in use beyond the university walls. The Irish study cited earlier found that instructors in communications need to review and update methods due to the rapid advances in communication technology [7]. It is expected from the practicing engineering graduates that they have the knowledge of basic MS Office applications , as well as other technical elements including Web page design, e-mail and graphic design, Word, Excel and PowerPoint, and these were the prime tools utilized in oral presentations.

Global Elements
With globalization becoming commonplace also with engineering work graduates need to have an understanding of international communications. This includes aspects such as implicit language and cross-cultural idiosyncrasies, or risk being isolated, and is particularly relevant in dealings between native English speakers and non-native English speakers.

Active Involvement of the Learner
Littlewoods put forward several elements that, importantly, involve the learner in order to reinforce learning. These four parts are:

- The classroom must be conducive to communication and learning.
- Learning has to be relevant to learners' interests and needs.
- Both processes and products are important in the classroom.
- Learners must engage in active roles in the classroom.(8)

Engaging learners will help facilitate and stimulate effective and purposeful learning by the students.Involving the learners directly, in particular, will engender a stronger sense of responsibility in the future graduates that they can take beyond the university and into the work arena.

The Fun Factor in Education
There is not much fun but rather a great deal of stress in engineering education. Many students fail to turn up to classes because they ultimately become dissatisfied with the style of the lectures, strongly suggesting that the students fail to see the relevance of attendance and, at times, the relevance of the topic being taught. Many engineering students are not especially motivated to learn certain subjects, primarily because they have no real idea why they may need all this information. They also do not know whether all of the material is actually required for their career.

Team-teaching Collaborations
Team-teaching collaboration between a subject expert and an English language teacher can be employed for the benefit of learners who will make the most of this integration. The synergy from team-teaching can significantly improve the written and oral communication skills of most students, particularly presentations and report writing, and that it generated a positive experience for all with a focus on students' needs and interests.

Designing a New Curriculum
Changes in the engineering educational process will lead students to participate in communicational development courses and the engineering faculty to focus on the need for a broader set of educational competencies to cope up with the changing educational culture. For the Engineering faculty these changes involve the use of new educational teaching methods for the course, and ways in which the faculty can help students to increase their ability in enhancing their communication skills in English. There are various ways to develop communication skills in the Engineering departments for the students.

- The Engineering faculty should embed into its curriculum, courses in communication skills to help students with their communication abilities. The subject should be made compulsory to all engineering students in order to ensure their active participation in learning English as a valuable tool in the Engineering curriculum.
- While designing the course, it should be recognized that students generally tend to avoid signing up for such courses mainly because of their hesitation towards attending a course taught in English and the failure to see the relevance of the course and how it might help them in future. Hence the Engineering faculty should try to highlight the importance and relevance of learning such skills in the global arena. CEOs and eminent engineers from the corporate sectors should be invited to give talks and to impress on the students the requirements and challenges of today's engineering profession and the roles that they will be playing. This will give the students a better understanding on what is expected of them and a general overview of their work profiles in future.
- The course should provide a forum for interactive learning. It should demand a high level of person to person communication and interaction that centered on the challenges of real life contextual communication. Lecturers will have to play an integral role in designing successful, active learning environment. When designing the topics, a *situative* approach should be used. It emphasizes that the educational process should be linked directly to real life situations in context. (Greeno, Collins, & Resnick, 1996). The *situative* approach characterizes a

student's development as a social learning experience and process which gradually increases with the desire to participate and his or her feelings of acceptance and belonging in the situation.
Through this the students can experience the fulfillment of expressing themselves and understanding others.

- The teaching abilities of the staff should also be monitored. Staff from an engineering background who have the skills and knowledge to teach communication skills courses would be able to provide a valuable opportunity for the students to learn communication skills from an engineering perspective. It is however essential to confirm that the staff recruited have the required levels of English ability upon selection.

ASSESSMENT CRITERIA

Communication skills have been identified as multidimensional and so it becomes crucial to classify how they will be assessed in the students' work. Furthermore, the particular communication skills required in a profession are usually poorly defined. One study identified that communication skill assessment must:
*Be formal so that it occurs at specific times and contributes to a student's marks.
*Provide feedback to be educational.
*Involve active participation by students in actual communication situations.
*Tackle student insights so that skills are identified and developed.
Individual feedback is important for improving the education of students. However, there needs to be prudent identification and clear operational definitions of the rating dimensions so that the same standards are applied to all students: consistency and accuracy. It is vital that the student understands what is expected and what will be assessed ahead of time to facilitate education, learning and the generation of desirable characteristics, thereby delivering formative (feedback) and summative (evaluation) assessment. The oral communication element also needs to fit in well with the subject at hand. Student self-assessment was utilised in the study at Monash University, allowing for students to displayinsight into what was expected of them and their own strengths and weaknesses. The assessor would also provide feedback to this self-assessment This would also give students the opportunity for reflection

CONCLUSION

Neglecting the learning opportunities in communication skills at the university level can lead to a shallow level of understanding in the engineer, if he or she does not see the relevance and application of these skills in engineering profession. These skills should be acquired within the four years of an engineering education at the university. As discussed on how best to teach these skills or conversely how students can most effectively learn these skills, a *situative approach* of teaching has proven to be successful in enticing the engineering students to participate and contribute in lectures. The *situative approach* emphasizes that the educational process be linked directly to real life situations in context. Bringing real world practices into the engineering curriculum through such English communication programmes will expose the engineering students to have a broader vision.
The incorporation of communication skills courses in English for engineers at the universities is becoming an essential element of continuous learning.. The aim has been to develop good English communication skills abilities in its engineers. The goal of developing communicatively competent users of English, , can be realized effectively if elementary schools, junior high and senior high schools and universities take the initiative in improving the educational system in respect of English education from their respective positions. The incorporation of language and communication improvement courses is an important element of continuous learning, and will ultimately contribute to the process of life-long learning. This should in turn facilitate advancements in engineering and, indeed, engineering education through streamlining fundamental communication skills.

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