Engineering Writing Resources

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Introduction [download PDF]

Technical work in engineering is useless to society unless the results are communicated to others. One study estimates that about two thirds of engineers' time is spent communicating in some way [1]. Engineers communicate with, among others, other engineers, architects, managers, technicians, and the general public. They write technical reports, articles, proposals, posters, emails and other forms of online writing. While the importance of communication in engineering may seem self-evident, many engineers do not conceive of themselves as writers, and so do not work to improve their writing skills or do not know how to.

But writing is a skill that can be learned and developed; in fact, many engineers and scientists are excellent writers (Carl Sagan and Richard Feynman to name a couple). By applying a few general principles and some specific guidelines to your writing, you can make your writing clearer and more persuasive to your reader. The purpose of this online resource is to help you do that.

Good engineering writing demonstrates an awareness of the audience it addresses and their objectives, level of knowledge, and attitude toward the topic. Good engineering writing is also clear and concise. Clarity is essential in communicating complex technical ideas, yet some engineers needlessly complicate their writing, making complex ideas even more difficult to understand. Concise writing is efficient, and efficiency is a core value in engineering.

The following short lessons introduce some general principles of audience awareness and guidelines for making your writing clearer and more concise. Exercises with possible answers accompany the guidelines.

General principles: audience awareness

Understanding the rhetorical situation

The rhetorical situation is the writing task and its context, the occasion for writing. Every writing task involves three points of what is known as the "rhetorical triangle": the writer, the reader, and the text, as shown in Figure 1:

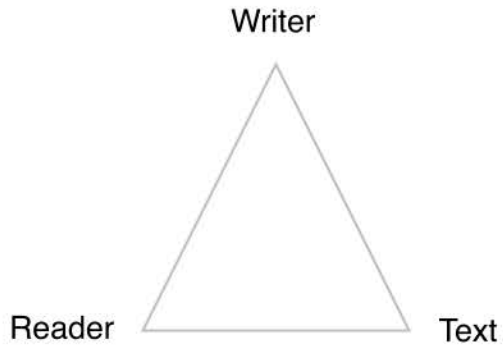

Figure 1. The rhetorical triangle. **Writers** should consider their own objectives and credibility, the concerns and expectations of the **reader**, and the constraints of the genre of the **text**.

Writers should consider each of these three points of the triangle when they approach a writing task. By adapting your writing to your own objectives, the readers' objectives and expectations, and the conventions of the genre, your writing will be more persuasive. Each point in the triangle is discussed in more detail below.

Writer

Writers should consider their own objectives in writing: what is the objective of the document? To secure a grant? To present test results to a research group? To recommend a set of procedures? It is tempting to think of engineering writing as merely informative—"the data speak for themselves"—but this is rarely the case. While a grant proposal is clearly a persuasive document, in which the writers are seeking a particular action from the readers, seemingly "objective" technical reports also seek to persuade their readers that the data and findings are valid. Thus, the data the writer selects and the presentation of the data will shape the reader's judgment of the information.

Writers should also consider their own credibility, or the character they are presenting of themselves in their writing. They should consider how they might enhance their credibility in the text—by showing they are knowledgeable about the subject, attentive to detail, and by showing they have the best interests of the readers in mind (rather than merely writing in their own self-interest).

Readers

As important as considering their own objectives, writers should also consider their readers' objectives. Important questions to ask include the following:

- Who are the primary readers of the document? A technical group? A managerial audience? The general public? Are there secondary audiences who should be considered?
- What do the readers hope to gain from reading the document—why are they reading? What kinds of decisions will the readers make based on the document?
- What is the reader's level of knowledge about the topic: expert in the field, general engineering knowledge, no technical background?
- What is the reader's attitude toward the document? Is the reader hurried (perhaps always a safe assumption)? Skeptical about its findings? Has the documented been solicited by the reader, or is it unsolicited?

For example, a grant proposal will have several readers with varying objectives and levels of knowledge, ranging from experts in the field to non-experts and program managers. A successful proposal will be understandable to each of these audiences: it will effectively communicate the overall research question and its significance to a general audience, as well as supply the necessary technical detail for the expert audience to persuade them that the research is feasible.

If readers' expectations, level of knowledge, and attitudes are not accommodated, the writer is unlikely to accomplish his or her objectives. On the other hand, when the writer shows that his or her own objectives align with the reader's objectives, and when the document accommodates the reader's level of knowledge about the topic, the document is more likely to persuade.

Text

Finally, writers should also consider what constraints the genre of the document puts on the writer. The genre, or type, of document dictates the content of the document, its arrangement, and its appearance. If you are unfamiliar with the conventions of the genre you are writing in, find a few examples you can use as models. If a text does not conform to the reader's expectations about the genre, or if it is formatted in a way that makes it difficult to find or read information, it is unlikely to be persuasive.

Returning to our grant proposal example, a proposal that ignores the requirements specified in the instructions is unlikely to be seriously considered (link to article on grant proposals). Similarly, research articles in engineering archival journals follow a specific structure; manuscripts that deviate from this structure are less likely to be published.

Of course, readers also expect flawless grammar and mechanics. Proofreading errors do not impress readers.

Depending on the importance of the document, writers should think more or less consciously about each of the points of the rhetorical triangle before they begin to write and throughout the writing process.

References

[1] Sageev, P., Romanowski, C. A message from recent engineering graduates in the workplace: Results of a survey on technical communication skills. *Journal of Engineering Education*, Oct. 2001, 685-693.