

## Designing and Teaching Technical Communication for Engineering Students: an emphasis on ESP

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### Abstract

This paper attempts to define what it means by technical communication and how it is seen as part of the larger picture in the context of engineering curriculum. It further sets out to focus on how the content of technical communication can be designed and disseminated by practicing English teachers working in engineering and technical institutions across India. Thirdly, it proceeds to deal with how technical communication can be taught to the target audience, namely the year engineering students, whose academic needs and expectations are invariably different. It differs in more ways than one from the variety of English taught to those who study arts subjects like commerce, economics, literature, nursing, pharmacy or fashion technology. The paper intends to show the variations in terms of content, methodology and delivery of the material that is far exclusively different from general English due to the need purpose and the subject of study among the engineering disciplines.

### TECHNICAL COMMUNICATION

According to Nell Ann Pickett "Technical communication is a field in which professionals develop information to guide readers, listeners, and viewers in solving practical problems" (2001:4). To the author of this paper, technical communication is of great importance to the budding engineers and other engineering teachers working in engineering institutions. It is of greater importance if they are involved in preparing a proposal for funding or while carrying out research activities. Technical communication can be defined as a variety of communication in English that is imparted to a specific audience for a specific purpose. Like report writing, memos, and letters, it is most certainly a specialty within the field of writing as a whole. Beginning writers in science and technology ought to gain a working knowledge of their new subject matter and its terminology. They must also learn to develop a prose style that is clear, objective, simple and economical. They must learn about

report types, variations in format, the different forms of communication such as business letters, formal and informal communication, oral and written reports, project work, effective correspondence like writing the agenda, minutes of the meeting and resolution. Similarly, upcoming engineers should also learn about participating in meetings as the Secretary, the Member or the President presiding over a meeting and so on. Sometimes, they need to learn about public speaking as well as about the need for making a formal speech based on a given situation or write a report of the company for the AGB Meeting of the Board of Directors.

There are no two opinions that the age of Information Technology has transformed the way we all think and communicate with each other. Therefore, our young writers must also learn to make use of audio-visual aids for communicating scientific ideas, use charts, diagrams and electronic equipment, like the tape recorder, the radio, the computer, the film or an LCD projector that can enhance one's presentation. Technical writers especially have to be familiar with people who read their reports manually and the expectations of their readers and audiences. They should learn to be good at the special business of being effective communicators—that is, as speakers and writers.

In the area of technical communication, a broad and sound foundation in other kinds of writing, say in designing documents, preparing an article for a Journal, creating a technical manual for a consumer product or drafting an advertisement or a brochure etc. is a tremendous asset to writers communicating about science and technology. There will be report writers, letter writers and speakers who must learn the art of communication so that they become versatile both on and off the job. They can learn to write a good letter and get a good customer, prepare a brochure for the company's manufactured products, create technical data like an empirical research report or a project proposal, make up manuals and document them in a form suitable for the purpose.

Technical manuals provide information about the methods of operation, maintenance and how to use a product or equipment, instructions regarding handling machinery, equipment, safety measures, trouble-shooting etc. We hope that many of us have seen the manuals supplied with TV or refrigerator or audio system, we purchased sometime ago. In this way, every novice or apprentice has to learn to become good writers. You may be surprised to know that top notch IT companies like Wipro, Infosys, TCS etc., are on the lookout for technical/content writers and instructional designers who can assist in the process of preparing CDs, designing or creating web-sites.

In writing, co-ordination, sub-ordination, simplicity, coherence and objectivity are important factors. The complexity of writing can vary with the nature of the audience, the substance and the purpose of communication. The inclusion of graphics, for instance, can mean more to a technical audience than what it means to a lay man. So, promising writers have to adopt different methods or styles of writing in order to convey their ideas or information clearly. Let us look at the following examples from the seminal text book titled Reporting Technical Information by Houp Kenneth et al (1992:4) and see how the examples cater to different audiences:

- . . The very nice plant my mother had on her table in the front hall.(1)
- . . . in a shaft of yellow sunlight, a white flowering begonia, in a red clay pot (2)
- . . . A 12-inch begonia propagated from a 3-inch cutting: age, 42 days. (3)

As a writer of technical information or a reporter of scientific data, you may have to use all of these styles to convey information to your intended readers. By playing the right tune with these kinds of style, in different combinations and by adding other skills like that of grammar, rhetorical methods in generous measure, you can generate and produce leaflets, brochures, sales literature and reports to stock holders. You can develop, with adequate practice, a great variety of letters and articles for magazines, journals as well as advertisements. When you write for your professional colleagues, you will be nearer to the closing 'begonia' example (3).

Technical English per se refers to the teaching of a variety of English by imparting the language skills such as LSRW to students of engineering, using technical information or content for a specific purpose. For example, at the first-year level, it will be useful to expose students to the variety of English, popularly known as ESP which stands for English for Specific Purposes. The

English teacher in an engineering classroom can deliver lectures on subjects like electricity and magnetism, sound and light, space and time, energy, motion and machines, electronic gadgets and their uses. Apart from these, the teacher can also tell the students about great scientists like Thomas Alva Edison, Albert Einstein, Isaac Newton, Rutherford, Marie Curie and their contribution to the modern age. To our knowledge, there are quite a lot of materials in the form of textbooks available in the market.

The author has come across one such book like The World of Science published by Parragon. It is worth mentioning that an appropriate textbook like this one dealing with technical subjects like electricity, magnetism etc. can be prescribed for I year engineering students. As a matter of fact, engineering students are expected to study and learn about science and technology, not necessarily about poets, novelists or dramatists like William Wordsworth, Thomas Hardy or T.S. Eliot. The reason is that these doyens of literature belonged to a different domain. The literary pieces like poems, novels and plays written by these eminent people will suit those students doing courses in arts like language or literature.

In the author's opinion, English teachers entrusted with the task of imparting communicative skills in English for students of commerce or economics or history should exploit the content that is specifically relevant for those disciplines. An economics student who wants to study or learn English must equip himself more with core subject areas like the Indian economy, the five-year plans, tax regulation, globalization of the economy, exports and imports, currencies of the world, inflation, RBI regulations and so on—topics that will evidently help a lot in his career. Similarly, a student of history should study about ancient and modern civilizations, events that changed the world, Indian freedom movement, archaeology, the causes and consequences of the two world wars etc. For them, a look like The Discovery of India by Pundit Jawaharlal Nehru will be much more relevant than any other.

The author hopes that appropriate ESP courses can be designed. "Course content" according to Hitesh D. Raviya, "is another name for what has come to be called a syllabus . . . In a formal educational set up, it is taken today to mean, an outline or brief description of the main points of a text, lecture or course." (14) At the time of taking into account information about the students' needs and objectives of the course, the teachers are required to resolve which aspects of ESP learning will be incorporated and stressed as the content for the course. The author believes that experienced English teachers can produce ESP course materials appropriate to their

students who need to study English for specific and career-oriented purposes.

But one constraint that stands in the execution of this approach of teaching English for specific audiences is that the English teachers working especially in engineering colleges need to acquaint themselves with technical content rather than exploiting or dealing with literary works like Hardy's *Far from the Madding Crowd* or Bernard Shaw's *St. Joan* or the short stories of Ernest Hemingway. These will suit the students of literature, not the students of engineering and technology. This is where the author of this paper wants to draw a distinction between English for arts subjects that are also specific disciplines and English for engineering students or the effervescence of Technical English. To sum up this discussion on Technical English, the content and methodology for the engineering students ought to encompass technical or scientific content.

Well, now let us mull over the other area, especially the grey area, namely grammar and composition that are also important. Dudley Evans endorses the same view when he states that "it is incorrect to consider grammar teaching as outside the remit of ESP. Where students have grammar difficulties that interfere with the essentially reproductive skills of speaking and writing, or the essentially receptive skills of listening and reading, it is necessary to pay some attention to those difficulties(2007:74). The grammar segment, of course, should include sentence skills like simple, compound and complex sentences, subject verb agreement, active voice, conditional clauses, idioms and phrases, articles and prepositions, parts of speech, tenses etc. It is not necessary to dump all the elements that are extant in grammar. Yet thirty per cent of marks may go to the study of standard English usage during examination and testing. Grammatical elements such as subject verb agreement, punctuation and sentence skills can be given more importance. The ESP content selected can be used intelligently to teach these elements. For example, we may have a short lesson on, say electricity and magnetism, that goes something like this :

Electricity is an invisible form of energy. It is based on the tiny, particles inside atoms. In an atom's nucleus, particles called protons have a positive charge. Whizzing around the atom's nucleus are electrons, which have a negative charge. Normally, the positive and negative charges balance. If they become unbalanced, an electrical force is produced. This may stay in one place as static electricity or move from place to place as a flowing current. Electricity is so useful to us because it can flow along wires to wherever we need it and can be changed

into other forms of energy such as light, heat and movement (Parragon,2007 : 48).

Using this text as an example, the teacher can focus on the use of present tense, passive voice, conditional clauses, positive versus negative sentences and so on. For each text like the one above, preferably running to one or two pages only, the teacher can design not only grammar units but also frame short questions which students have to answer in the classroom. For instance, there may be questions like these:

- What are atoms?
- Who invented electricity?
- What are pylons?
- How is electricity produced?
- Who was Michael Faraday and what was his contribution?

Like these authentic materials adapted from technical and science books, many lessons of shorter length can be used to teach technical communication or technical English to the students of engineering courses. Talking about writing, M. Ashraf Rizvi makes an interesting point by stipulating that professionals "are required to write business letters, memos, email messages, reports, proposals, minutes, summaries, and so on. Both professionals and students need excellent writing skills to survive and excel in their pursuits as there is hardly and academic or professional activity that does not require writing skills"(2005:18). The author firmly believes that more training on writing proposals, projects and reports may be given to I year engineering students so that it will help them later on in their job-related work. They also can read Paul Anderson's *Technical communication*; Houp Kenneth's *Reporting Technical Information*. But the one that fills the bill is Nell Ann Pickett's *Technical Communication* listed in the references.

Lastly, a course in technical communication cannot preclude the audio—visual components. A judicious mix of verbal and non—verbal elements can contribute immensely to the success of the technical communication course. It involves a two-pronged approach and in fact, non—verbal communication via the internet, social media, and the worldwide web should play a more dominant role in the design of the course or in the delivery of the substance of technical communication. I would like to contend that the discussion of non-verbal or audio—visual information is indispensable in the itinerary of technical communication. Perhaps a separate article will serve the purpose. In the final analysis, suffice it to say this: Given a strong foundation in

technical communication, combined with adequate technical skills in the domain area, our engineering workforce will not only make the employers proud but make the nation strong, vibrant and prosperous. The responsibility of fulfilling this imperative objective rests certainly in the ambient atmosphere of the institutions and in the hands of the teaching fraternity across the board.

## REFERENCES

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Emphasis has been placed on learning styles and teaching styles in engineering education [8 , 15]. One reason is lecturers' teaching styles preferences and students' learning styles preferences do influence the teaching and learning process [16-17]. The Technical Communication classrooms are English for Specific Purposes (ESP) in nature and thus knowledge of the students' learning styles preferences may be useful information for the lecturers when planning their lessons. As highlighted by Sinha and Sadorra, the ability to use a variety of in-class activities. This instrument was chosen for this study as it was designed with engineering students in mind and various studies have discussed its reliability and validity [11, 21-32] .