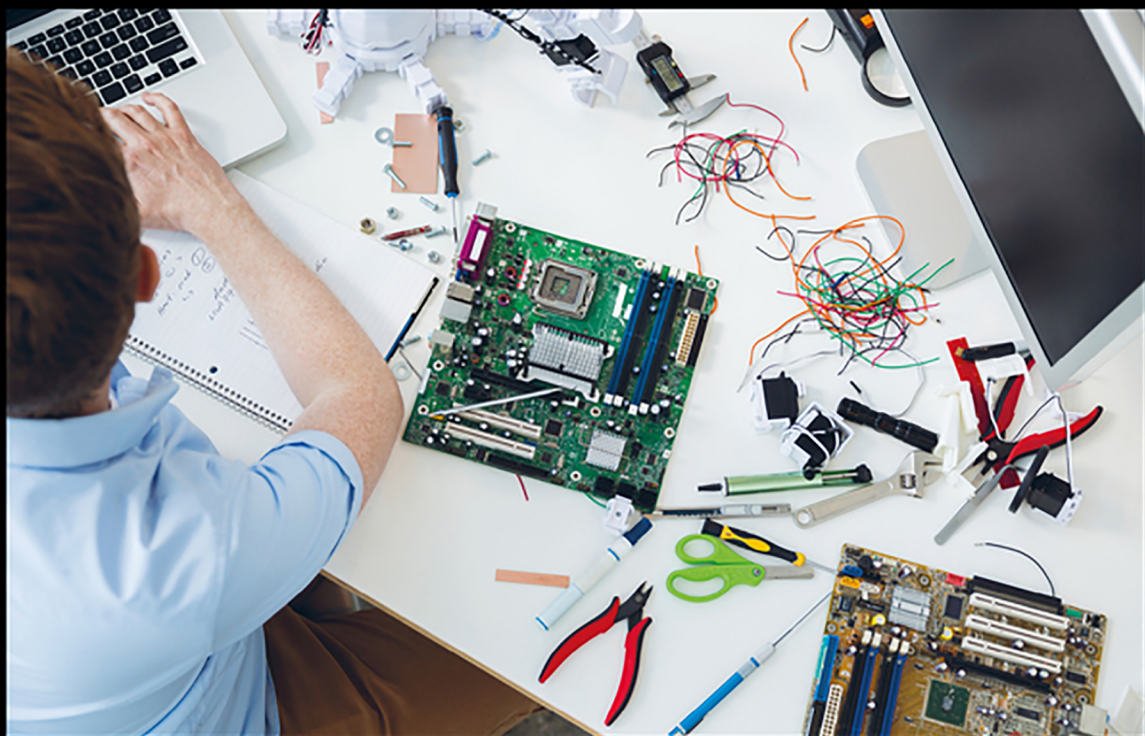


IEEE PCS Professional Engineering Communication Series

Traci Nathans-Kelly, Series Editor

The IEEE Guide to Writing in the Engineering and Technical Fields

David Kmiec • Bernadette Longo




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A Note from the Series Editor

With this book, *The IEEE Guide to Writing in the Engineering and Technical Fields*, the IEEE Professional Communication Society (PCS) continues its work to help engineers, technical professionals, scientists, researchers, teachers, and students alike make their work easier, more clear, and better targeted for dispersing information. Wiley-IEEE Press and the PCS are proud to add this guide to our book series titled *Professional Engineering Communication*. This guide, authored by David Kmiec and Bernadette Longo, is a wonderful entry point into reconsidering the technical message, the shape it will take, the readership it will inform, and the mechanical prowess to make it professional. Readers will not only find here some basics about mechanics and purpose, but also come to understand the deeper considerations for writing certain types of technical documents and how to achieve their purpose.

The authors bring their considerable experience in guiding technical professionals, engineering practitioners, and even students to this volume. Even a quick perusal of this volume will realign your purpose, tone, and outcomes when diligently applied.

The series has a mandate to explore areas of communication practices and application as applied to the engineering, technical, and scientific professions. Including the realms of business, governmental agencies, academia, and other areas, this series has and will continue to develop perspectives about the state of communication issues and potential solutions when at all possible.

While theory has its place (in this book and this series), we always look to be a source where recommendations for action and activity can be found. All of the books in the fast-growing PEC series keep a steady eye on the applicable while acknowledging the contributions that analysis, research, and theory can provide to these efforts. There is a strong commitment from the Professional Communication Society of IEEE and Wiley to produce a set of information and resources that can be carried directly into engineering firms, technology organizations, and academia alike.

For the series, we build on this philosophy: at the core of engineering, science, and technical work is problem solving and discovery. These tasks require, at all levels,

talented and agile communication practices. We need to effectively gather, vet, analyze, synthesize, control, and produce communication pieces in order for any meaningful work to get done. This book, like others in the series before it, contributes to that vision.

Traci Nathans-Kelly, Ph.D.

About the Authors

Dave Kmiec coordinates undergraduate technical writing for the Department of Humanities at New Jersey Institute of Technology. He also consults for government agencies and engineering services and manufacturing firms, which he helps them establish knowledge management practices and effective workflows for digital and print publications. Dr. Kmiec earned his Ph.D. in Rhetoric and Technical Communication from University of Minnesota, where his research focused on engineering communication and the cultural history of engineering as a profession. He also holds an M.S. in Technical Writing from North Carolina State University and B.A. degrees in Chemistry and English.

Bernadette Longo is an Associate Professor in the Department of Humanities at New Jersey Institute of Technology. She is the author of *Edmund Berkeley and the Social Responsibility of Computer Professionals* (ACM Books/Morgan & Claypool, 2015) and *Spurious Coin: A History of Science, Management, and Technical Writing* (State University of New York Press, 2000), as well as numerous articles and conference papers in the field of technical and professional communication. Dr. Longo earned her Ph.D. in Rhetoric and Technical Communication from Rensselaer Polytechnic Institute in 1996.

A Technique for Writing Like a Professional

Introduction

What does it mean to write like an engineer? How does writing like a technical professional in a workplace differ from other kinds of writing you may do? Looking at a few examples of the writing tasks that engineers and technical professionals face can help illustrate what the authors of this handbook mean by *writing on the job*:

- A mechanical engineer is asked to research possible material options for a new fastener. She prepares a memo for her manager that presents the options, as well as provides information about the suppliers of each material. As part of the memo, she recommends the best material option based on specific design parameters.
- A software engineer documents his work on a feature change in a software application. The documentation is recorded in an online system that allows other members of the development team to review the feature change and add their own comments.
- A biomedical engineer working on an implantable shoulder joint prepares a series of documents that will allow his company to apply for federal approval from the U.S. Food and Drug Administration (FDA) so his company can test the device in humans.
- A computational biologist reviews a research article submitted for publication in a well-respected science journal. As part of her review, she must ensure that the work submitted is original, appropriately documented, and written using terms customary for professionals in the field.

In its simplest terms, writing like an engineer or a technical professional means conveying specialized information that helps people adopt and implement technologies for practical purposes. However, writing in this way does more than help people use technologies. You are also persuading others to adopt your viewpoint on technology. For example, the mechanical engineer recommends one material choice above

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David Kmiec and Bernadette Longo.

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other options. Her recommendation is based on her research and her evaluation of the options based on design parameters such as cost, sustainability, availability, and time to delivery. Likewise, the biomedical engineer must follow the strict protocols associated with device review and approval, since an implantable device like a shoulder joint must not injure the patient. These communications are, therefore, as much about human relations as they are about technology.

Because all communication reflects human relations, many technical professionals acknowledge that writing is more than simply a neutral conduit to convey information from one person to another. Instead, engineers and technical professionals shape knowledge as it moves between the professional and a client or the end users of technology. In this sense, writing like an engineer or a technical professional means influencing the way that people understand the world around them.

Working engineers and technical professionals understand the importance of writing in their professional lives. Many of them learn how to be effective writers on the job, usually under the mentorship of a more senior colleague, such as an engineering manager or team leader. The purpose of this book and its accompanying website is to provide insight into writing in engineering and technical professions for both students and working professionals. The sections of this book will give you strategies for writing that are based on understanding the work contexts in which writing functions.

Written documents like the examples listed above are not isolated works; they exist in a network of interpersonal and organizational contexts. On an interpersonal level, a writer works within existing relationships with other people in the organization, such as supervisors, co-workers, and people in other departments. On an organizational level, this writer is part of a department or unit that functions in conjunction with other departments. For example, the software developer in the earlier example might be part of a team that is working on a larger project within an organization. They might be working on a control system for a piece of equipment and need to communicate with people in other departments, like the legal or marketing departments, working together as an interdisciplinary team.

In addition to internal contexts, a writer works within a social context that extends beyond the walls of the organization. The work an individual engineer or technical professional does on the job is often shared among other people in a discipline, profession, or industry. The work you do may need to be reported to a government regulatory agency. You might even find that your work is scrutinized by a citizen watchdog group. You will probably find that you are preparing documents for a wide circle of potential readers.

To be immediately effective, the documentation that the software engineer prepares in the example above has to be composed in such a way that his peers can understand it and comment on it. But to be effective in the lifecycle of the project, the document may also need to be written so it can be included in a record of changes made to that version of the product or incorporated into a report on work done for a client over a certain time period. For it to be effective beyond the life of the project, the

software engineer may also need to make sure the information will be understandable to future programmers working on the next version of the software. He may consider how to communicate information about the project and product to an organization's legal or marketing staffs, which will have particular guidelines to follow that emphasize specific information from the programmers.

In order to write effective documentation, this engineer had to understand some pragmatic considerations: how work gets done in his specific corporate environment, what documents like the one he was preparing typically look like, how the project was scheduled to proceed. He also had to understand some social considerations: the expectations of a specific project manager and the specific team of engineers who would read and comment on his work, how his documentation might be used in indirect ways to evaluate his work, how it might be used by future engineers to do new work, and how people in other departments needed to use his documentation to complete their work related to the project.

This book presents a technique for assessing the social situation of writing and then using that assessment to make writing decisions. To do this, we present a model of the social situation that you might use to generate justifications for certain textual patterns and we present a guide to the places in text where patterns are likely to be found and decisions are likely to be made. The first part of this book articulates this approach.

- *Chapter 1: The Social Situation of Text.* This chapter discusses models for understanding social environment in which communication functions. It also provides a hybrid model of the social environment, based on the rhetorical and pragmatic situation of text, that you can use to inform your decisions as you write.
- *Chapter 2: Making Writing Decisions.* This chapter discusses the writing process and the nature of text. By identifying the places where a writer has control over documents, arguments, and language, writing can be treated as an active decision-making process.

Then, in the second part, we introduce typical purposes for writing in organizations and discuss general forms of workplace documents. This section will help you more fully understand the sample workplace documents available in the online supplement to this handbook.

- *Chapter 3: Writing to Know: Informative Documents.* This chapter discusses common reporting forms and talks about the importance of drafting and deploying evidence-based arguments in documents like reports and logically arranging and attending to precise style techniques in documents like specifications.
- *Chapter 4: Writing to Enable: Instructions and Guidance.* This chapter discusses documents that instruct and enable readers to perform tasks or operate

in the workplace and covers how to deploy action-based forms of text for policies, procedures, and training materials.

- *Chapter 5: Writing to Convince: Persuasive Documents.* This chapter discusses overtly persuasive documents and considers how understanding your readers' existing beliefs and values enables you to prepare a persuasive proposal or business plan.
- *Chapter 6: Correspondence: Medium of Workplace Collaboration.* This chapter discusses mundane workplace communications like emails and describes how understanding workplace habits and goals and the work habits of others enable you to write quick and productive messages.