1 Research
Why We Do It and Why We Read It

Introduction

If you were asked to envision someone "doing research," you might imagine a student in a library sitting amidst stacks of books. Or you might envision an internet search starting with Google. Or you might picture a scientist in a white coat sitting in a laboratory surrounded by flasks of colorful, bubbling liquids, peering through a microscope. Certainly, these are all examples of research, but they illustrate a narrow, although popular, view about research: namely, that it is academic and somewhat removed from our everyday world.

This book, however, is about research that shapes our professional practice—research that informs practical decisions that technical communicators make. The purpose of this chapter is to introduce you to the role that research plays in technical communication and the types of research that can be done. Its goal is to encourage you to think about your own research potential as a student or practitioner of technical communication, or the ways that you could apply the research of others to your own practice as a technical communicator. It also tries to help you understand that the way a researcher thinks about and approaches a research project can influence what he or she finds.

Learning Objectives

After you have read this chapter, you should be able to:

- Classify research based on its goals
- Classify research based on its methods
- Describe the role of industry, academia, professional communities, and government in regulating the admission of new knowledge into a field of practice
- Describe the different hierarchies of research publications

What is Research?

Peter Senge (1990) uses the term *abstraction wars* to describe a kind of debate typified by a free-for-all of opinions and personal beliefs. You encounter these types of arguments quite frequently among technical communicators (as you would among practitioners of any profession). For example, a group of writers trying to collaborate on a set of documents might argue about the media used to deliver the content so as to

protect intellectual property. They might also argue about the mechanics of documents, such as what kind of font should be used as the body text, how many steps procedures should be limited to, whether important notes should be printed in boldface, and so forth.

But in a professional field of practice such as technical communication (like other fields of practice), abstraction wars should not dictate the tenets of the practice. What makes up good technical communication should not rest on arbitrary whims of the individual writer or the personal persuasiveness of those advocating a particular standard or technique. There needs to be a way that the best practices of a profession can emerge as a recognized and reliable consensus among the practitioners of that profession. Well-conducted research can be such a way.

When someone in a meeting says, "Users don't want to go to an online reference to get this information," a reasonable counter is to ask, "What makes you say that?" Typically, what the questioner is seeking is evidence or *data*, and beyond that, an indication of how the data support what the speaker is advocating. What differentiates reasonable arguments from abstraction wars is the use of verifiable observations to support the point being advocated, what the field of action science calls building a *ladder of inference* back to directly observable data (Argyris, Putnam, & Smith, 1985).

A Definition

In essence, the linking of actions, decisions, or advocacy to observable data is what research is all about. In this book, the term *research* is used to mean *the systematic collection and analysis of observations for the purpose of creating new knowledge that can inform actions and decisions*. Let's look at what this definition is saying.

- Research is systematic—The purpose of this book is to describe a repeatable process for conducting research, one that has protocols and safeguards meant to deliver reliable outcomes.
- Research involves the collection and analysis of data—The importance here is that these are two separate activities. The mindset of the researcher is first to focus on gathering good data and *then* to determine what they mean. Data gathered to "prove a point" will almost invariably prove that point, meaning that researcher preconceptions and biases will influence the research design and the data analysis. For example, news sources sometimes select information that supports one point of view and ignore information that may support another. Thus, information can be removed from its context and prove virtually any point. Good researchers must always be willing to go where the data take them.
- Research creates new knowledge—Don't be misled by misconceptions from high school where a "research paper" was intended to show the teacher what you had learned reading from the internet. In a field of practice, such as technical communication, research should advance our collective knowledge about our field.
- Research should inform actions and decisions—Because technical communication is a field of practice, the outcome of research should enable us to do our jobs better. Technical communication, like engineering, is an applied discipline. That is, we apply theories to solving problems. Research in our field takes on a pragmatic aspect associated with the kind of research often called *action*

> *research*. "In action research, a researcher works with a group to define a problem, collects data to determine whether or not this is indeed the problem, and then experiments with potential solutions to the problem" (Watkins & Brooks, 1994, p. 8).

The concept of research also carries with it the assumption that the knowledge created is applicable at a generalized level and is repeatable over multiple instances, producing the same results. For example, although we may sometimes wish to describe the characteristics of one person or a small group to further a goal within an organization, we most often wish to add value by describing how people in general or a class of people behaves. Similarly, it would not be the role of research merely to describe how readers used a specific document; its value would come from describing how readers use documentation or a genre of documentation. These last examples illustrate one of the primary challenges that researchers face: *Research must ultimately articulate generalized truths from specific instances*. For example, if a researcher wants to know how readers in general process information from web pages, that researcher cannot look at all readers nor analyze all web pages. The researcher has a narrow access to *some* readers of *some* web pages, and must optimize this limited opportunity to learn as much as possible about readers and web pages in general.

Research in Technical Communication

Research in technical communication is not an activity conducted in a vacuum; it is generally initiated by a problem or a need to understand a phenomenon related to technical communication. Nor is it an activity conducted for its own sake; its conclusions should move the field of technical communication forward, improve technical communicators' decisions, and make their actions based on those decisions more effective than if they had acted without that knowledge. Just as individuals in a meeting want inferences based on data to support someone's assertions, the field of technical communication relies on research to inform best practices within that field.

Classifying Types of Research

As much as researchers and readers would like to believe that research is a totally objective undertaking, it is not. Ultimately, it is shaped by the goals of the researchers and the methods that they choose to use. Those who do not acknowledge these influences will not be able to manage their own biases or perspectives as researchers, nor be able to critically evaluate potential bias or the effects of researcher perspective in the research that they read. The purpose of this section is to examine the different goals that researchers have, the methods that they employ, and the ways that those goals and methods can direct and affect the outcome of research.

The Scientific Method

Starting with Francis Bacon in the 17th century, research has been associated with a methodology called the scientific method, characterized by the following process (Bright, 1952):

1. Observing a phenomenon or aspect of the physical universe
2. Stating a tentative description, called a hypothesis, that explains the observations
3. Using the hypothesis to make a prediction about what effect would follow a certain action
4. Conducting an experiment to see whether the predicted effect actually does result from the stated action

This model evolved primarily within the physical sciences and is still widely used. However, with the advent of social sciences such as psychology, anthropology, and sociology, research has developed a broader set of methods. Although all of these methods rely on the observation of data and on rigorous techniques for validating the conclusions drawn from those data, research is no longer bound to a strict reliance on hypotheses and experiments as defined in the scientific method.

The following discussions describe the more complex landscape of modern research by classifying research genres by their goals and their methods.

Goals of Research

Research goals act as lenses that affect how the researcher filters and interprets data. Just as camera lenses can help a photographer focus on certain details of a landscape, they can also de-emphasize other details. Therefore, part of the photographer's science and skill is being able to select the correct lens for a specific objective or type of subject. Similarly, part of the science and skill of a researcher or critical reader of research is to select or recognize what goals are driving the research being conducted or studied.

This concept of researcher-as-filter is an important one and is often overlooked by researchers and readers of research alike. For example, suppose that your teacher is leading the class on a tour of your university's usability lab, and the lab director points out the logging station. The director explains that the role of the logger is to keep a running narrative of the user's actions. Your teacher takes the opportunity to interject and point out to the class the importance of the logger's role since this is the first filtration of the data—that is, the logger makes decisions about what data to log and what not to log.

The lab director disagrees with this comment and claims that their loggers record all of the data. Your teacher asks whether loggers typically note details such as when they scratch their arms, shift in their chairs, or brush back their hair. The director almost snorts and replies, "Of course not." And certainly they shouldn't, but the point is that every researcher applies filters and constantly makes decisions about which data are important and which are not. When researchers do not acknowledge these filters, and when readers of research are not sensitive to the fact that some data have been filtered out before even being shared with the reader, they lose the ability to analyze the results critically.

Categories of Research Goals

To form your own research agenda or to understand better the research done by others, it is helpful to understand the various goals that drive research. Reeves (1998), as the editor of the *Journal of Interactive Learning Research*, identified six categories with which to classify educational research by its goals. Technical communicators face many of the same questions and situations faced by educators, and these classifications can help researchers in technical communication as well. Table 1.1 describes Reeves's classifications in the context of technical communication.

Table 1.1 Classifications of research based on goals

Research Goal	*Description*
Theoretical	Focuses on explaining phenomena without necessarily providing an immediate application of the findings.
Empirical	Focuses on testing hypotheses related to theories of communication and information processing in the context of their application to technical communication.
Interpretivist	Focuses on understanding phenomena related to technology's impact on the ways that humans interact with technology, users interact with the products that technical communicators produce, or technical communicators interact with people in other roles within an organization.
Postmodern	Focuses on examining the assumptions that underlie applications of technology or technical communication with the ultimate goal of revealing hidden agendas and empowering disenfranchised groups.
Developmental	Focuses on the invention and improvement of creative approaches to enhancing technical communication through the use of technology and theory.
Evaluative	Focuses on a particular product, tool, or method for the purpose of improving it or estimating its effectiveness and worth.

THEORETICAL RESEARCH

Technical communication is a field of practice more than a field of study. As such, not many technical communicators engage in theoretical research, but they often rely on the theoretical research conducted by other fields, such as cognitive psychology or human factors.

For example, a classic theoretical research article that has had a profound impact on technical communication is George Miller's "The magical number seven, plus or minus two" (1956). In that article, Miller defines limitations in human capacity to hold information. His observations have influenced many practices in technical communication, such as the optimal way to chunk data so that it is easily processed and remembered.

The point is that although Miller's article has heavily influenced technical communication, he does not specify concrete practices within it. The purpose of theoretical research is to understand the phenomenon, not necessarily to point to its ultimate application. This seeming lack of an action-based resolution does not belittle the practicality of this kind of research; it merely points out that theoretical research is foundational, often driving the other kinds of research described in the following discussions.

EMPIRICAL RESEARCH

Empirical research is the type that most people are familiar with. It has the following characteristics.

- It is based on observation or experience.
- It is based on quantitative and/or qualitative data that are collected systematically.
- It is verifiable.

This type of research is typified by the scientific method. It often involves the testing of hypotheses that come out of theoretical research. For example, empirical research often tests a hypothesis by comparing the results of a control group against the results of a group that has had a particular intervention applied. A technical communicator might read Miller's study "The magical number seven, plus or minus two" and form the hypothesis that the error frequency when users enter long software identification keys needed in an installation procedure might decrease if the numbers were chunked into groups of five digits. This hypothesis that includes a prediction could then be tested by comparing the performance of users who have the long, unchunked software identification key against the performance of users who are presented the same key that has been chunked in accordance with Miller's findings.

The advantage of empirical research is its relative objectivity. Its conclusions are based on observations and well-accepted analysis techniques. On the other hand, one of the disadvantages of empirical research is its narrow focus: *What you learn is tightly constrained by the question that you ask*. In the previous example, the researcher certainly might learn which way of presenting the software key was better (chunked versus unchunked), but it is highly unlikely that while using this approach, the researcher would discover an entirely novel approach to secure software that did not involve user-entered numbers.

INTERPRETIVIST RESEARCH

Interpretivist research is relatively new (compared to theoretical and empirical) and comes from the social sciences, where it was originally termed *naturalistic inquiry* (Lincoln & Guba, 1985). The main focus of interpretivist research is to *understand* rather than to test. Hendrick (1983) states that the purpose of this kind of research is to illustrate rather than provide a truth test. Whereas the example about testing the hypothesis of chunked text strings tested a very specific question ("Is chunked better than unchunked?") an interpretive approach would take a more open-ended strategy. Instead of asking, "Is this way better than that way," the interpretive researcher might ask, "How do people make sense of strings of text? How do they use them in the course of trying to accomplish their own tasks?" The observations might not be as quantifiable in this case as in an empirical study, consisting more of descriptions of user behavior or transcripts of interviews.

The advantage of this more open-ended approach is that it allows for the discovery of unexpected knowledge. The disadvantage, however, is that its non-experimental approach (that is, its lack of hypothesis testing) can allow researchers and readers alike to apply their own subjectivity and not reach agreement on the validity and reliability of the conclusions. (The concepts of *validity* and *reliability* are discussed in later chapters; for now, think of them as describing the quality of the research.)

POSTMODERN RESEARCH

Postmodern research is typified by a general cynicism about technology and an interest in social or political implications, especially where technology might disenfranchise certain groups. This type of research has gained a greater foothold in the field of education than in technical communication, but there are issues in technical communication that could be attractive to a postmodernist researcher. For example, where

empiricists and interpretivists might try to apply information design principles to developing better approaches to electronic voting machines, postmodernists might want to research the impact that high technology has on discouraging older or less-educated voters. Their research might advocate that technology favors the *haves* and the status quo over the *have-nots* or disenfranchised constituents. Technical communicators might also be interested in researching how disinformation propagated through social media is used to sway consumers in particularly emotional or complex contexts.

Koetting (1996) summarizes the differences among empirical (which he calls positive science), interpretivist, and postmodern (which he calls critical science) research: "Positive science has an interest in mechanical control; interpretive science has an interest in understanding; and critical science has an interest in emancipation" (p. 1141).

DEVELOPMENTAL RESEARCH

Developmental research is targeted at producing a new approach or product as its outcome. Accordingly, much developmental research is conducted by companies. In a strong sense, professional associations play an important role in this regard. For example, some articles published in *Technical Communication*, the official journal of the Society for Technical Communication, are written by practitioners who are sharing discoveries made while working on developmental projects for their companies.

Continuing with the example of different kinds of research that could be spawned by Miller's original theoretical research, a technical communicator might conduct usability tests on different approaches to the interface of online help to discover how different chunking schemes could make user searches easier and more successful. The advantage of developmental research is its emphasis on practical application. The disadvantage is that its conclusions might not be generalized as easily or as broadly as other models.

EVALUATIVE RESEARCH

The main difference between developmental and evaluative research is that evaluative research starts with a completed product, whereas developmental research is conducted during the design phase of a product.

Michael Hughes interviewed Dr. John Carroll (personal communication, December 28, 1997) at the beginning of his own doctoral studies. In the interview, Hughes asked Carroll, the founder of Minimalism in information science, for advice on directing his own doctoral research. Carroll commented that one of the misconceptions people have is the notion that academics conduct all research to discover new knowledge and then business goes about applying it.

Carroll believed that the more exciting discoveries are being made by businesses, but that they often lack the time or expertise to fully understand or document why their advances work. He thought that academic research can add value by helping in this area. The type of research Carroll was suggesting would be a good application for evaluative research. The advantage of evaluative research, as Carroll points out, is that it draws on what is actually being done by the true thought and technology leaders. The disadvantage is that it is more difficult to generalize the lessons learned when a specific product is the focus of the study.

Exercise 1.1 Classifying Research by Goals

This exercise gives you some idea how varied research can be in the field of technical communication while letting you practice classifying research by goals.

Label the following descriptions of research projects by the type of research goal each seems to be pursuing. Use the following codes:

T Theoretical
Em Empirical
I Interpretivist
P Postmodern
D Developmental
Ev Evaluative

See the answer key at the end of the chapter for the recommended responses.

1. _____ Tests the hypothesis that boldfacing terms in a definition increases how well the term is remembered by comparing two groups: one reading definitions with boldfaced terms and the other reading definitions without boldfaced terms.
2. _____ Exposes the disparity in the treatment of women technical communicators versus male technical communicators in terms of salary and technical credibility, and advocates that women are not treated fairly in technology cultures.
3. _____ Assesses the success of a new online product database in improving customer service levels in a technical support call center.
4. _____ Describes the experience of seven first-time software application users, trying to understand what emotions or impressions that experience evokes in novice users.
5. _____ Analyzes the effect of animation on a computer screen on a viewer's field of focus.
6. _____ Compares and contrasts five leading master's programs in technical communication.
7. _____ Tries to understand what strategies users employ when looking for information in online help.
8. _____ Tries to determine the most effective layout of navigation links on a specific web site to optimize its usability.

Methods of Research

In addition to being categorized by its goals, research can also be categorized by its methods. The methodology that a researcher chooses to employ can shape the outcome of the research in the same way that tools affect an artisan's output. For example, a wood carver could be given the same raw material (wood) and objective ("carve a pelican"), but a different set of tools—for example, a chainsaw, a knife, or a set of large chisels. The outcome would be significantly different based upon which set of tools the carver used.

At a more technical level, the look and feel of a web site or online help might differ, even if only in subtle ways, based on the authoring tool chosen. The same applies to research. The outcome of the research can be greatly influenced by the methodology

chosen to conduct it and analyze the data. Therefore, researchers and critical readers of research need to understand the differences in the methods and the ways that they influence the outcome of the research.

Categories of Research Methods

Table 1.2 lists the five categories described by Reeves (1998) in the guidelines for authors for the *Journal of Interactive Learning Research*.

QUANTITATIVE

Quantitative data and their analysis are typically associated with our traditional view of research. Quantitative research relies on statistics to analyze the data and to let the researcher draw reliable inferences from the findings. For example, a research project that compared the average times to complete a task using two styles of online help would use quantitative methods (the capturing of data in numeric format and the statistical analysis of those data).

QUALITATIVE

Qualitative methods rely on non-numeric data, such as interviews with users or video recordings of users trying to perform tasks. Qualitative data are more difficult to analyze in some respects than quantitative data, since they can be more susceptible to subjective interpretation. An example of a qualitative approach would be a field study where the researcher observes workers using a new software product and takes notes about how they go about using the documentation to learn the new product. The researcher might also supplement the observations with interviews. The resulting data,

Table 1.2 Classifications of research based on methods

Method	*Description*
Quantitative	Primarily involves the collection of data that are expressed in numbers and their analysis using descriptive and inferential statistics. This is the usual method employed in empirical research involving hypothesis testing and statistical analysis.
Qualitative	Primarily involves the collection of non-numeric data (data represented by text, pictures, video, and so forth) and their analysis using ethnographic approaches. This method is often used in case studies and usability tests where the data are the words and actions of the test participants. It can also be used in empirical studies.
Critical Theory	Relies on the deconstruction of "texts" and the technologies that deliver them, looking for social or political agendas or evidence of class, race, or gender domination. This method is usually employed in postmodern research.
Literature Review	Primarily involves the review and reporting on the research of others, often including the analysis and integration of that research through frequency counts and meta-analyses. This method is usually applied in research that integrates prior research.
Mixed Methods	Combines multiple methods, usually quantitative and qualitative. Mixed methods are often found in usability tests, which are a rich source of quantitative data, such as time to complete tasks or frequency of errors, and qualitative data, such as user comments, facial expressions, or actions.

then, would consist of notes and transcripts that would be analyzed to determine whether meaningful patterns emerge.

CRITICAL THEORY

Critical theory looks closely at texts—that is, formal or informal discourses—to determine what they are "really saying" (or what they deliberately are *not* saying) versus their superficial meanings. For example, a study might examine how technical communicators handle known product deficiencies in user guides by analyzing their language styles to see whether stylistic devices such as passive voice or abstraction obscures the meaning of the text and avoids frank discussion of the deficient features.

LITERATURE REVIEW

Although all research projects should include a literature review, some exclusively review other research projects published on the same subject (usually referred to as "the literature"). The purpose might be to look for trends across the research or to collect in one document a cross-section of the important opinions and findings about a particular topic. Think of such a review as a meta-analysis of the literature. For example, a researcher might do a literature review looking at research about the usefulness of readability measures and try to draw conclusions about general trends or findings. This kind of review can be particularly helpful to practitioners who want to adopt best practices.

MIXED METHODS

It is not unusual to find more than one of the above methods being employed in the same research project. For example, a usability test might use quantitative methods to determine where in a web site the majority of users abandon a task and then employ qualitative methods to understand why. Another example would be an evaluative study that uses interviews to determine which section of a manual is considered the most important by users and then compares how rapidly information from that section can be retrieved versus a similar section in a competitor's manual.

Exercise 1.2 Classifying Research by Method

This exercise asks you to apply the categories just discussed in the context of actual technical communication topics.

Label the following descriptions of research projects by the type of method each seems to be applying. Use the following codes:

QN Quantitative
QL Qualitative
C Critical Theory
L Literature Review
M Mixed Methods

See the answer key at the end of the chapter for the recommended responses.

1. _____ Interviews graduates of technical communication degree programs after their first year out of the program to see how they think that their education has affected their professional growth.
2. _____ Records the time that it takes each of 12 users to install a product and calculates the average installation time.
3. _____ Examines the wording of the online ads for technical communication jobs to uncover how age-discrimination messages are being communicated.
4. _____ Counts the number of times users go to the online help and interviews each user to understand why they consulted help at the particular times that they did.
5. _____ Reports on seven different studies of font legibility to see whether there is a consensus among researchers concerning serif versus sans-serif typefaces.
6. _____ Compares average salaries of technical communicators based on their level of education.
7. _____ Conducts focus groups to determine the critical issues facing technical communicators today.

Association of Goals and Methods

There is a strong association between the goal of the research and the methods that a researcher employs. Table 1.3 shows associations often encountered in research.

If you are a student researcher or an experienced practitioner starting your first formal research project, the choices can seem overwhelming. But your personal interests or work requirements will dictate the goal, and most technical communication research relies on quantitative or qualitative methods, both of which are covered in this book.

As a critical reader of research, one question that you should ask is whether the researcher has applied the appropriate method for the stated or implied research goal. A mistake that researchers sometimes make is to choose the method of their research before they have clarified their goal. Often this problem results from a preference for qualitative over quantitative (by those afraid of "number crunching") or vice versa (by those who feel that only measurable phenomena can be trusted). The better approach is to *classify the goal first and then to choose the appropriate method(s)*. Classifying the goal is a direct outcome of choosing the research topic and research question, which is discussed in the next chapter.

Table 1.3 Common associations of goals and methods

Goals	*Methods*
Theoretical	Quantitative
Empirical	Quantitative, qualitative, or mixed
Interpretivist	Qualitative
Postmodern	Critical theory
Developmental	Quantitative, qualitative, or mixed
Evaluative	Quantitative, qualitative, or mixed

Exercise 1.3 Brainstorming Research Topics

The purpose of this exercise is to get you thinking about all the possibilities for a research project that you might conduct.

1. For each type of research goal presented in Chapter 1, identify one to three examples of possible research topics within the field of technical communication. Draw on topics from your studies or real life problems that you deal with as a technical communicator or user of technical documents.
2. For each topic identified in step 1, discuss which method(s) could be appropriate, and give a general example of what kinds of data might be gathered.

Research Sources

Earlier in this chapter, we stated that research in technical communication helped inform best practices within the field. But how does that happen? How does that research get sponsored and disseminated? In effect, there are four sources of research:

- Industry
- Academia
- Professional societies
- Government

The Role of Industry

One of the great contributions that industry makes is that it keeps research in a field relevant and practical. New ideas are scrutinized against two criteria.

1. Is it worth the cost? (Would users pay for it or would it reduce the price of products or services?)
2. Can you really do it? (That is, can you obtain the results that you promise?)

Both of these criteria drive the need for the collection and analysis of data: research! The disadvantage is that industry generally lacks both the motivation and the mechanisms for distributing the new knowledge that it creates. Businesses also need to protect any proprietary information developed through the research that they conduct.

The Role of Academia

Academic programs in technical communication are another source of research in this field. They have the advantage of having professors who provide both continuity and expertise combined with students who can provide the mental (and sometimes physical) labor. If you are a student getting ready to embark on a required research project as part of your studies, you are part of this mechanism that keeps the field of technical communication vibrant and relevant. Faculty and students also have easy access to the conference proceedings, journals, and books that publish research results. Faculty can also incorporate results into courses and influence students who then carry those results into the workplace.

The Role of Professional Societies

Another source of support for research is the professional societies associated with technical communication. These organizations often sponsor research directly, but more importantly, they publish journals that disseminate the results of relevant research to their members. The exemplars in this book are taken from four such journals:

- *Technical Communication*, the journal of the Society for Technical Communication
- *IEEE Transactions on Professional Communication*, the journal of the IEEE Professional Communication Society
- *Technical Communication Quarterly*, the journal of the Association of Teachers of Technical Writing
- *Journal of Usability Studies*, the journal of the User Experience Professionals Association

The Role of Government

Local, state, and federal governments are yet another source of support for research in technical communication. For example, governments might want to gauge the effectiveness of a communication campaign promoting safe sex or evaluate the usability of a web site that disseminates information about health issues. Government funding of technical communication research is often embedded in grants to natural or social scientists, information technologists, or engineers. Government funding for technical communication can also be found in unexpected places. For example, the Georgia Department of Transportation has funded grants for technical communication research; topics such as the usability of databases, readability of signage, usability of drivers' apps, and data visualization are just a few potential research areas. Funding from such government agencies can often help advance knowledge for the field.

Hierarchies of Publications

Anyone who wishes to have his or her ideas or research published or who wishes to be a critical reader of ideas and research in a professional field needs to understand the different hierarchies of publications and their requirements for publication. There are three levels:

- Open publications
- Editor-regulated publications
- Refereed journals

An *open publication* is one in which anyone can publish without the scrutiny of anyone else as to the validity or reliability of their assertions. For example, anyone can create and post a web site without anyone's permission or review. Another example of an open communication is called the "vanity press." In these venues, an author or a company pays all the publication expenses. Another category of open

publication is the "white paper," a document written and published by a company as a marketing tool to promote its technologies or processes, or to share the results of its research in the hope of attracting future business or investment. Read open publications with a high degree of skepticism, since no filtering for adherence to standards of research has been applied by a third party.

An *editor-regulated publication* is one in which the editor or an editorial staff decides which submissions to publish. Standards such as interest of the subject matter to readership, reputation of the author, and quality of the writing are often applied. Examples of editor-regulated publications are newsletters and magazines. These publications may have an informal style and may not reference other research to support the author's assertions.

Refereed journals represent the most rigorous screening of submissions for publication. Submissions are initially evaluated by the editor and then referred to an independent review committee recruited for the purpose of evaluating the manuscript. These reviews are called "peer reviews" because they are conducted by practitioners or academics who share the author's level of expertise (or an even higher level of expertise). These reviewers critique the manuscript, often requiring that the author elaborate on or re-evaluate assertions made in it. Sometimes enthusiastic researchers make unwarranted assertions or claims about their results, and peer reviewers often help them make their claims more conservative and reliable. Often these peer reviewers will reject the submission for not meeting the standards of reliable research. For these reasons, research articles that come from refereed journals have higher credibility and reliability than those appearing in open or editor-regulated publications.

Some book publishers—university presses, for example—combine the methods of editor-regulated publications and peer-reviewed journals. In these cases, an editor makes an initial judgment about the quality of the work, and then all or portions of the manuscript are subject to peer review.

Summary

Research is the systematic collection and analysis of observations for the purpose of creating new knowledge that can inform action. Research in technical communication informs practical decisions that technical communicators make. Its value is that it shapes the best practices of the field.

Research can be categorized by its goals:

- Theoretical—Focuses on explaining phenomena without necessarily providing an immediate application of the findings.
- Empirical—Focuses on testing hypotheses related to theories of communication.
- Interpretivist—Focuses on understanding phenomena related to technology's impact on the ways that humans interact with technology, users interact with the products, or technical communicators interact with people in other roles within an organization.
- Postmodern—Focuses on examining the assumptions that underlie applications of technology or technical communication with the ultimate goal of revealing hidden agendas and empowering disenfranchised groups.

- Developmental—Focuses on the invention and improvement of creative approaches to enhancing technical communication through the use of technology and theory.
- Evaluative—Focuses on a particular product, tool, or method for the purpose of improving it or estimating its effectiveness and worth.

Research can also be categorized by its methods:

- Quantitative—Primarily involves the collection of data that are expressed in numbers and their analysis using descriptive and inferential statistics.
- Qualitative—Primarily involves the collection of non-numeric data (data represented by text, pictures, video, and so forth) and their analysis using ethnographic approaches.
- Critical theory—Relies on the deconstruction of "texts" and the technologies that deliver them, looking for social or political agendas or evidence of class, race, or gender domination.
- Literature review—Primarily involves the review and reporting on the research of others, often including the analysis and integration of that research through frequency counts and meta-analyses.
- Mixed methods—Combines multiple methods, usually quantitative and qualitative.

The publications that disseminate research can be sorted into three hierarchies:

- Open publications—No filtering or selection process is applied.
- Editor-regulated publications—Submissions are selected by the publication's staff.
- Refereed journals—Submissions are peer reviewed not only for the quality of the writing, but for the rigor of the research methods employed.

Answer Key

Exercise 1.1

1. Empirical. The key words *tests* and *hypothesis* point right away to a scientific method approach, placing this study squarely in the empirical category.
2. Postmodern. The emphasis on social disparity (focusing on gender inequity) coupled with a definite point of advocacy (women are not being treated fairly) makes this a postmodernist study. In effect, it is pointing out how technology is being applied to a group's disadvantage—a common theme in postmodernist research.
3. Evaluative or empirical. The results of a specific product are being evaluated. Although the study would look at one instance, it could lead to the generalization that online databases might improve customer service levels in other instances.
4. Interpretivist. This study is trying to understand a general phenomenon, looking to learn how people experience or make sense of a technology experience. It has no prior assumptions, hypotheses, or political agenda. Interpretivist studies can be recognized by this open-ended approach of "What happens when" or "How do people make sense of" to technical communication-related experiences.
5. Theoretical. The clue here is that the root of the question is in human psychology or physiology. The findings are likely to be broad descriptions of how human

sensing or mental processing works. Its findings would not lead to a specific outcome as much as they would lead to additional research that applied its findings to specific designs or processes.
6. Evaluative or empirical. In this case specific programs are being compared and contrasted. The outcome of this study could be applied to making a decision about which program to attend, or it could give insight to someone contemplating starting such a program within his or her own university.
7. Interpretivist. The emphasis is on trying to understand how users make sense of a technical communication task, in this case using online help. It is open-ended and does not purport to test a theory.
8. Developmental. The researcher is trying to optimize a specific product or design. Even so, its findings may point to a best practice that can be applied to other designs; thus, it is included in the field of research.

Exercise 1.2

1. Qualitative. The data being taken and analyzed consist of interviewees' words.
2. Quantitative. The data consist of numeric measurements.
3. Critical Theory. Even though the data consist of words, the analysis is looking for nuances in the text.
4. Mixed methods. The study uses quantitative (number of times users go to help) and qualitative data (interviews to understand why).
5. Literature Review. The study is a *study of studies* and not an original research project.
6. Quantitative. The data are all numeric (that is, salaries and levels of education).
7. Qualitative. The data are the words and other forms of expression gathered or observed in the focus group.

Exercise 1.3

The answer to this exercise will be unique for each person who prepares it, so there is no key to this exercise.

References

Argyris, C., Putnam, R., & Smith, M. M. (1985). *Action science: Concepts, methods, and skills for research and intervention*. Jossey-Bass.

Bright, W. E. (1952). *An introduction to scientific research*. McGraw-Hill.

Hendrick, C. (1983). A middle-way metatheory. *Contemporary Psychology*, *287*, 504–507.

Koetting, J. R. (1996). Philosophy, research, and education. In D. H. Jonassen (Ed.), *Handbook of research for educational communications and technology* (pp. 1137–1147). Simon & Schuster Macmillan.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage.

Miller, G. (1956). The magical number seven, plus or minus two: Some limits on our capacity for processing information. *The Psychological Review*, *63*, 81–87.

Reeves, T. (1998). The scope and standards of the *Journal of Interactive Learning Research*. www.aace.org/pubs/jilr/scope.html

Senge, P. (1990) *The fifth discipline: The art and practice of the learning organization*. Doubleday.

Watkins, K. E., & Brooks, A. (1994). A framework for using action technologies. In A. Brooks & K. E. Watkins (Eds.), *The emerging power of action inquiry technologies* (pp. 99–111). Jossey-Bass.