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The Nature of Technical Writing

1.1 Introduction

What is technical writing? I'm afraid that there is no universally accepted definition. Many authors discuss the difficulties in defining "technical writing" and then offer their own definition. For our purposes, it is easier to define technical writing by differentiating it from all other kinds of writing. There are two main differences between technical and nontechnical writing: precision and intent.

Precision is crucial in technical writing. When you express an idea in technical writing, it may be realized in some device or process. If the idea is wrong, the device or process will also be wrong. To quote my friend, physicist and software engineer par excellence, Dr. George Hacken, "syntax is destiny."

For example, imagine the consequences of an incorrect subscript in some chemical formulation, or a misplaced decimal point in a mathematical specification of some process for controlling a nuclear plant. Precision is particularly important in computer software. In 1962, a NASA Mariner 1 Venus satellite was lost, in part because of a misplaced hyphen in a data editing program [NASA 2017].

Precision in other kinds of writing is also important, of course. The title of Lynne Truss' book on punctuation, *Eats, Shoots & Leaves*, makes this point [Truss 2004]. The title refers to the dietary habits of a panda. However, if you add a comma after the word "eats," the title now could refer to a diner who refuses to pay his restaurant bill and shoots at the proprietor before fleeing the scene.¹ But the consequences of this kind of mistake are not nearly as potentially disastrous as in the specification, design, or code of some mission-critical system. Even in legal documentation, where imprecision can have deleterious consequences, there is not the same risk of loss of a system or life.

Another characteristic difference of technical writing is that there should be no intent to evoke an emotional response from the reader. The technical writer should simply try to convey information as concisely and correctly as possible. In poetry, prose, news reporting, and even business writing, it is necessary to convey information content or a story. But in poetry and prose, it is clear that an emotional response is also desirable. The situation is the same in news, where the reporter may be looking to scare, shock, or evoke sympathy or pity from the reader. Even in everyday business correspondence such as advertising, contracts, lawsuits, job applications, and so on, a visceral response or at least a call to action is desirable. This is not the case in technical writing.

A valid objective of technical writing may include persuasion of opinions, for example, convincing readers that a commonly held view about a topic is incorrect. Conveying neutral, but correct and concise, technical information often brings about this type of education in an unemotional and nonthreatening way.

Although they may not be truly “technical”, encyclopedias, dictionaries, handbooks, directories, etc. fall under the category of technical writing. These items are truly “technical” in the sense that precision is needed.

You are likely to find equations or technical terms in technical writing—this situation is different from other kinds of writing. But equations neither define technical writing, nor necessarily do they define precision. Technical writing may exist entirely without any equations; for example, a guide may contain only step-by-step procedures for assembly, installation, use, or deconstruction of some product. Equations can also be imprecise or incorrect.

Finally, there are legal implications to technical writing. While any kind of writing can be libelous, an error in technical writing can have serious consequences. For example, writing quality in user manuals is known to have caused catastrophic software failures [Wong et al. 2017]. Other technical writing errors could lead to financial loss, damage to property, environmental catastrophe, injury, or death. Consider, for example, the potential consequences of the following: bad financial advice in an investment brochure, a wiring instruction error in a manual for an electric clothes dryer, an error in a hospital record for a seriously ill patient, an incorrect formulation recipe for mixing pesticides, or an error in the maintenance instructions for an aircraft.

1.2 Who Writes Technical Documentation?

I imagine that if you made a list of professionals who must write technically, you would include engineers, scientists, architects, physicians, lab technicians, and so forth. In the broadest sense, virtually any trade or profession

can be considered to have a technical component, and its practitioners must prepare technical writings. Think about doctors, nurses, farmers, lawyers, and experts of all types. Every one of these persons will write in the jargon of their discipline—a kind of technical writing. From this point forward, when I say “technical professional,” I mean a large and flexible collection of any profession or trade where technical writing can occur.

Everyone is a technical writer, at least occasionally. Product complaint letters, driving directions, or recipes written for friends are all kinds of technical writing. Disclosures to insurance companies, responses to legal inquiries, and incident reports at work should also be treated as technical writing—in these it is especially important to be very precise, include provable facts, and avoid expressing emotion. Whenever you endeavor to write something at work or elsewhere, pause to consider if that writing should be treated as technical.

1.3 Taxonomy of Technical Writing

For ease of discussion throughout the remainder of this book, I refer to the taxonomy described by Montgomery and Plung [1988], shown in Figure 1.1.

Pedagogically oriented technical writing focuses on teaching, for example, a calculus textbook or a book for the novice photographer. Technical writing of a theoretical orientation involves various kinds of theoretical and applied research. The broadest form of technical writing—professional orientation—serves the needs of various professionals. As has been mentioned, these

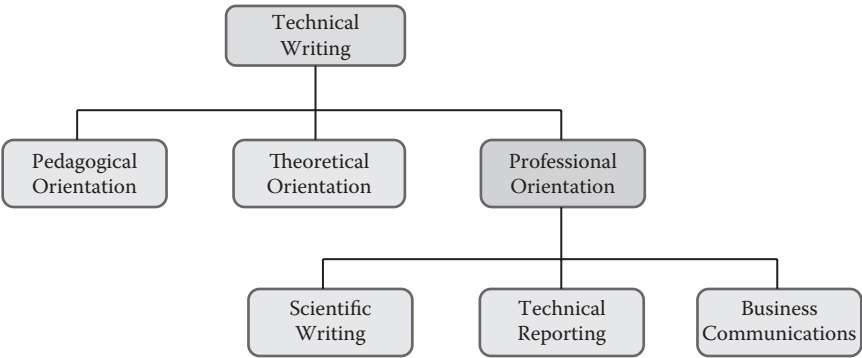
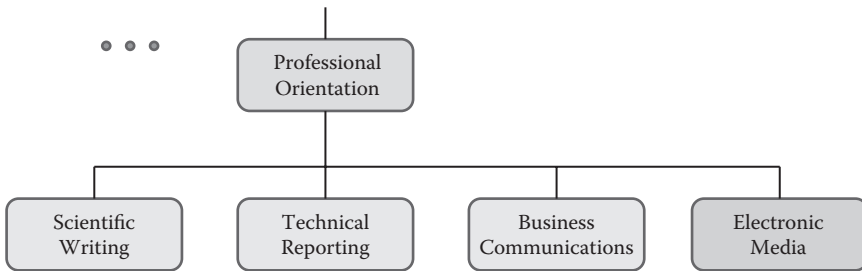


FIGURE 1.1
An illustrated taxonomy of technical writing. (Redrawn from Montgomery, T. and Plung, D., *Proc. of International Professional Communication Conference, 1988, Seattle, Washington, October 5–7, 1988*, pp. 141–146.)

**FIGURE 1.2**

An updated version of Montgomery's taxonomy for technical writing of a professional orientation. (Redrawn from Montgomery, T. and Plung, D., *Proc. of International Professional Communication Conference, 1988*, Seattle, Washington, October 5–7, 1988, pp. 141–146.)

professionals may be in any discipline. Professional orientation is the class of technical writing on which I will concentrate.

Although briefly mentioned by Montgomery and Plung, at the time their paper was written, electronic media was very new. Since then, however, a new form of written media and a unique style of writing have emerged. I would like to expand Figure 1.1 to include these forms of professional writing, adding a new category under “Professional Orientation” called “Electronic Media” (see Figure 1.2).

Let's look at each of these areas under “Professional Orientation” in some further detail. Examples of most of these various technical writing forms can be found in later chapters in this book. I have organized these later chapters to correspond with the major headings below.

1.4 Technical Reporting

Technical reports are documents that are prepared for supervisors, subordinates, peers, customers, clients, and various government agencies. Typical technical reports include:

- Progress reports
- Feasibility studies
- Specifications
- Proposals
- Facilities descriptions
- Manuals
- Procedures

- Planning documents
- Environmental impact statements
- Safety analysis reports
- Bug reports

There are many other types of reports, of course, but all have a unity of purpose: to convey specific information in an archival way. By “archival” I mean that the document is intended to be stored and referenced for many years.

1.5 Business Communications

Business communications include a wide range of correspondence that must be written in the course of business activities. Typical business communications documents that you may read or write include:

- Résumés
- Cover letters
- Transmittal letters
- Customer relations writing
- Human resources communications
- Trip reports
- Administrative communications

Of course, there are other types of such correspondence that you may encounter in the workplace as a vendor, customer, client, consultant, or worker.

Here is an example, it’s my short autobiography or “biosketch,” which I use when submitting articles to journals and magazines. One of the challenges in writing a biosketch is keeping it short—they are often limited to 100 words or less (this example is 50 words):

Phil Laplante is a professor of software and systems engineering at Penn State. His current work encompasses software testing, software security, requirements engineering, the internet of things, and software quality and management. He holds a PhD in computer science from Stevens Tech and is a licensed professional software engineer in Pennsylvania.

I discuss business communications, including résumé writing, in Chapter 5.

1.6 Scientific Writing

Scientific writing includes experimental research and associated documentation, as well as the scholarly publications that emerge from that work. Scientific writing also includes scholarly and experimental research in medicine.

Scientists and engineers can publish their work in a variety of venues, including:

- Books
- Journals
- Magazines
- Conferences
- Newsletters
- Websites and blogs

These kinds of technical publications vary widely in authority and in rapidity of publication. Authority refers to the reliability of the scientific content, which tends to be much higher if manuscripts submitted for publication are reviewed by technical peers and tends to be much lower if the writing is not peer reviewed. The speed with which material gets published is an important consideration of the timeliness of its content (Figure 1.3).

Peer review takes many months, sometimes a year or more for very complex technical material. Therefore, any research findings must be of an archival quality, meaning that the work must focus on long-term theoretical concepts that are not expected to change soon. Technical matter that will change rapidly must be published in venues that have a very short time from submission of the material to publication, or the technical writing will be stale before it appears.

Collectively, journals, magazines, and newsletters are referred to as “periodicals” because they are published at some regular rate, say from four to twelve times per year. Usually² these publications are digitally archived, that is, placed in an electronically accessible, Web-based library. Writers of technical material who wish to publish and users of technical material for reference must consider the trade-off of time to publication versus authority.

In Chapter 8, I describe in detail the type of writing used for these kinds of publications and give many examples. In the next few sections, I describe several types of technical writing, including books, journals, magazines, conference proceedings, newsletters, websites, and blogs. Please refer to Figure 1.3 as needed during these discussions.

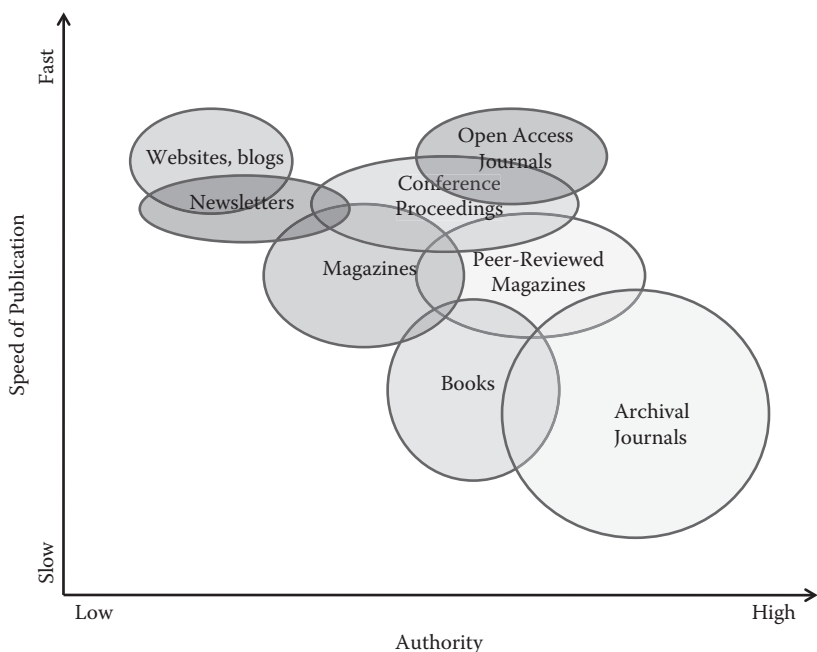


FIGURE 1.3
Speed of publication versus authority of content for a variety of technical writing types.

1.6.1 Books

Books are a way for scientists and engineers to get very wide and archival distribution for their ideas. But books take a long time to write, edit, and finally publish—often three years or more from the initial concept to the published book. If focusing on the professional reader, a fast publication time is critical, while for college textbooks, a longer period of development is acceptable. Books receive a certain amount of technical vetting through peer review.

1.6.2 Journals

Journals are the preferred venue for publication of important scientific ideas and technical breakthroughs. Scientists and engineers seek to publish in the best journals—those that are widely read and cited by other scientists and engineers. Journal articles usually focus more on theory and less on applications because they are intended to be relevant for a very long period of time. Theory changes more slowly than the applications for the theory.

When articles are submitted for consideration in a journal, they are reviewed by experts to determine if the work is worthy of publication.

This activity is often called “refereeing.” It can sometimes take two years or more from submission to final publication of a paper in a scientific journal. So, although the article will exist in a digital library in perpetuity, timeliness is of concern for those who write for and publish scientific journals.

A new kind of journal with a faster time to publication and lower cost to readers has recently emerged. These so-called “open-access journals” are discussed in Chapter 8.

1.6.3 Magazines

There are numerous scientific and technical magazines catering to various communities of interest. A community of interest is a group with a shared focus, whether technical professional, political, recreational, religious, or other. Typical technical interest communities include green energy, robotics, personal aircraft, and history of science. Unlike technical journals, which tend to be rather conservative in appearance, technical magazines may resemble any magazine that you might find on a newsstand, complete with color graphics, advertisements, and editorials.

Magazine publications can be refereed, although this is not always so. The time from submission to publication for a magazine is usually much shorter than for a journal publication. Therefore, when scientists wish to get their ideas out quickly, but in a venue that has a certain amount of prestige, they may choose to publish in a widely read magazine.

Readers of magazines are generally looking to keep up with developments in their field without having to read the more theoretical papers that tend to appear in journals.

1.6.4 Conference Proceedings

Conferences are meetings where researchers present scientific findings, often in preliminary form. Experts are sometimes invited to these conferences to give presentations. In other cases, intended presenters must send a prospectus of what they intend to present (called an “abstract”) or even a fully developed paper on which the presentation will be based. A vetting committee reviews the abstract or paper presentation to decide whether the authors should be invited to present their work to the conference.

Often the presentations at conferences are based on papers that are intended to be published in a transcript of the conference called “proceedings.” The conferences are often peer reviewed, and the proceedings tend to be published within a few months of the conclusion of the conference, although there is a very wide range of practices and quality in conference proceedings publications.

1.6.5 Newsletters

Newsletters are informal publications produced by some community of interest, for example, a user group, a special interest group of some professional society, or an informal collection of practitioners. These publications have a fast turnaround, often only a few days, and are a way to expose an idea for rapid consideration and discussion. Newsletters, not usually peer reviewed, and do not have the prestige of journals, magazines, or conferences.

1.6.6 Websites and Blogs

Many technical disciplines, subdisciplines, and specialties have spawned one or more dedicated websites and columnist blogs. Websites and blogs can have nearly instantaneous publication so that they can be very timely in their coverage. Very few of these websites or blogs, however, are peer reviewed and so you must be wary of the accuracy of their content.

1.6.7 Vignette: Nontechnical Writing

The following is an example of nontechnical writing. It's an email to a friend or Facebook post concerning an accident in which I was involved:

So yesterday I'm driving to the bank on Valley Road when this idiot runs a stop sign and T-bones my car. Thank God I wasn't hurt, but my side airbag deployed and that probably saved me. The car isn't totaled, but the passenger side door was crushed and there is a lot of other damage to it and they had to tow it. The cop who responded to the scene thought I was looking at \$15,000 of damage or more. They towed my car to the body shop, but I haven't gotten an estimate to repair yet. The other guy was driving some old clunker and it barely had a scratch on it. Stupid jerk was probably drunk, but the cop didn't want to give him a breathalyzer test because I think he knew the guy.

Notice how the writing contains emotion, accusations, speculation, and blame, features that are not supposed to appear in technical writing.

1.6.8 Vignette: Technical Writing Sample

The following is an accident report written for an insurance company describing the same accident as in Vignette 1.6.7:

On October 1, 2017 at approximately 10 AM Driver A was proceeding by vehicle on Valley Road through a cross street. Driver B was proceeding through the stop sign at the cross street, colliding with the passenger side of the vehicle driven by Driver A. The driver side airbag for Driver A's

vehicle deployed. There were no injuries. Driver A's vehicle needed to be towed.

Notice how this report avoids any emotional statements, speculation, or insults and focuses only on facts. You should always treat an accident as a technical report. Your lawyer will thank you for this advice if the situation ever escalates to a lawsuit.

1.7 Exercises

- 1.1 For the following, which could be considered to be technical writing, nontechnical writing, or both?

An email to a friend about your new computer

A complaint letter to the manufacturer of a robot vacuum cleaner

A letter to your insurance company explaining how a disease affects you

A letter to a government taxing agency in response to their inquiry about your tax return

A written request to your work supervisor for a salary increase

A letter to your local government authority requesting a zoning variance for a new pool

- 1.2 Consider the definition of “technical writing” given in the introduction. Based on this definition, is this book about “technical writing” technical writing itself, or not? Defend your answer. *Hint:* Where does this book fit in the taxonomy of Figure 1.1?

- 1.3 For a technical discipline of your choosing, identify a relevant:

Blog

Newsletter

Magazine

Journal

Conference

Make a note if you cannot find any of these

- 1.4 For the publications you identified in Exercise 1.3, find the publication's author guidelines (e.g., recommended paper length, aims and scope, submission instructions). These are generally found at the publication's website.
- 1.5 Using the same axes that were used in Figure 1.3, identify where the publications you discovered in Exercise 1.3 would appear on a similar graph.

- 1.6 Write a 300–400 word Facebook post describing your current place of residence.
- 1.7 Write a 300–400 word technical description of your current place of residence for an insurance company.
- 1.8 What are the main differences between your writings from Exercises 1.6 and 1.7?
- 1.9 Write a 50 word or less biosketch for yourself.

Endnotes

1. I was told a different version of this wordplay by members of the Royal Australian Air Force more than twenty years ago. In reference to diet, an Aussie would say, “A panda eats roots, shoots and leaves.” But the panda is known to be quite amorous and a double entendre arises if you add a comma after “eats,” that is, “A panda eats, roots, shoots and leaves”; the word “root” meaning the act of procreation. Thus, with one misplaced comma, you convert a harmless statement about panda dietary habits to pornography.
2. At least for the past decade or so, this has been the usual practice for technical periodicals. There are still many prior decades of important work not yet available in digital form.

References

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