

LINGUISTIC BARRIERS IN ENGINEERING COMMUNICATION / BARRIERES LINGUISTIQUES DANS LA COMMUNICATION EN INGENIERIE¹

Abstract: *Being able to communicate effectively is regarded as one of the most important life skills to acquire. Having good communication skills helps in all aspects of life - from personal to professional life. Poor communication in the workplace can lead to misunderstandings, frustration, confusion as well as to a tense environment which does not encourage employees to be productive and open to collaboration. Besides solid technical knowledge, engineering employers attach a lot of importance to strong communication skills which are becoming imperative as the engineering industry continues to evolve. Unfortunately, there is evidence that most graduate engineers lack the communication skills they need in the workplace. An employer who sees improving communication skills as a top priority and invests time and effort in reaching this objective is an asset to any organisation.*

Key words: *communication, barriers, engineering*

Language may be defined as the key to a person's self-identity. It enables people to express emotions, share feelings, tell stories and convey complex messages (Imberti, 2007: 67). "The importance of communication in human society has been recognized for thousands of years, far longer than we can demonstrate through recorded history." (Stacks & Salwen, 2009: 223) Communication is no longer seen as a linear process, one in which the speaker speaks and the listener listens. It is rather seen as a transactional process, one in which the participants are in turn speakers and listeners. Our communication skills will determine our influence and effectiveness as group members and our emergence as group leaders. They will also influence other people's attitudes towards us in a variety of public speaking situations.

The first stage in the communication process may be said to be the perception of the problem. The sender communicates information to the receiver. The former resorts to an encoding process to turn information into a set of symbols (language). The result of the encoding process is the message. The communication channel determines the form of the message, which can be a telephone conversation, face-to-face communication, an email or a written report. The receiver interprets the message according to his/her prior experience. Feedback from the receiver shows the sender whether or not the message produced the desired effect. The communication process may be affected by certain barriers, which can be psychological, cultural or linguistic. To communicate successfully with the other members of your team or with other teams, you need to be aware of the barriers that prevent messages from being sent and received correctly. A communication barrier is seen as anything that prevents people from receiving and interpreting correctly the information, ideas and thoughts expressed by other people.

The importance of communication in engineering

Most jobs in the modern world involve communication with employees, employers, suppliers and customers. Technical skills are no longer sufficient for engineers to perform workplace jobs efficiently in our globalised world. Over the past twenty years, communication skills have become crucial to an engineer's success in the workplace. Unfortunately, engineers are faced with great difficulties when they have to communicate in speaking and writing. It goes without saying that engineers who possess good communication skills have the edge over their colleagues who are poor communicators.

Although engineering is commonly seen as a technical field, communication in engineering is essential to succeeding as an engineer. Improving communication skills should be a top priority for any engineer and engineering student. Engineers spend a great deal of time communicating information. The amount of time they spend reading and writing reports, making and listening to presentations increases with seniority. Mechanical engineers, for instance, need to write emails, reports, project proposals,

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operating manuals, engineering specifications, etc. They have to make oral presentations which range from a short telephone conversation to a formal speech. They need to adapt their communication to their audience. A product presentation which is successful with the team of technicians who are going to build the product might be inaccessible to a company executive. The ability to write and speak well when applying for grants and industry jobs is of paramount importance for engineers. In order to demonstrate how vast their technical knowledge is, they need to be able to translate it into lay terms. The ability to synthesise complex technical materials into reports accessible to non-engineers is a valuable asset.

Since science is closely connected with scientific discoveries which depend on funding allotted by professionals from different backgrounds, engineers need to be able to explain what they do in terms which can be understood by anyone listening to them. Clear and concise communication can help engineers speak about what they do, convince young people that engineering is worth studying and raise money for good inventions. Modern engineers need to be able to produce technically appropriate designs as well as to communicate these designs in written, oral, and graphical form to audiences which range from their technical peers to the general public.

It is highly important for engineers to develop a "professional voice" which refers to "the tone, the style and the vocabulary engineers use when they write and talk about their engineering projects" (Knisely, C.W., Knisely, K.I., 2014: XIII). A professional voice can be developed by reading "the kinds of communication that the job requires, practising writing, receiving timely feedback from an experienced mentor, and making a conscious effort not to repeat previous mistakes" (*ibidem*: XIII).

Causes of linguistic barriers in engineering communication

One of the major causes of the linguistic barriers in engineering communication is the emphasis laid in engineering faculties on endowing students with as much technical knowledge as possible, showing little or no interest in developing students' communication skills in spite of their commonly accepted importance. Engineers need to communicate on a daily basis - with one another, with supervisors, with colleagues from different departments, with clients, etc. For engineers to be successful in their careers, they need to understand that communication skills are as important as technical skills. Yet, most engineers put a lot more effort into learning about new technologies than they put into developing their communicative skills.

Paretti (2008) sees school and work as two different activity systems. Classroom experience is centred on students' learning, the main objective being mastery of the subject matter, whereas the desired outcome of the workplace activity is a product or a process. Being a good engineer means much more than understanding the complex processes they work with. It also means being able to explain these complex processes to an audience that is unfamiliar with them. A good engineer is expected not only to execute a design, but also to explain his/her work to people who are not involved in the project. In other words, engineers need to be able to communicate effectively with other engineers, but also with non-engineers.

Linguistic barriers occur when people speak different languages. There are situations when the receiver of a message finds it hard to decode it correctly even if he/she speaks the same language as the sender, but their levels of proficiency are different. Having or not prior experience of the matter being discussed can lead to linguistic barriers being formed. The more familiar the participants to a communication are with the topic, the less likely it is for them to send correct messages and to decode them successfully.

When people have different professions, linguistic barriers occur if they use specialised language which is not understood by one or more of the participants to the communication. Within multidisciplinary teams, people from different occupational backgrounds interact when they exchange information about designs, products, processes, etc. Such a team working on developing a new product may be made up of physicists, chemists and engineers. Even if each of them masters the specialised language of his/her field, misunderstandings are likely to occur. In order to avoid them, they can reduce difficult terminology as much as possible. They can also use analogies to events and

processes that the participants are familiar with. Such a word as *matrix* has different meanings in mathematics (matrice) and metallurgy (matriță). On the other hand, misunderstandings may also occur among different types of engineers. *Boom*, when used in civil engineering, means *talpă a grinzii*. In automotive engineering, it refers to *fleșa unui excavator/a unei macarale* whereas in mechanics it means *braț, săgeată*.

Consequences of linguistic barriers

The importance of effective communication in engineering industries, for instance, cannot be overstated. Effective communication allows a project to run smoothly. On the contrary, defective communication among engineers results in delays, frustration and bad working conditions.

Solutions

In order to help engineering students become effective communicators, it is essential to identify the communication requirements they will have to meet in the professional setting. They will need to be able to successfully interact with the management, to give an accurate description of a process, design, product, etc, to select the best medium to communicate messages, to communicate appropriately with individuals with different cultural backgrounds, and to present high-quality written materials (Norback et al., 2010).

It is vitally important for universities to find creative ways to broaden their engineering students' communication skills. Entering today's global job market with poor communication skills will be a permanent hindrance to their personal and professional development. Most companies expect employees accepting jobs in a country where English is a secondary language to have basic or intermediate proficiency in the host language.

According to Nicometo et al. (2010), the ideal engineering communication skills in the industry setting can be grouped into three main themes: 1) the ability to effectively speak, write, and interact with audiences outside of engineers' specific discipline or focus; 2) the willingness to initiate communication with other people; and 3) the ability to listen carefully to other people in order to achieve the best results valued by clients, managers, colleagues, etc.

In order to improve their technical writing, engineers and engineering students should be familiar with its characteristics. The main aim of technical writing is to inform the audience, which may be made up of technically trained people or of non-engineers. Technical texts are also characterized by brevity and the correct use of grammar and punctuation. The passive voice is frequently used. For instance, it is preferred to active voice in process descriptions: *The pulp is drained of water to form a mass that is then bleached and washed again*. Writing is often seen as the most difficult communication skill to teach. It is advisable for engineering students to unlearn some of the writing skills acquired before entering an engineering degree in order to learn how to write succinctly and objectively (Milke et al., 2013). A good way to develop one's technical writing is to practise writing as much as possible. Paradoxically, one can also develop it by reading extensively. As Spretnak points out, if you carefully read your engineering textbooks, paying attention to the way "the material is presented, thinking about the word choices the authors make, and seeing the big picture of their writing styles, your writing will benefit from your reading" (Knisely, C.W., Knisely, K.I., 2014: 12).

In addition to writing, oral communication is also important in engineers' professional lives. Oral communications need to be characterized by clarity, conciseness and the presence of well-organised, logical messages, delivered in a confident way. Written and oral engineering communications can be formal and informal. Speeches which have been prepared in advance are an example of formal oral communication whereas group interactions, which are spontaneous, are an example of informal oral communication. In other words, formal communication refers to communication that passes through predefined channels of communication throughout the organization. Informal communication flows in every direction in the organization. It is very important for employees to master them both and never mix them up. Speaking formally to a co-worker might sound unnatural whereas speaking informally to one's employer will definitely sound rude and inappropriate.

In order to help engineering students improve their communication skills, communication intensive courses should be introduced in engineering programs. A good strategy is to teach communication alongside engineering topics. As Donnel et al (2011) show, coupling communication with situated project activities is a good strategy that could be “enhanced when the individuals teaching and advising these projects are themselves skilled communicators, aware of industry expectations for professional communication requirements”.

Companies should also spend more time and money investing in developing their engineers’ ability to communicate. One way to do this might be to create an environment where communication is not only valued, but also practised in a safe and confident way.

Conclusions

In today’s globalised market economy, effective communication is crucial to the success and growth of any organisation. Communication has always been the most significant part of human expression and interaction. Although its importance in people’s personal and professional lives has long been acknowledged, it does not always receive the attention it deserves. Most engineering graduates feel they gained analytical and problem-solving skills, technical knowledge and decision-making skills at university. What most of them failed to improve as engineering students was their communication skills. In today’s globalised world, employers expect engineering graduates to have the technical expertise to do their jobs; what they are looking for in a job applicant is possession of good communication skills which allow them to communicate productively and effectively in the workplace.

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