CHAPTER

1 Introduction to Technical Communication

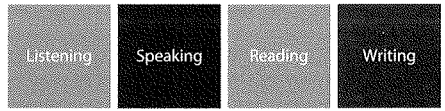
THIS TEXTBOOK EXPLORES how people in the working world find, create, and deliver technical information. Even if you do not plan on becoming a *technical communicator* (a person whose main job is to produce documents such as manuals, reports, and websites), you will often find yourself creating documents on your own, participating in teams that create them, and contributing technical information to others who use and create them. The purpose of *Technical Communication* is to help you learn the skills you need to communicate more effectively and more efficiently in your professional life.

What Is Technical Communication?

Technical information is frequently communicated through documents such as proposals, emails, reports, podcasts, computer help files, blogs, and wikis. Although these documents are a key component of technical communication, so too is the *process*: writing and reading tweets and text messages, for example, or participating in videoconference exchanges with colleagues. Technical communication encompasses a set of *activities* that people do to discover, shape, and transmit information.

When you produce technical communication, you use the four basic communication modes—listening, speaking, reading, and writing—to analyze a problem, find and evaluate evidence, and draw conclusions. These are the same skills and processes you use when you write in college, and the principles you have studied in your earlier writing courses apply to technical communication. The biggest difference between technical communication and the other kinds of writing you have done is that technical communication has a somewhat different focus on *purpose* and *audience*.

Four Basic Modes of Communication



UNDERSTANDING PURPOSE

Technical communication begins with identifying a problem and thinking about how to solve it. Because of the variety of problems and solutions in the working world, people communicate technical information for a number of *purposes*, many of which fall into one of two categories:

- **Communication that helps others learn about a subject, carry out a task, or make a decision.** For instance, administrators with the Department of Health and Human Services might hire a media production company to make a video that explains to citizens how to use a website to manage their Medicare benefits. The president of a manufacturing company might

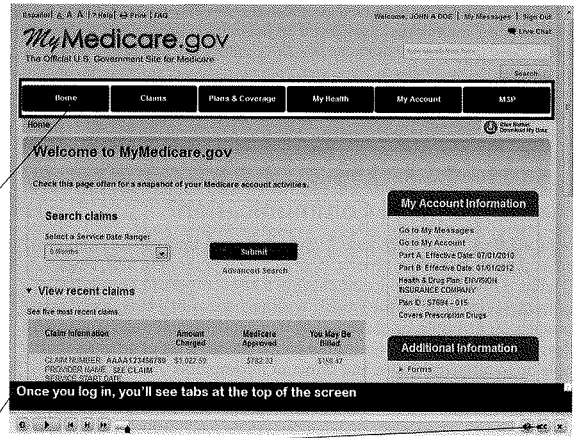


FIGURE 1.1
A Communication That Helps Others Carry Out a Task

The purpose of this online video at Medicare.gov is to help members carry out the task of using the website.

Information from Centers for Medicare & Medicaid Services, 2016: www.mymedicare.gov/Help/VirtualTour/WBT_Virtual_Online_Tour.aspx.

The red box guides viewers as they watch the video, showing them where to find the navigation tabs on the site.

The closed captioning aids the hearing impaired.

write an article in the company newsletter to explain to employees why management decided to phase out production of one of the company's products. The board of directors of a community-service organization might produce a grant proposal to submit to a philanthropic organization in hopes of being awarded a grant. Figure 1.1 shows a screen capture from an online video that explains how to use the Medicare website.

- **Communication that reinforces or changes attitudes and motivates readers to take action.** A wind-energy company might create a website with videos and text intended to show that building wind turbines off the coast of a tourist destination would have many benefits and few risks. A property owners' association might create a website to make the opposite argument: that the wind turbines would have few benefits but many risks. In each of these two cases, the purpose of communicating the information is to persuade people to accept a point of view and encourage them to act—perhaps to contact their elected representatives and present their views about this public-policy issue. Figure 1.2 shows an excerpt from a website that promotes the building of wind turbines off the coast of Massachusetts.

UNDERSTANDING AUDIENCE

When you communicate in the workplace, you have not only a clear purpose—what you want to achieve—but also a clearly defined *audience*—one or more people who are going to read the document, attend the oral presentation, visit the website, or view the video you produce. Sometimes audience

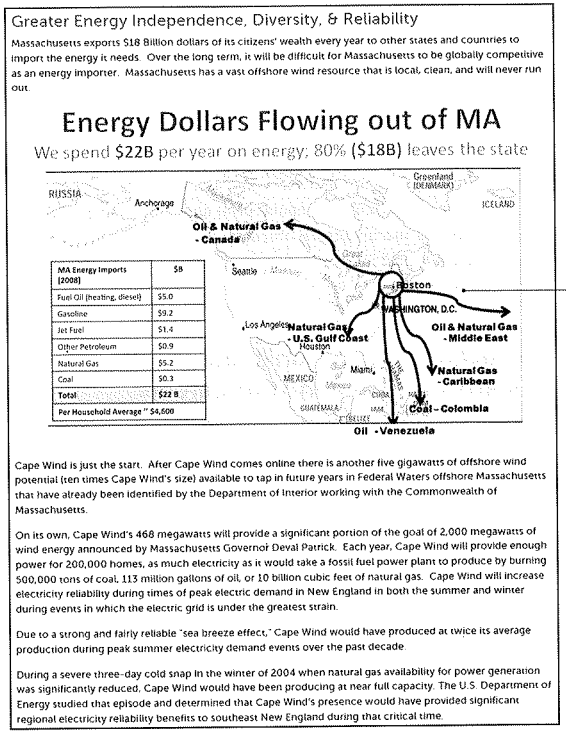


FIGURE 1.2 A Communication That Aims to Change Attitudes

The purpose of this website, created by an energy development company, is to generate public support for an offshore wind park.

Information from Cape Wind Associates, 2016: www.capewind.org/what.

This page relies heavily on statistics and visual techniques to show the economic benefits of the wind park.

members share the same purpose, but not always. It's possible, even likely, that a piece of technical communication will have multiple audiences with different purposes.

In most of your previous academic writing, your audience has been your instructor, and your purpose has been to show your instructor that you have mastered some body of information or skill. Typically, you have not tried to create new knowledge or motivate the reader to take a particular action—except to give you an "A" for that assignment.

By contrast, in technical communication, your audience will likely include peers and supervisors in your company, as well as people outside your company. For example, suppose you are a public-health scientist working for a federal agency. You and your colleagues just completed a study showing that, for most adults, moderate exercise provides as much health benefit as strenuous exercise. After participating in numerous meetings with your colleagues and after drafting, critiquing, and revising many drafts, you produce four different documents:

- a journal article for other scientists
- a press release to distribute to popular print and online publications
- an infographic for use in doctors' offices
- an animated blog post for your agency to share on social media

In each of these documents, you present the key information in a different way to meet the needs of a particular audience.

Why Technical Communication Skills Are Important in Your Career

Many college students believe that the most important courses they take are those in their major. Some biology majors think, for example, that if they just take that advanced course in genetic analysis, employers will conclude that they are prepared to do more advanced projects and therefore will hire them.

But knowledge in a particular field is not the only thing employers are looking for. It's not even the most important skill or ability. Surveys over the past three or four decades have shown consistently that employers want to hire people who can communicate. Look at it this way: when employers hire a biologist, they want a person who can communicate effectively about biology. When they hire a civil engineer, they want a person who can communicate about civil engineering.

A 2012 survey by Millennial Branding, a research and management consulting firm that helps companies find and train Generation Y employees, sifted through data from more than 100,000 U.S. companies. The results showed that 98 percent of those companies named communication skills as extremely important for new employees (Millennial Branding, 2012). The next two most important characteristics? Having a positive attitude (97 percent) and teamwork skills (92 percent).

Job Outlook 2013, a report produced by the National Association of Colleges and Employers, found that communication skills, teamwork skills, and problem-solving skills top the list of skills and qualities that employers seek. The report's main conclusion: "the ideal candidate is a good communicator who can make decisions and solve problems while working effectively in a team" (National Association, 2012, p. 31). On a 5-point scale, where 5 equals "extremely important," here are the top ten skills and qualities, according to employers, and the scores they earned:

SKILL OR ABILITY	SCORE
Ability to verbally communicate with persons inside and outside the organization	4.63
Ability to work in a team structure	4.60
Ability to make decisions and solve problems	4.51
Ability to plan, organize, and prioritize work	4.46
Ability to obtain and process information	4.43
Ability to analyze quantitative data	4.30
Technical knowledge related to the job	3.99
Proficiency with computer software programs	3.95
Ability to create and/or edit written reports	3.56
Ability to sell or influence others	3.55

Most of these skills relate to the technical communication process introduced in this chapter and described in greater detail throughout the book.

A study of more than 400 employers suggests that technical communication is even more important for professionals now than it ever has been in the past (Hart Research Associates, 2015, pp. 1–4). Over 80 percent of the employers surveyed said that their top priority in hiring new employees is finding people with excellent writing, speaking, and problem-solving skills. They also emphasized the ability to work in groups and make ethical decisions. Some reports estimate that, in the aggregate, companies spend over three billion dollars annually to train employees to write (College Entrance Examination Board, 2004, p. 29). Would companies rather not have to spend that money? Yes.

You're going to be producing and contributing to a lot of technical documents. The facts of life in the working world are simple: the better you communicate, the more valuable you are. This textbook can help you learn and practice the skills that will make you a better communicator.

The Challenges of Producing Technical Communication

One of the most challenging activities you will engage in as a professional is communicating your ideas to audiences. Why? Because communication is a higher-order skill that involves many complex factors.

The good news is that there are ways to think about these complex factors, to think *through* them, that will help you communicate better. No

matter what document you produce or contribute to, you need to begin by considering five sets of factors.

AUDIENCE-RELATED FACTORS

What problem or problems is your audience trying to solve? Does your audience know enough about your subject to understand a detailed discussion, or do you need to limit the scope, the amount of technical detail, or the type of graphics you use? Does your audience already have certain attitudes or expectations about your subject that you wish to reinforce or change? Does your audience speak English well, or should you present the information in more than one language? Does your audience share your cultural assumptions about such matters as how to organize and interpret documents, or do you need to adjust your writing approach to match a different set of assumptions? Does your audience include people with disabilities (of vision, hearing, movement, or cognitive ability) who have requirements you need to meet?

PURPOSE-RELATED FACTORS

Before you can write, you need to determine your purpose: what do you want your audience to know or believe or do after having read your document? Do you have multiple purposes? If so, is one more important than the others? Although much technical communication is intended to help people perform tasks, such as configuring privacy settings in a social-media environment, many organizations large and small devote significant communication resources to the increasingly vital purpose of branding: creating an image that helps customers distinguish the company from competitors. Most companies now employ community specialists as technical communicators to coordinate the organization's day-to-day online presence and its social-media campaigns. These specialists publicize new products and initiatives and respond to questions and new developments. They also manage all of the organization's documents—from tweets to blog posts to Facebook fan pages and company-sponsored discussion forums.

SETTING-RELATED FACTORS

What is the situation surrounding the problem you are trying to solve? Is there a lot at stake in the situation, such as the budget for a project, or is your document a more routine communication, such as technical notes for a software update? What is the context in which your audience will use your document? Will the ways in which they use it—or the physical or digital environment in which they use it—affect how you write? Will the document be used in a socially or politically charged setting? Does the setting include established norms of ethical behavior? Is the setting formal or informal? Settings can have a great deal of influence over how audiences think about and use technical communication.

DOCUMENT-RELATED FACTORS

What type of content will the document include? How will the content aid problem solving? Does your subject dictate what kind of document (such as a report or a blog post) you choose to write? Does your subject dictate what medium (print or digital) you choose for your document? Do you need to provide audiences with content in more than one medium? If you're using a document template, how should you modify it for your audiences and purposes? Does the application call for a particular writing style or level of formality? (For the sake of convenience, we will use the word *document* throughout this book to refer to all forms of technical communication, from written documents to oral presentations and online forms, such as podcasts and wikis.)

PROCESS-RELATED FACTORS

What process will you use to produce the document? Is there an established process to support the work, or do you need to create a new one? Do you have sufficient time for planning tasks, such as analyzing your audience and purpose, choosing writing tools, and researching and reading background information? Does your budget limit the number of people you can enlist to help you or limit the size or shape of the document? Does your schedule limit how much information you can include in the document? Does your schedule limit the type or amount of document testing you can do? Will the document require updating or maintenance?

Because all these factors interact in complicated ways, every technical document you create involves a compromise. If you are writing a set of instructions for installing a water heater and you want those instructions to be easily understood by people who speak only Spanish, you will need more time and a bigger budget to have the document translated, and it will be longer and thus a little bit harder to use, for both English and Spanish speakers. You might need to save money by using smaller type, smaller pages, and cheaper paper, and you might not be able to afford to print it in full color. In technical communication, you do the best you can with your resources of time, information, and money. The more carefully you think through your options, the better able you will be to use your resources wisely and make a document that will get the job done.

Characteristics of a Technical Document

Technical communication shares certain general characteristics with other types of communication. For example, both technical communication and journalism report data and information in an organized and efficient manner. Technical communication, however, isn't journalism or investigative

reporting. It's communication produced in workplace settings to help people in both professional and personal contexts accomplish tasks.

Almost every technical document that gets the job done has six major characteristics:

- **It addresses particular readers.** Knowing who the readers are, what they understand about the subject, how well they speak English, and how they will use the document will help you decide what kind of document to write, how to structure it, how much detail to include, and what sentence style and vocabulary to use.
- **It helps readers solve problems.** For instance, you might produce a video that explains to your company's employees how to select their employee benefits, or you might write a document spelling out the company's policy on using social media in the workplace.
- **It reflects the organization's goals and culture.** For example, a state government department that oversees vocational-education programs submits an annual report to the state legislature in an effort to secure continued funding, as well as a lot of technical information to the public in an effort to educate its audience. Although the connection may not be obvious, technical documents also reflect the organization's culture. For example, many organizations encourage their employees to blog about their areas of expertise to create a positive image of the organization.
- **It is produced collaboratively.** No one person has all the information, skills, or time needed to create a large document. You will work with subject-matter experts—the various technical professionals—to create a better document than you could have made working alone. You will routinely post questions to networks of friends and associates—both inside and outside your own organization—to get answers to technical questions.
- **It uses design to increase readability.** Technical communicators use design features—such as typography, spacing, and color—to make a document not only more attractive but also more usable, so that it creates a positive impression and is easy to navigate and understand.
- **It consists of words or images or both.** Images—both static and moving—can make a document more interesting and appealing to readers and can help the writer communicate and reinforce difficult concepts, communicate instructions and descriptions of objects and processes, communicate large amounts of quantifiable data, and communicate with nonnative speakers.

Although most technical documents share the characteristics listed above, their quality can vary widely. How can you recognize a well-made document? Consider the characteristics described in the Guidelines box on page 11.

GUIDELINES Measures of Excellence in Technical Documents

Nine characteristics distinguish excellent technical documents:

- **Honesty.** The most important measure of excellence in a technical document is honesty. You need to tell the truth and not mislead the reader, not only because it is the right thing to do but also because readers can get hurt if you are dishonest. Finally, if you are dishonest, you and your organization could face serious legal charges. If a court finds that your document's failure to provide honest, appropriate information caused a substantial injury or loss, your organization might have to pay millions of dollars.
- **Clarity.** Your goal is to produce a document that conveys a single meaning the reader can understand easily. An unclear technical document can be dangerous. A carelessly drafted building code, for example, could tempt contractors to use inferior materials or techniques. In addition, an unclear technical document is expensive. Handling a telephone call to a customer-support center costs $5–$10 for a simple question but about $20–$45 for a more complicated problem—and about a third of the calls are the more expensive kind (Carlaw, 2010). Clear technical communication in a product's documentation (its user instructions) can greatly reduce the number and length of such calls.
- **Accuracy.** A slight inaccuracy can confuse and annoy your readers; a major inaccuracy can be dangerous and expensive. In another sense, accuracy is a question of ethics. Technical documents must be as objective and unbiased as you can make them. If readers suspect that you are slanting information—by overstating or omitting facts—they will doubt the validity of the entire document.
- **Comprehensiveness.** A good technical document provides all the information readers need. It describes the background so that readers unfamiliar with the subject can understand it. It contains sufficient detail so that readers can follow the discussion and carry out any required tasks. It refers to supporting materials clearly or includes them as attachments. A comprehensive document provides readers with a complete, self-contained discussion that enables them to use the information safely, effectively, and efficiently.
- **Accessibility.** A good technical document can be accessed and used by people with varying physical abilities. Although accessibility is important in all documents, it is of particular concern with online materials. For example, instructional videos should include closed-captioning for the visually impaired. Documents designed with accessibility in mind tend to function better for everyone. For more about designing accessible documents, see Chapter 11, pages 281–84.
- **Usability.** In technical communication, *usability* measures how successfully a document achieves its purposes and meets its audience's needs. For more about testing for usability, see Chapter 13.
- **Conciseness.** A document must be concise enough to be useful to a busy reader. You can shorten most writing by 10 to 20 percent simply by eliminating unnecessary phrases, choosing shorter words, and using economical grammatical forms. Your job is to figure out how to convey a lot of information economically.

(continued)

- **Professional appearance.** You start to communicate before anyone reads the first word of the document. If the document looks neat and professional, readers will form a positive impression of it and of you. Your document should adhere to the format standards of your organization or your professional field, and it should be well designed. For example, a letter should follow one of the traditional letter formats and have generous margins.
- **Correctness.** A correct document is one that adheres to the conventions of grammar, punctuation, spelling, mechanics, and usage. Sometimes, incorrect writing can confuse readers or even make your writing inaccurate. The more typical problem, however, is that incorrect writing makes you look unprofessional. If your writing is full of errors, readers will wonder if you were also careless in gathering, analyzing, and presenting the technical information. If readers doubt your professionalism, they will be less likely to accept your conclusions or follow your recommendations.

Skills and Qualities Shared by Successful Workplace Communicators

People who are good at communicating in the workplace share a number of skills. Three of them relate to the problem-solving skills you have been honing in school and will continue to develop in your career:

- **Ability to perform research.** Successful communicators know how to perform primary research (discovering new information through experiments, observations, interviews, surveys, and calculations) and secondary research (finding existing information by reading what others have written or said). Successful communicators seek out information from people who *use* the products and services, not just from the manufacturers. Therefore, although successful communicators would visit the Toyota website to learn about the technical specifications of a Prius if they wanted to find out what it was like to drive, own, or repair a Prius, they would be sure to search the Internet for information from experts not associated with Toyota, as well as *user-generated content*: information from owners, presented, for example, in discussion forums and blogs.
- **Ability to analyze information.** Successful communicators know how to identify the best information—most accurate, relevant, recent, and unbiased—and then figure out how it can help them in understanding a problem and ways to solve it. Successful communicators know how to sift through mountains of data, identifying relationships among apparently unrelated facts. They know how to evaluate a situation, look at it from other people's perspectives, and zero in on the most important issues.
- **Ability to speak and write clearly.** Successful communicators know how to express themselves clearly and simply, both to audiences that know a lot about the subject and to audiences that do not. They take care to revise, edit, and proofread their documents so that the documents present accurate information, are easy to read, and make a professional impression. And they know how to produce different types of documents, from tweets to memos to presentations.

In addition to the skills just described, successful workplace communicators have several qualities that relate to professional attitudes and work habits. These qualities are outlined in the Guidelines box below.

GUIDELINES Communicating Professionally

When you communicate in the workplace, model the behavior of successful professionals.

- **Be honest.** Successful communicators tell the truth. They don't promise what they know they can't deliver, and they don't bend facts. When they make mistakes, they admit them and work harder to solve the problem.
- **Be willing to learn.** Successful communicators know that they don't know everything—not about what they studied in college, what their company does, or how to write and speak. Every professional is a lifelong learner.
- **Display emotional intelligence.** Successful communicators understand their own emotions and those of others. Because they can read people—through body language, facial expression, gestures, and words—they can work effectively in teams, helping to minimize interpersonal conflict and encouraging others to do their best work.
- **Be generous.** Successful communicators reply to requests for information, and they share information willingly. (Of course, they don't share confidential information, such as trade secrets, information about new products being developed, or personal information about colleagues.)
- **Monitor the best information.** Successful communicators seek out opinions from others. They monitor the best online sources for new approaches that can spark their own ideas. They use searching and filtering tools to help them stay on top of the torrent of new information on the Internet. They know how to use social media and can represent their organization online.
- **Be self-disciplined.** Successful communicators are well organized and diligent. They finish what they start, and they always do their best on any document, from the least important text message to the most important report.
- **Prioritize and respond quickly.** Successful communicators know that the world doesn't always conform to their own schedules. Because social media never sleep, communicators sometimes need to put their current projects aside in order to respond immediately to a problem or request. And even though speed is important, they know that quality is, too; therefore, they make sure every document is fully professional before it goes out.

DOCUMENT ANALYSIS ACTIVITY

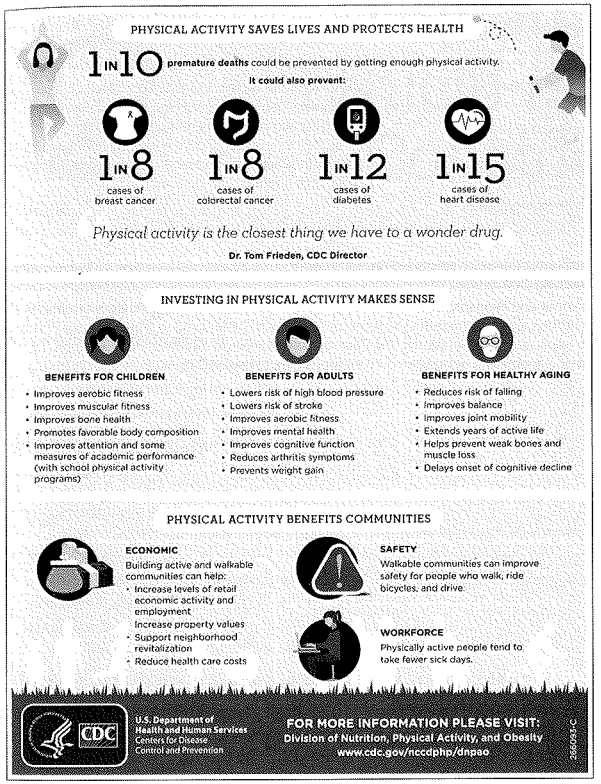
Analyzing a Technical Document

This two-page publication was produced by the Centers for Disease Control and Prevention (CDC). The following questions ask you to think about the various factors that contributed to the content and design of this document.

1. Who is the audience for this document? Where do you think the authors intended for the document to be displayed?
2. With which of the two general purposes does this document more closely align? Does it help others to learn about a subject, carry out a task, or make a decision, or does it reinforce or change attitudes and motivate readers to take action? If the document appears to have some combination of these purposes, which seems to be the most important? How can you tell?

Information from Centers for Disease Control and Prevention, 2016: www. cdc.gov/physicalactivity/downloads/healthy-strong-america.pdf.

Analyzing a Technical Document *(continued)*



3. What problem is the document addressing? Does the document provide clear solutions?
4. Has the document been designed to facilitate usability? How does it use words and images to communicate information? Does it create a positive impression? Is it easy to navigate and understand? Does it address readers with various physical abilities?
5. Is the document concise? How well does it communicate a lot of information in an economical manner? Can busy readers scan it and grasp the main point?
6. Does the document appear professional? Why or why not?

EXERCISES

For more about memos, see Ch. 14, p. 376.

1. Form small groups and study the home page of your college or university's website. Focus on three measures of excellence in technical communication: clarity, accessibility, and professional appearance. How effectively does the home page meet each of these measures of excellence? Be prepared to share your findings with the class.
2. Locate an owner's manual for a consumer product, such as a coffee maker, bicycle, or hair dryer. In a memo to your instructor, discuss at least three decisions the writers and designers of the manual appear to have made to address audience-related factors, purpose-related factors, setting-related factors, document-related factors, or process-related factors. For instance, if the manual is printed only in English, the writers and designers presumably decided either that it was not necessary to create versions in other languages or that they didn't have the resources to do so.
3. Using a job site such as Indeed.com or Monster.com, locate three job ads for people in your academic major. In each ad, identify references to writing and communication skills, and then identify references to professional attitudes and work habits. Be prepared to share your findings with the class.

CASE 1: Using the Measures of Excellence in Evaluating a Résumé

Your technical-communication instructor is planning to invite guest speakers to deliver presentations to the class on various topics throughout the semester, and she has asked you to work with one of them to tailor his job-application presentation to the "Measures of Excellence" discussed in this chapter. To access relevant documents and get started on your project, go to LaunchPad.

CHAPTER 2

Understanding Ethical and Legal Considerations