

# Importance of Communication Skills in Engineering Education

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**Abstract:** Each year, universities across the world award engineering degrees to thousands of undergraduates in their chosen discipline. At some point, these talented, intelligent young men and women are expected to move into industry (or higher education) and display the skills and abilities in mathematics and the physical sciences they have worked so long to attain. Despite numerous papers written and many presentations made throughout their college career, many of these people will not be able to communicate their engineering skills via communication.

This article seeks to highlight the importance of communication skill in engineering education. Making use of recent literature with regard to the subject, and examples of less-than-adequate writing, the case will be made that some premium should be placed on communication skill as a means of better preparing students to function in today's competitive world.

**Keywords:** communication skills, engineering education, discipline, english.

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## Introduction

Industry today wants engineers who are not only technically proficient, but who also can speak or communicate well. An engineer might interact with technology all day, but that doesn't mean he has no interaction with other people. He communicates with other engineers, with team members outside of engineering and often with customers as well. Within engineering, effective communication makes it possible to transform requirements into the best possible working or workable solutions. Outside of engineering, effective communication makes it possible to verify the team is working on all of the right requirements, and to ensure the resulting solution can, in fact, be implemented. While all engineers should have good communication skills, global engineers face additional challenges, making effective communication an imperative.

A number of studies have focused on this precise question and the findings of those studies indicate that communication skills are extremely important to the work of engineers, more important than many realize.

Various surveys show that "process skills" are more important than technical knowledge to working engineers. A study, conducted by several engineering faculty at Northeastern University, examined the responses of 133 Northeastern alumni who graduated in mechanical engineering technology, electrical engineering technology, and computer technology. The respondents felt that in general, "the areas of greatest importance [to engineers] are problem solving, accomplishing tasks within the organization, teamwork, oral communications, professional ethics, writing skills, and use of personal computer tools." (The least important areas were differential equations and basic engineering areas, like thermo/fluids and materials.)

Similar studies conducted at Delhi University, IP University, and the Netaji Subhash Institute of Technology have arrived at similar findings. Problem solving is considered the most important skill, but secondary to that are teamwork, communication (oral and written), and management skills. One curricular conclusion from the Northeastern study was that the engineering curriculum should focus more on design projects, lab reports, and also on group reports—as effective assignments for incorporating a number of these valued process skills.

According to Lang et al., engineering is a rapidly changing field requiring a broader set of skills than was once thought necessary in the engineer's college education:

The engineering environment has changed dramatically. International competition, the shift from defense toward commercial enterprise, and new technologies have restructured the industry and altered how engineers practice engineering. William A. Wulf, the President of the National Academy of Engineering, defines engineering as “design under constraint.” Increasingly, engineers must supplement technical mastery with business and communication skills, and an understanding of the ethical and societal impact of engineering solutions.

The reasons for our poor grasp of the most important communication skill is that it’s hard. Not accounting for the fact that we think faster than someone else can speak, we have the added challenges of multi-tasking, calling the subject matter “boring”, or listening only for facts versus the entire content or ‘reading’ the speakers body language. Overcoming this challenge is difficult. Without mental preparation before a scheduled meeting or telephone call, or the conscious thought to concentrate on what you are hearing, it’s nearly impossible for you to leave an engagement with tangibles. The guess is that you often face the same situation.

Building a capability and capacity to truly listen is an art and it’s essential if you have aspirations of success. The quality of our relationships, ability for solving problems; for generating business; for overcoming difficulties; or for initiating new opportunities all require high fidelity listening skills. Add to this any communications that’s cross-cultural and the need for Herculean listening skills is amplified.

Communication skills are absolutely essential to our existence and they are the foundation for our success. If your skills are lacking, begin first by focusing on your listening skills. Strengthen these and you’ll be in a very solid position.

“Better to remain silent and be thought a fool than to speak out and remove all doubt.” - **Abraham Lincoln.**

### **Types of Communication Skills**

Although this is a simple definition, when we think about how we may communicate the subject becomes a lot more complex. There are various categories of communication and more than one may occur at any time. Communication is key to maintaining successful business relations in various fields. For this reason, it is paramount that Engineers/professionals working in business environments have first-class communication skills.

The different categories of communication are:

**Spoken or Verbal Communication:** face-to-face, telephone, radio or television and other media.

**Non-Verbal Communication:** body language, gestures, how we dress or act - even our scent.

**Written Communication:** letters, e-mails, books, magazines, the Internet or via other media.

**Visualizations:** graphs and charts, maps, logos and other visualizations can communicate messages.

#### **Spoken or Verbal Communication**

Verbal or oral communication uses spoken words to communicate a message. When most people think of verbal communication, they think of speaking, but listening is an equally important skill for this type of communication to be successful. Verbal communication is applicable to a wide range of situations, ranging from informal office discussions to public speeches made to thousands of people. Higher levels of communication competencies deal with persuasive speaking and these skills are necessary for management level employees and those in marketing positions within a company. All employees can benefit from public speaking courses, which help develop these key communication skills.

#### **Non-Verbal Communication**

Nonverbal communication is much more difficult for many people. It consists of body language and the cues that are given off while listening to someone else speak. Those in customer service positions need to have a highly developed competency level in listening. Nodding of the head, inclining towards the speaker and showing an open body (shoulders back, arms uncrossed) let a speaker know that you are listening and hearing what they have to say. Non-verbal communication sets the tone of a conversation, and can seriously undermine the message contained in your words if you are not careful to control it. For example, slouching and shrinking back in your chair during a business meeting can make you seem under-confident, which may lead people to doubt the strength of your verbal contributions. In contrast, leaning over an employee’s desk and invading his or her personal space can turn a friendly chat into an aggressive confrontation that leaves the employee feeling victimized and undervalued.

## **Written Communication**

Written communication is essential for communicating complicated information, such as statistics or other data, that could not be easily communicated through speech alone. Written communication also allows information to be recorded so that it can be referred to at a later date. When producing a piece of written communication, especially one that is likely to be referred to over and over again, you need to plan what you want to say carefully to ensure that all the relevant information is accurately and clearly communicated. Written communication that is poorly worded, misspelled or full of errors detracts from the overall message that is being imparted. This is even more vital when dealing with the public through written communication. People judge others by the way they write and it is important to make sure that written communication is professional.

## **Visualizations**

The various graphs and charts, maps, logos, labels, colors, ribbons and other visualizations can also communicate information. A good visualization certainly has to do more, but these criteria are useful to draw the line between a lot of things that are often called visualization and what we consider visualization in this field. When the goals of the visualization include communication, the designer must extend on these principles and incorporate novel, domain-specific elements to facilitate the presentation of the desired message. When dealing with high-dimensional data the visualization must also incorporate 3D interaction design, since it may be impossible to display the information on a two-dimensional surface. In these cases the designer must utilize spatial reasoning to help the observer interact with and comprehend the data.

## **Need of Effective Communication Skills**

In the information age, we have to send, receive, and process huge numbers of messages every day. But effective communication is about more than just exchanging information; it's also about understanding the emotions behind the information. Effective communication can improve relationships at home, work, and in social situations by deepening your connections to others and improving teamwork, decision-making, and problem solving. It enables you to communicate even negative or difficult messages without creating conflict or destroying trust. Effective communication combines a set of skills including nonverbal communication, attentive listening, the ability to manage stress in the moment, and the capacity to recognize and understand your own emotions and those of the person you're communicating with.

While effective communication is a learned skill, it is more effective when it's spontaneous rather than formulaic. A speech that is read, for example, rarely has the same impact as a speech that's delivered (or appears to be delivered) spontaneously. Of course, it takes time and effort to develop these skills and become an effective communicator. The more effort and practice you put in, the more instinctive and spontaneous your communication skills will become.

When emotional awareness is strongly developed, you'll know what you're feeling without having to think about it—and you'll be able to use these emotional cues to understand what someone is really communicating to you and act accordingly. The goal of effective communication is to find a healthy balance between your intellect and your emotions, between thinking and feeling.

## **Importance of Communication Skills for Engineers**

Researches indicate that communication skills are what helped Homo sapiens evolve beyond our related ancestors, and that these skills have helped humankind develop into the advance societies of earth today. 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. The dean of Engineering at Duke University stated that, "Engineers who adept communications have a considerable advantage over those who do not...". Furthermore, this lack of communication skills only serves to undermine the whole profile of a professional engineer. Three sources of weakness that can significantly impact on an engineer's communication skills education are:

- Attitude of students to communication
- Insufficient course content
- Deficient or inappropriate Teaching methods

Another significant element included the lack of opportunity for engineering students to be able to practise communication skills particularly the oral component.

Engineers are technically-minded by nature. This can put them at a disadvantage when it comes to communicating with people outside of engineering, let alone the technically challenged. Communicating with non-engineers, however, is not the only challenge faced by engineers on global projects. Global engineers can encounter communication barriers even with fellow engineers from other countries due to cultural differences, language barriers and even technical differences. Special attention must be given to developing the skills needed to overcome these barriers.

Companies with limited resources may only choose to engage in a few of these activities while larger organizations may employ a full spectrum of communications. Since it is difficult to develop such a broad range of skills, communications professionals often specialize in one or two of these areas but usually have at least a working knowledge of most of them. By far, the most important qualifications communications professionals can possess are excellent writing ability, good 'people' skills, and the capacity to think critically and strategically.

Strong communication is absolutely essential in the workplace and especially important in an engineering workplace. Without good communication skills, ideas and hard work are in vain. After all, an idea is only as good as your ability to show or tell someone else. If your communication skills aren't up to scratch, your ideas are not going to get the credit or recognition they deserve.

### **Conclusion**

Communication skills are as important as technical qualifications for engineers aiming at a bright career. Communications hold the key. Poor communication skills, low confidence levels and improper body language have bad results in the job race. The person recruited will have to deal with the global clients directly. The command over the language and accent neutralization also plays a vital role in the recruitment process. Like scientists and technology folks, engineers can be a challenging group as they are often quite brilliant in their research and analysis of the facts, but often quite poor in communicating their ideas. They should stress more on effective communication skills along with their technical experiences.

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