CHAPTER 1

UNDERSTANDING READERS

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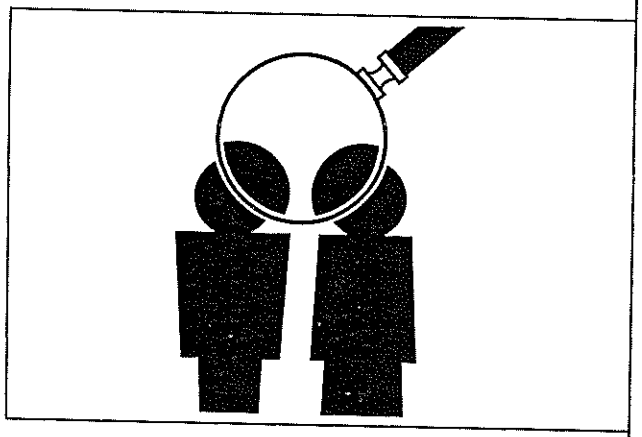

Understanding your readers is critical to producing a useful document, and teachers of technical communication regularly emphasize the need for audience analysis. To understand their audiences, technical communicators often ask specific questions about their readers' jobs, education, age, and needs—important information for the specific document. Equally important is understanding more generally how people act as readers, that is, how they work with documents. That more general understanding is the focus of this chapter.

The chapter has four major sections, each devoted to a critical aspect of how readers work with documents:

1. Readers decide how much attention to pay to a document.
2. Readers use documents as tools.
3. Readers actively interpret as they read.
4. Readers interpret documents in light of their own knowledge and expectations.

In each section, I discuss both relevant research and practical implications for technical communicators.

READERS DECIDE HOW MUCH ATTENTION TO PAY TO A DOCUMENT

Just writing a document isn't enough to ensure that people will read it. Reading is a voluntary act; people don't have to do it.

What the Research Says

Wright, Creighton, and Threlfall (1982) found that people have definite opinions about when instructions should be necessary. They asked the subjects in their study, who were typical adult consumers, to imagine that they had just bought products ranging from cake mix to bleach to a digital watch to a washing machine. There were 60 products on the list, all with made-up brand names. Wright and her colleagues asked these consumers how much of the instructions they would read for each product.

The results showed both that consumers have strong feelings about the types of products for which they would and would not read instructions and that many consumers agree on the products for which they did and did not expect to need instructions. For example, they wouldn't read instructions for a TV because they expect to only have to plug it in and switch it on. You can't assume that, just because you wrote a document, people will read it.

People's beliefs about the need for instructions are difficult to overcome. Wright (1981, 1989) relates this example: When a British candy company put out a very strong peppermint that was not meant to be eaten like candy, it put a caution notice on the package. The caution notice didn't work. The product looked like candy; it was sold with candy; and people bought it and ate it like candy—and got sick. The company was surprised, but it should not have been. People don't look for instructions on a package that seems to contain candy. As a technical communicator, you need to be aware of readers' expectations and of potential conflicts between the message that the packaging sends and the messages in your illustrations and written words.

People may decide not to deal with documents even when it means giving up something they deserve and need. For example, in one of our early studies, my group at the American Institutes for Research found that poorly written forms and notices are overwhelming to many readers (Rose, 1981). People miss deadlines, don't turn in applications, and don't pursue incorrect refunds or benefits statements because the documents are just too difficult to understand and use. You cannot assume that people will work their way through a document just because it is important. If the organization, language, and design make the document too difficult, many readers will give up.

In a 1990 study, we found similar results on a much larger scale. We invited readers of *Modern Maturity*, the magazine of the American Association of Retired Persons, to answer questions about their experiences with forms and notices. We asked them to select one form or notice that they had recently dealt with and to answer questions about that document.

Of the more than 3,800 people who responded, 34% said that they had lost money or benefits because the document was too difficult to understand or fill out. Of the 474 respondents who wrote about forms that they were trying to use to apply for credit or to buy something, 29% gave up before finishing the process, and 30% stopped using the service or organization (Bagin & Rose, 1991a, 1991b).

These readers lost out because they decided not to deal further with the document, but the businesses that were trying to communicate with these people also lost. They lost potential customers and future sales, perhaps because they did not realize that, even when people start out wanting whatever the document covers, they may give up on both the document and the company if the document is too difficult.

Writing so that people read a document is not restricted to those who communicate with the general public. In the workplace, your technical documents compete with many others for readers' attention. The most salient characteristic of readers in the workplace is that they are busy and don't have time to waste on dense documents. Consider your own experiences as a reader. How many documents have you glanced

at and put aside to read later because they looked too dense to deal with immediately? How many of those have you never really read?

Even sophisticated, technical readers of technical documents want to be able to open a document, find what they need quickly, understand it easily, and have the most important information stand out visually on the page or computer screen.

Readers are continually deciding, consciously or subconsciously, whether more time and effort with a document is worth the additional benefit in learning or understanding. I've found it useful to think of this as *satisficing*, to borrow a term from the work of the well-known economist Herbert Simon (1976). Simon used *satisficing* to describe what administrators do when they "look for a course of action that is satisfactory or 'good enough.'" They act without exploring all the options. They use "rules of thumb that do not make impossible demands upon [their] capacity for thought" (Simon, 1976, p. xxx).

Readers working with technical documents and products also satisfice. They skim; they skip; they read just enough to reach a personal level of satisfaction with their new knowledge or until they reach a personal level of frustration with the document or product. They may return to the document later for more information or to try again, which is another reason why helping readers to find what they need quickly is so critical in technical documents.

Many people continue to do tasks in less than optimal ways because the effort to figure out a new way seems too great. How many functions of your own VCR, microwave oven, telephone, or word processor do you use? Do you ever want to do more or do something differently—for example, record one program on your VCR while you're watching another program, address an envelope using the computer, or place a conference call—and yet not do it because it's too much trouble to read the documentation? If so, you're satisficing.

In many cases, satisficing is the only way that readers can cope with their work environment. For example, subject matter specialists who read proposals for grant agencies may have 10 to 12 proposals to read in five hours. That's 20 to 30 minutes per proposal. Much as these readers want to be fair and give each proposal all the points it deserves, they have to satisfice. They don't have the time to hunt out information that may be hidden under an obscure heading. They don't have the time to untangle a wordy and convoluted plan. Proposal writers who have made it easy for these readers to find and understand the relevant information are going to get higher scores.

What You Can Do

What implications do these facts about readers have for technical communicators? One is that you should consider whether you are writing

the best type of document to help your readers. For example, given the fact that many people were overwhelmed with a particular form, Carolyn Boccella Bagin of the American Institutes for Research turned the form into a series of letters (Bagin, 1988). As I'll discuss later in this chapter, people are more comfortable with letters than with forms. (Of course, not every form would be better as a letter, yet most forms you see could be vastly improved by a technical communicator who understands readers and knows techniques of good document design.)

Another implication is to deal head-on with the reality that busy readers may not be willing to read much. For example, given the problem of how to get executives to start using electronic mail, Joanne Landesman of the American Institutes for Research created a 12-panel card of *Mini-Lessons*. The *Mini-Lessons* card started with a bulleted list of what executives could do through the electronic mail program. It then gave the information these users needed to get into the program and showed them—with step-by-step instructions and a picture of the screen—how to do the most basic tasks. Each task was on a separate panel of the fold-out card. That's all these executives were willing to work with, and it was enough to get them going.

A third implication is to consider how your readers will use the document. Will they primarily browse through it, stopping to read what catches their interest? Will they search it for one specific piece of information? Will they read it from beginning to end? Will they return to it later to look for something they had read earlier? The answers to each of these questions imply specific techniques for organizing and designing documents, techniques that are discussed in the later chapters of this book.

READERS USE DOCUMENTS AS TOOLS

In a work of fiction, the value of the work may be intrinsic. In a workplace document, however, the value is almost always extrinsic, that is, external to the document itself. As a technical communicator, you want readers not just to read the document, but to use it. Consider these situations:

When you write this type of document:	You may want readers to do this:
Engineering specification	Build the bridge properly
Feasibility study	Make a wise decision
Instruction manual	Use the product effectively and efficiently
Memo about a meeting	Come to the meeting on time and prepared
Progress report	Continue to fund your project; agree to changes
Proposal	Fund the project
Report of an experiment	Use the same method; build on your results

What the Research Says

In the workplace, people most often "read to do" rather than "read to learn," although the opposite is true in school (Sticht, 1985; Mikulecky, 1981). In school, the main point of reading is to learn information that you will have to remember at some future time. In the workplace, many documents, from memos to reports to manuals, are used at the moment they are read to serve an immediate need. Busy readers don't generally study documents. Instead, they scan them to find the critical information and to act on that information. If they need more information, or even the same information later, they can look it up again. The working person's primary job is not usually to read documents. It is to do something, such as get a bridge built, put people on the payroll, or decide which machine to buy. Even technical communicators don't get paid for the amount they read; they get paid for writing successful communications.

Because many technical documents are tools that people use to do their jobs, they want to get in, get the information, and get out of the document. Wright shows this clearly in her model of how people use technical documents (Figure 1.1).

Wright's View of Using Technical Information

Before reading

- Formulate question—but not necessarily a precise question
- Find the location of a potential answer

During reading

- Comprehend text—but reading may be highly selective
- Construct action plans or use information to make a decision

After reading

- Execute action plans or implement decisions
- Evaluate outcome of actions or decisions

FIGURE 1.1 How People Use Technical Documents (Wright, 1987, p. 340)

Wright (1988) says that the questions people ask of technical information are problem-driven ("Why didn't that work?") or task-driven ("How do I do that?"). They are not usually system-driven ("How does it work?"). Wright's view of how people use technical documents is very similar to Donald Norman's view of how people use such objects as lamps, doors, coffeepots, VCRs, and computers (Norman, 1988). People use objects and the technical information about them in actual situations. The objects and information serve as the means for accomplishing plans and goals that are relevant to those situations. People focus on the plans and goals, not on the objects or technical documents themselves.

Research in the 1980s showed that Wright's model of how people use technical documents is clearly true for manuals. Many people use a manual only as a last resort. They don't read it; they go to it when they have a problem to solve. In a study of users trying to locate library books through a computerized catalog, Sullivan and Flower (1986, pp. 170–171) discovered the following about how people used the manual for the catalog:

- No one carefully read more than two sentences of the manual at a time.
- Most people began to use the product before they turned to the manual.
- The people in the study used the manual only when they were not successful in achieving their goal.
- Most did not read the introduction first; nor did they read all of it, even though it was only three short paragraphs.
- Most did not read any section in its entirety.

Even documents that require a careful reading initially, which may be the case with many scientific papers and technical reports, are often used again later for reference. At that point they become just like the manual in Sullivan and Flower's study. Readers go to them looking for a specific piece of information or the answer to a specific question—and these readers follow Wright's model.

Not everyone, of course, will act like the people in Sullivan and Flower's study. One of my points in the next section of this chapter is that each reader approaches documents differently. In usability laboratory studies at the American Institutes for Research, we have found that some people are readers and others are nonreaders. Some people look up information, use online help regularly, and are happy with explicit instructions, for example, in tutorials. Others are risk takers who prefer to work with a product on their own, who seldom look in a manual or in online help, who would rather explore than work through a tutorial (Redish, 1988).

These findings echo a study by *PC Magazine* (1988) in which more than 1,200 people responded to questions about learning to use new products. Of the six choices for "How do you learn new software?" only two got significant numbers of responses: "read the manual" and "experiment on your own," each of which came in at 45%. In the same study, *PC Magazine* asked, "What's your greatest obstacle in learning software?" Fifty-nine % chose the option "poorly written manuals." No other response received more than 15% of the votes. Many people, however, also commented that "lack of time" was a major problem.

What You Can Do

What are the implications of the fact that busy people use documents as tools? One implication is that because readers want help in finding the information they need quickly, good access tools are critical. The table of contents needs to match the topics that readers will be looking for. The index needs to include words that readers bring to it. (Also see the discussion in the fourth section of this chapter on the role of a good table of contents in giving readers an overview of the document.) The later chapters of this book, as well as Redish, Battison, and Gold (1985), offer many suggestions for organizing information so that it is easily accessible to readers.

Another implication is that readers want to grab information off the page quickly—often without sustained reading. For busy readers, you need to design pages that can be skimmed, scanned, and searched easily. To put white space onto a page and to chunk (separate) the information into usable pieces, you can use headings that stand out from the text; lists that set off steps or items with numbers or bullets; relevant visuals, such as tables, charts, and illustrations; and short paragraphs.

A third implication is that you have to understand how people are going to work with the document. Will people use it primarily to "read to learn"? If so, structures that promote recall, such as summaries, help readers. Will people use it primarily to "read to do"? If so, structures that promote action, such as numbered lists of steps, help readers.

Elsewhere I have suggested that some documents in the workplace, primarily computer tutorials and users' guides, must serve a hybrid purpose of "reading to learn to do" (Redish, 1988). Readers come to these documents wanting to use them like "reading to do" materials; they are eager to get on with their work. However, they will get on better with their work in the future if they also learn from the materials. Carroll and Rosson (1987) call this the "production paradox." Chapters 2 and 5 explore ways to develop documents that serve many uses.

READERS ACTIVELY INTERPRET AS THEY READ

Meaning does not reside in the text of a document; it exists only in the minds of communicators who produce documents and readers who use documents. Because each reader is an individual with his or her own knowledge, interests, and skills, a text can have as many meanings as it has readers. As Gopen and Swan (1990) write, "We cannot succeed in making even a single sentence mean one and only one thing; we can only increase the odds that a large majority of readers will tend to interpret our discourse according to our intentions" (p. 553).

What the Research Says

Early models of reading and writing that fixed the meaning in the text do not account for the dynamic nature of the reading process. Figure 1.2 shows the traditional, static model of reading and writing.

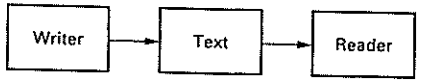

FIGURE 1.2 An Overly Simple, Static Model of Reading and Writing

A more appropriate model would show the complexities of the interaction, including the characteristics of individual readers and the characteristics of the document, all of which influence the reader's interpretation of the text. Figure 1.3 is an example of such a model from a 1982 paper by Holland and Redish.

As this figure shows, each reader brings his or her own needs, motivations, expectations, knowledge, and style to the interaction. Readers use documents to carry out tasks. To accomplish these tasks, readers have to form an internal representation of the document and select strategies for making sense of the document. That is, they have to figure out when, how, and why to use the document; whether and when to browse, search, read, or study; and how to carry out these different types of interactions with the document.

The Holland and Redish model in Figure 1.3 shows that these representations and strategies are influenced by the document's purpose and its place in an institutional or social setting as well as by the internal characteristics of the document. As the readers formulate representations and strategies, they are also influenced both by the content of the message in the document and by the ease or difficulty of using the document, that is, by its organization, format, syntax, and vocabulary.

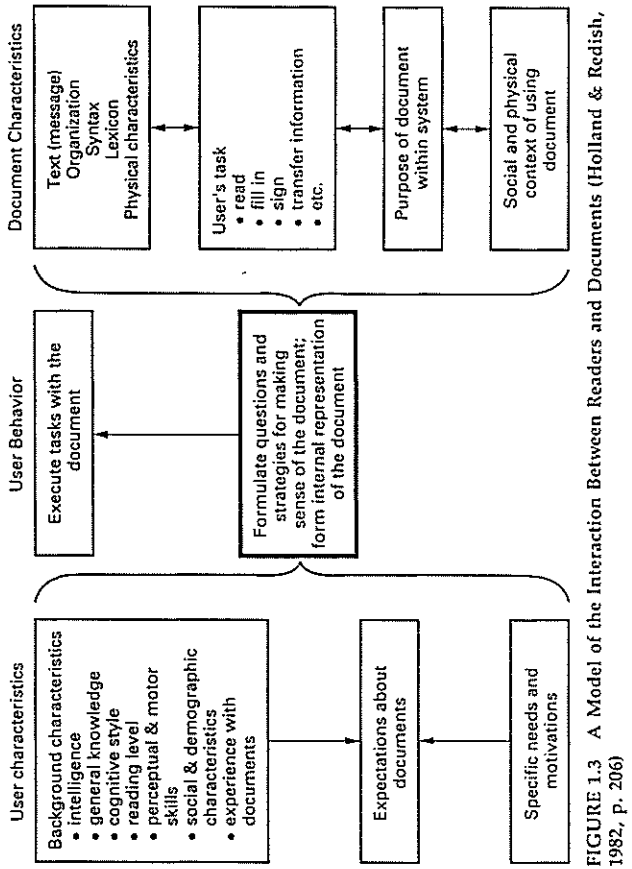

FIGURE 1.3 A Model of the Interaction Between Readers and Documents (Holland & Redish, 1982, p. 206)

A more recent model by Linda Flower, shown in Figure 1.4, adds yet another dimension to Holland and Redish's picture. Flower points out that the interpretation between person and text happens for both the communicator and the reader (Flower et al., 1990). Each is influenced by his or her own social context, goals, knowledge, language, conventions, and awareness. The text that the communicator produces is only an approximation of the mental representation of what he or she wanted to communicate. Likewise, the reader interprets the text through his or her own mental representation.

How do we know that readers form mental representations and actively interpret as they read? One way is through think-aloud pro-

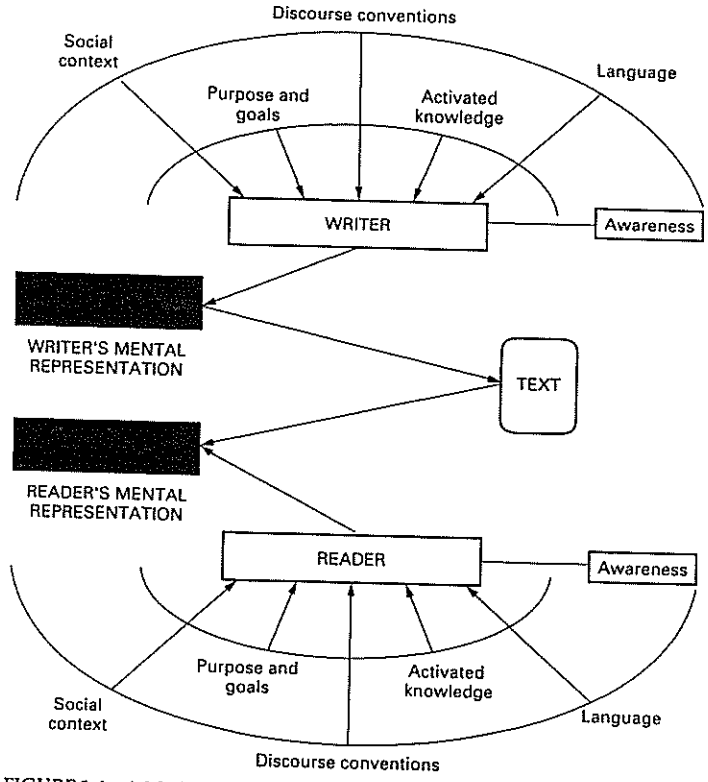

FIGURE 1.4 A Model of How Writers and Readers Interact with a Text (Flower et al., 1990)

tocols (Newell & Simon, 1972). As the name implies, people giving a think-aloud protocol say out loud whatever they are thinking as they go through a task. The *protocol* is the written record of what the person says. Think-aloud protocols have been used to understand how people solve problems and make decisions. They have also been used to understand how readers interact with documents.

Flower, Hayes, and Swarts (1983) asked people who had to use a particular federal regulation to read the regulation and think out loud. The text was typical of many bureaucratic documents: most verbs were in passive voice, the subjects of the sentences were often nouns made out of verbs, and the person or agent who should have been the subject was seldom mentioned. When Flower and her colleagues analyzed the transcripts, they found that these readers often translated the passive, nominal prose into *scenarios*. That is, the readers restated the information for themselves in terms of "who did or might do what to whom." The readers were doing a lot of work to understand the text. No wonder so few of the people who should read regulations like these actually do. Moreover, the scenarios that these readers came up with as they translated the difficult text were often wrong. The policies that the technical communicators were trying to convey were not the ones that readers thought they found in the text. The technical communicators' mental representations of the text and the readers' mental representations did not match.

Think-aloud protocols are a standard part of most usability testing and usability research. (See Chapter 11 for more information about usability testing and the place of think-aloud protocols in testing.) Using this technique, John Carroll and his colleagues at IBM's Watson Research Center discovered just how active readers and users are as they interpret documents and products. In observing and listening to secretaries who were working with a new word processing program and the manual for it, Carroll and his colleagues found that people are not passive learners. The secretaries in Carroll's studies actively interpreted the text as they tried to make sense of what happened and they acted on the basis of their interpretations rather than on what the writer may have meant the text to say. Their interpretations came from their previous experiences in other situations and were often wrong for the program they were working with. Nonetheless, these people acted on their own explanations and on their own predictions of what would happen next. When other evidence, such as what was on the screen or what was in the manual, conflicted with their explanations or predictions, they ignored or misinterpreted the information from the screen or manual (Mack, Lewis, & Carroll, 1983; Carroll & Mack, 1984; for a general review of the work of this group, see Carroll 1990).

In these studies, Carroll and his colleagues found that the people they observed not only interpreted as they read, but also tended to

- Resist reading
- Set their own goals
- Jump the gun to act before reading the instructions

As Carroll and Mack (1984) wrote, these people were "doing, thinking, and knowing" rather than just reading and decoding. I, and probably anyone else who has heard readers think aloud or watched people work with a product or document, have seen readers do the same with a wide variety of documents (Redish, 1988).

We cannot change the fact that readers participate actively and individually in the process of interpreting text. We should not want to even if we could because research shows us that people learn best when they are actively involved (Brown, Collins, & Duguid, 1989; Suchman, 1987). In a study of computer tutorials, Charney and Reder (1986; see also Charney, Reder, & Wells, 1988) found that readers working with a tutorial that told them exactly what to do performed only slightly better on later tasks than people who just read the tutorial without working on the computer at all. A problem-solving approach in which people had to work actively through problems as part of the tutorial resulted in faster and more accurate performance on later tasks.[1]

What You Can Do

What are the implications of the fact that readers actively interpret documents as they work with them? One implication of Flower and her colleagues' study is that the "scenario principle" is a powerful tool for writing. If the technical communicators had written that regulation in scenarios (active voice, action verb sentences with people or organizations as the subjects of the sentences), they would have increased the probability that people would actually read the text and that the readers would interpret the text to mean what the agency wanted it to mean.

1. The word *active*, as in active readers, active users, active learners, is being used in two different senses in the literature at the moment, and this may be causing some confusion.

   All readers are active in the sense that they use their prior knowledge and experience to understand a new document. Every reader is a thinking human being. Every reader is involved in making meaning for himself or herself by invoking and building on his or her schemata. When Carroll and others talk about readers making hypotheses about what happened, they are referring to readers being active in this sense.

   Not all readers are active, however, in the sense that they want to explore new documents or products. When Mirel, Feinberg, and Allmendinger (1991) use "active learner" to refer to a certain type of learner, they are using this second sense of "active." They mean "explorer," or "risk taker," as I have used the term in the second section of the chapter. Mirel and her colleagues have observed, as we have at the American Institute for Research, that not all readers are happy exploring new products or documents.

   Much of Carroll's work has been on developing materials that foster exploration. In some of his early studies, however, he found that even though his subjects did better with brief cards that forced them to learn by exploring than they did with large tomes of system-oriented documentation, some were uncomfortable with a highly exploratory approach.

Another implication is that you know how readers will interpret a document only when you try it out with readers. Think-aloud protocols can be very useful to technical communicators. Schriver (1991) has shown that, when technical communicators have access to think-aloud protocols, they produce more extensive and better revisions than they do by other methods.

READERS INTERPRET DOCUMENTS IN LIGHT OF THEIR OWN KNOWLEDGE AND EXPECTATIONS

If readers actively interpret text, what is the basis of their interpretations? The basis is their own prior knowledge and the expectations that they have about the subject matter, the type of document, and the context in which they are reading the document. Their knowledge and expectations are organized into schemata.

A *schema* (plural *schemata*) helps people to make meaning from disparate pieces of information. As Anderson and Pearson (1984) explain, schemata are networks of information connected by chronology, functions, topics, and so on. They can be fragmentary and restructured on the spot. They are multidimensional, rather like hypertext, in that one piece of information can be linked to many others, each of which has its own set of connections.

A schema is like a mental model, a way of understanding. Consider the earlier example about turning forms into letters (Bagin, 1988). More people have a schema for dealing with letters than have one for dealing with forms, and they feel more comfortable with their schema for letters.

What the Research Says

Everyone uses schemata to organize information. As they read, readers (and listeners and users) automatically access their existing schemata (Bartlett, 1932; Rumelhart, 1980). People also share elements of schemata with others in their specific cultures. For example, within Western culture, most of us have a common schema or script for "going to a restaurant" (Schank & Abelson, 1977). Suppose I said: "We went to a restaurant. The hostess showed us to a table. We sat down, and then the waiter came to give us the bill." You might say, "What? Wait a minute! What happened to the menus and the food?"

How did you know to say that? You knew because you have a schema telling you that, in a restaurant with a hostess and a waiter,

people eat before paying. The words *restaurant*, *hostess*, and *waiter* may have made you call up that schema. If I had started with "We went to a fast-food place," you would not have expected to hear *hostess* and *waiter*. You would also probably have had a different reaction to the timing of the bill because you would have probably called up your "fast-food restaurant schema," in which paying comes before eating.

People also create and recreate their own schemata. As you read this, you are making connections in your mind to information you already know.

What You Can Do

Understanding the way that readers use their prior knowledge and expectations has profound implications for communicators organizing material both on a large scale (the document as a whole) and on a small scale (paragraphs and sentences). Let us look first at the issues that relate to whole documents and then at issues that relate to paragraphs and sentences.

Issues for Documents as a Whole. Successful documents are those that make explicit connections to readers' prior knowledge and expectations. One way to help readers is to help them activate an appropriate schema. Bransford and Johnson (1972, 1973) showed that you can do that with something as simple as a useful title or an illustration. (See Bransford & Johnson, 1972, 1973, or Duin, 1989, for a copy of the text that Bransford and Johnson used in one of their most famous experiments.) In their experiment, subjects who read the passage with a useful title recalled more than twice as many ideas as those who read the passage without a title.

Because users of a regulation come with questions in mind, a regulation that is organized by users' questions is most helpful to them (Flower et al., 1983; Redish et al., 1985). Because product users come to a manual knowing their goals or tasks, a manual that is organized by users' tasks is most helpful to them (Redish et al., 1985).

Readers should be able to glance down the table of contents or across the tabs of a document and immediately understand both the overall content and the structure of the document. The table of contents and tabs must work both as introduction and overview. Because the headings and subheadings in the document form the table of contents, technical communicators must pay special attention to how well the headings and subheadings work as a framework. If readers have only the headings and subheadings in order, without any text, will they know what your document is saying and where to find the information they need? (See Chapter 7 for more information on this subject).

Making connections to readers' schemata (prior knowledge and expectations) is critical, but so is expanding that knowledge. Otherwise,

you would have no reason for writing. How do you both make connections and expand readers' knowledge?

This question is the equivalent for technical documents of what Carroll and Rosson (1987) call the "assimilation paradox." Carroll and Rosson found that, as people attempted to learn new software products, they actively interpreted what they saw on the screen and what they read in the manuals. In many cases, being able to make connections to what they already knew was helpful, but these readers also relied on their prior knowledge even when it did not apply. The paradox is that if you make no connections for readers, they will find the material very difficult to assimilate; at some point, however, that prior knowledge may hinder the same readers from moving further into the product or the document.

Fischer (1988) shows this dilemma very dramatically with the following comparison between a user's mental model of a hypothetical system and the system itself (Figure 1.5).

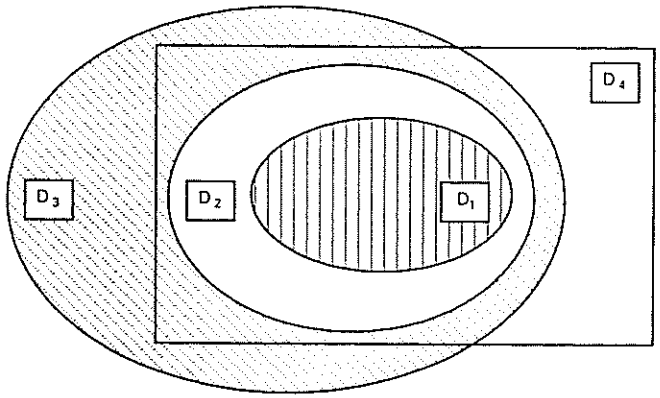

FIGURE 1.5 Comparing the User's Model of a System and the Actual System (Fischer, 1988, p. 139)

The area labeled D_1 in Figure 1.5 is the part of the system that this particular user understands and works with regularly. The larger oval, D_2, is the part of the system that the user understands less well and works with only occasionally. The rest of the oval, D_3, is the user's mental model of the system—this user's expectations of what else he or she can do in this system and how to do those other tasks. The rectangle, D_4, is the actual system. Note that the user's view, developed from an understanding of D_1 and D_2, only partially coincides with the actual system.

Discrepancies between our mental models and real systems or documents are common. Fischer drew this picture to describe the need for an intelligent help system that would

- Recognize what the user is doing or wants to do
- Evaluate how the user is trying to achieve a goal
- Construct a model of the individual user
- Decide when and how to interrupt and provide new information

With an intelligent help system like this, users could accomplish their goals more efficiently and effectively because the system would help bring the users' mental models closer to an accurate view of the system. Fischer doesn't mention it, but the opposite is also true. That is, by studying the discrepancies between users' views of the system and the actual system, product developers could change the system to be more in line with the users' models of it.

How does this relate to technical documents? Research from linguistics, rhetoric, and psychology shows us that the same principles hold for documents and products. Here are four of these principles:

- Provide an explicit schema
- Follow the given-new contract
- Maintain coherence and consistency
- Provide multiple pathways through a document

Provide an explicit schema. One way to help readers is to frame the document with a title, headings, and subheadings that show explicitly the schema you want to invoke. You can carry this further through the document by creating useful *chunks*, which are sections that you introduce by briefly elaborating an appropriate schema.

For example, Smith and Goodman (1984) compared instructions for building an electrical circuit in three formats:

- Linear (two introductory sentences and then all the instructions with no breaks or further framing).
- Structurally elaborated (that is, with brief procedural introductions to sections of the instructions). A structural (procedural) elaboration would be something like this:

  > Assembling a circuit requires that you get the major components ready, then connect them. It is often the case that the components themselves have to be assembled first.

- Functionally elaborated (that is, with brief conceptual introductions to sections of the instructions). A functional (conceptual) elaboration would be something like this:

> In a circuit, electrical current flows from a source to a consumer (i.e., to something that requires current, like a lamp). Current can flow only when the circuit's components are interconnected in a complete circle, each connection being made by a wire or other metal object that conducts electricity.

Smith and Goodman found that both types of elaboration were more useful than no elaboration at all. The structural (procedural) elaborations were somewhat more useful than the functional (conceptual) elaborations. That is, people were fastest and most accurate in completing the task—building a circuit—with the brief procedural elaborations. Brief procedural elaborations served to activate and build an appropriate schema. They also broke (chunked) the instructions into manageable pieces. Charney, Reder, and Wells (1988) also found that brief procedural elaborations in a users' guide helped readers who were not sure exactly which task they wanted to do.

Follow the given-new contract. In the 1970s, Haviland and Clark (Haviland & Clark, 1974; Clark & Haviland, 1975) showed that people who are conversing expect new information to come couched in a framework of known or previously given information. This is the *given-new contract*, and it holds for written documents as well as for conversation. Readers anticipate the given-new contract; that is, they understand new information best when it is presented in a framework of information that they already know or that they have previously been given.

For the document as a whole, the given-new contract means organizing the document with a title and headings that form a logical framework for the reader. Another way to use the given-new contract in technical documents is to set up visual patterns in the page layout that chunk information in ways that are meaningful to readers. Repeated visual patterns—the page layouts—rapidly become "given" information and help readers find what they need quickly and understand it. For example, if procedures are always given in indented, numbered lists, readers rapidly build an expectation of where to look on a page for that type of information.

Maintain coherence and consistency. Coherence in a technical document lies in the consistency of the framework that is created by the structural elements—the headings—and by the visual patterns of the pages. Creating standard visual pages can greatly facilitate reading.

In designing a report for a major company, for example, my group at the American Institutes for Research created a two-page spread, called a folio design, for each major topic. On each two-page spread, we

- Introduced the topic with the major heading, "The need for [topic]"
- Gave a specific recommendation
- Followed that with a numbered list of action steps

- Added a few short paragraphs of observations that were the rationale for the recommendation and the action steps

Busy executives who wanted to read only the recommendations could flip through the pages and find each recommendation in the same place on one page after another. If they wanted more information for a particular recommendation, they could continue down the page, grabbing the information rapidly because it was broken into small chunks and was always in the same order.

Mirel, Feinberg, and Allmendinger (1991) have recently suggested using folio designs in manuals. In their manual, each task-oriented topic gets a two-page spread. These two-page spreads incorporate the four principles of Keyes, Sykes, and Lewis (1988):

- Chunking—breaking the information into small sections that are visually distinct on the page
- Queuing—organizing the information hierarchically
- Filtering—showing the organization through levels of headings and other design features such as listing, changes in typography, and placement on the page
- Mixing modes—giving information in both words and pictures

Chapter 7 describes specific design techniques to take advantage of these principles.

Providing multiple pathways through a document. Readers bring not only their own schemata and prior knowledge to each text, but also their different cognitive, or reading, styles. Some readers are more comfortable with text, others with visuals. For many readers the synergy of text and visuals makes a document clearer. Visuals can include line drawings, charts, tables, sample computer screens, and examples set apart from the text (Redish, 1987). Chapter 6 explains how you can effectively use visuals.

Issues for Paragraphs and Sentences. People construct meaning by making sense both of the structure of the document as a whole and of the individual words, sentences, and paragraphs.

Readers' knowledge about the document as a whole influences their expectations about information they will find in that document and even colors their interpretation of individual words. Think about how you would define the word "enter" if you saw it on an income tax form, in a computer manual, or in a script for a play.

Headings can also bias expectations of the information that readers will find under them. To understand the document, however, readers must also be able to interpret the strings of words that make up the information under those headings.

Many features of the text on the level of paragraphs and sentences influence how quickly and easily readers can build meaning from the

words. Chapter 5 discusses several of these features. I will discuss just two here: following the given-new contract and using the power of parallelism.

Follow the given-new contract. The given-new contract, which I discussed earlier as an issue for the document as a whole, also operates very strongly on the paragraph and sentence level (Redish, 1989). In considering scientific writing, Gopen and Swan (1990) found that "the misplacement of old and new information turns out to be the No. 1 problem in American professional writing today" (p. 555).

Dixon (1987) investigated what happens when readers get new information first and the contextual (old, given, framing) information second. Two hypotheses for how readers understand such sentences are possible:

- Readers put the new information into a mental buffer and wait for the context in order to understand it.
- Readers guess at the context and act without waiting.

The readers in Dixon's study clearly guessed. They began to act on information immediately without waiting. For example, given the following sentences, most readers drew the picture in Figure 1.6*a*.

> This will be a picture of a wine glass. Draw a triangle on top of an upside-down T.

Given the same sentences in the opposite order (action-context; new-given), however, many readers drew the "Christmas tree" in Figure 1.6*b* rather than a wine glass.

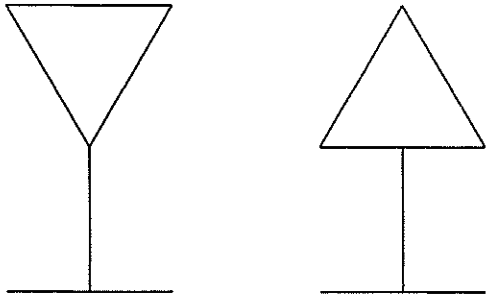

FIGURE 1.6 Different Responses for Sentences in the Order Context-Action and Action-Context: (*a*) context-action order, response correct; (*b*) action-context order, response incorrect (Dixon, 1987, p. 28)

One implication of this work is that, even on the sentence level, writers should follow the order in which readers will expect the material or in which users will do their tasks. Consider the following examples:

Poor order:

Enter ABC at the A> prompt to install ABC.

Better order:

To install ABC:

1. At the A> prompt, type: ABC
2. Press Enter.

Readers of the first example have to wait until the end of the sentence to be sure that the sentence relates to what they want to do (install ABC) and that they are in the right place (at the A> prompt). Readers who guess and start to type before finishing the sentence may find themselves in trouble if they are not at the A> prompt or if they don't want to install ABC. The first, poor, example gives readers instructions in the reverse order from the way they must act. They must first verify that they want to install ABC, then they must see that they are at the A> prompt or get there, then they must type the appropriate letters, and only last do they actually "Enter" anything, that is, press the Enter key.

Structural principles such as the given-new convention are far more important in developing useful, understandable documents than are readability formulas. Readability formulas are based on the outdated, static, linear model of Figure 1.2 (on p. 22), which assumes that the same meaning exists in the text for all readers (Redish & Selzer, 1985; Duffy, 1985). Most readability formulas also rely on only one sentence feature—length—and one semantic feature—word length or word frequency.

Duffy and Kabance (1982) found that shortening sentences and simplifying words in several reading passages led to improved scores on readability formulas but did not make the passages easier to understand. Only in one case did the Navy recruits in their study do better on a comprehension test with the revised passages than with the original ones.

Olsen and Johnson (1989) analyzed Duffy and Kabance's revised passages in an attempt to understand these results. They found that, although Duffy and Kabance's revised passages had better scores on readability formulas, they were less coherent and cohesive in their given-new links. In breaking up the sentences, Duffy and Kabance had moved information into positions that violated the given-new contract.

Olsen and Johnson suggest that Duffy and Kabance's revisions did not improve comprehension because they did not maintain the given-new contract. Shortening sentences while disrupting the given-new contract may improve the score on a readability formula but hinder real readability—that is, people trying to understand the meaning of a text, as measured by a comprehension test.

Chapter 2 discusses this point further. Chapter 5 presents specific writing techniques for attaching new information to existing knowledge.

Use the power of parallelism. A second important principle in meeting readers' needs at the paragraph and sentence level is to structure the text so that it places the least possible burden on the reader. One way to reduce the reader's burden is to create and use recurring patterns in the text, to use parallel syntactic structures.

Readers respond to recurring patterns of text. They also try to impose patterns on text. If you use visual techniques such as bulleted lists for showing off the parallelism, the parallel text is also much easier to grasp quickly.

For example, compare the two versions of the same passage in Figures 1.7 and 1.8. Figure 1.7 is the original text. It comes from an insurance policy that meets the readability standards of all the states that use a readability formula as the measure of "plain English." How "plain" do you think it is?

Option Two—Premium Reduction

Dividends will be used to pay or reduce any premium then due provided any amount of that premium remaining is paid by the end of the grace period. If the dividend is larger than the premium due, any excess will be paid in cash to the owner.

FIGURE 1.7 The Original—without Parallelism

Readers trying to understand this paragraph have to set up the parallelism for themselves. (They also have to translate the passive, nominal prose into personal, active sentences, that is, into scenarios—see the discussion of readers translating text into scenarios earlier in this chapter. See also Chapter 9, for more information on using passive and active verbs.)

When the technical communicator makes the parallelism in the choices obvious, the paragraph puts much less burden on the reader and becomes much easier to understand quickly and correctly. Figure 1.8 is my revision.

Option Two—Using Dividends to Help Pay the Premium

If you choose this option, we will use each dividend to pay all or part of the next premium that is due.

- If the dividend is less than the premium, you must pay the difference before the end of the grace period.
- If the dividend is more than the premium, we will send you a check for the extra amount.

FIGURE 1.8 A Revision–with Parallelism

Technical communicators can help readers find and understand information in their documents by using techniques like the ones that I have described in this section. For the document as a whole, these techniques are as follows:

- Provide an explicit schema through a useful title and table of contents.
- Follow the given-new contract; for example, use headings that mirror readers' prior knowledge and expectations.
- Maintain coherence and consistency; for example, use repetitive, consistent page layouts.
- Provide several pathways through a document; for example, give information visually as well as in prose.

The techniques for paragraphs and sentences are as follows:

- Follow the given-new contract on the local as well as the global level; for example, give the context before the instruction in a manual.
- Make parallel concepts clear by writing parallel sentences.

These six are only a few of the techniques that work well for making documents easy for busy readers who are trying to find and understand information quickly. They are a base for you to build on as you read the other chapters in this book.

SUMMARY

Readers are not passive vessels into which technical communicators can pour information. Readers are active participants in the communication process. They decide whether to pay attention to a document and how much attention to pay. Technical documents, in the workplace or the home, are usually meant for busy people who need to accomplish a goal or task that goes beyond just reading the document. Because the document is a tool to help accomplish the goal, readers want to find what they need in the document quickly and understand it easily.

Readers actively interpret what they read, calling on *schemata* or mental models that they have developed from prior knowledge and experiences. Technical communicators can, however, improve the chances that readers will understand their messages by taking into account readers' knowledge, expectations, and styles and by using techniques that have been shown to match the way that readers approach documents.

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LIST OF TERMS

chunking Breaking the text into short, meaningful pieces. Frequent, useful headings and subheadings support chunking. Short paragraphs and lists support chunking.

given-new contract Says that listeners and readers expect communicators to use information they already know as the context for new information. Listeners and readers understand most easily when technical communicators link new information to information that readers bring to the document or that technical communicators have already given in the document.

reading to do Reading documents to "do" or act. If readers need the documents for reference later, they can go back and look at them again. Many documents that people in business deal with are used for reading to do.

reading to learn Reading to learn information that the reader will have to remember later. Textbooks are used for reading to learn. Reading-to-do and reading-to-learn materials require different communication techniques.

reading to learn to do Describes the reading of certain documents, such as computer tutorials and users' guides, that serve an interme-

diate purpose. Readers go to them wanting to accomplish their own tasks quickly. They do not want to spend time reading. However, they also want to learn how to do tasks so they will not have to look them up each time. Technical communicators can learn techniques to facilitate reading to learn to do.

satisficing A term borrowed from the work of the noted economist Herbert Simon. People trade off the time and effort it takes to learn more or to find a better solution against accepting a less than optimal way of doing something or a less than perfect solution to a problem.

scenario principle Writing in the active voice with action verbs and the doer of the action as the subject of the sentence. Flower and her colleagues (1983) found that readers trying to make sense of bureaucratic prose translated the text into scenarios.

schema (pl. schemata) Structures that people form by developing associations among separate pieces of information. A schema (plural, schemata) helps people to make meaning of disparate pieces of information.

think-aloud protocol Used to describe the process in which a reader or user says all of his or her thoughts out loud while reading a document or doing a task. The entire session is tape-recorded, and the tape can be transcribed and analyzed. Think-aloud protocols are very useful for gaining insights into how people solve problems and understand documents.

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