

Toward Better Case Study Research

Abstract—Case study research can make important contributions to the field of professional communication if the research is carried out with rigor. This paper discusses inaccurate uses of the term “case study” and then presents ideas for conducting more rigorous case studies. Advantages and disadvantages are described, as well as typical techniques, such as interviews, logs, and visual and verbal protocols.

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IMAGINE this: At a technical communication conference, you have to choose between competing sessions, both of which sound interesting. Because you are vitally interested in keeping up with the latest research findings, you choose to attend the one titled, “Integrating New Professional Communications Employees: A Case Study.” When the presentation begins, you realize that the speaker is simply going to tell the story of her experience—that there has been no formal research process—but it is now too late to go to the other session in another part of the convention center. When this happened to me (the title has been changed), I was angry and disappointed. After all, one should be able to expect that technical communicators would be precise in their use of technical terms such as “case study.” But I find the same thing often happens when I turn to articles in technical communication journals: the label “case study” is misused. Such misuse calls into question our professional credibility, so all of us—authors, editors, and readers—should not only aim for more precision in our choice of labels, but perhaps we also need to think more carefully about what characteristics identify good empirical research.

This article, then, presents some strategies for better case study

research in the belief that carefully designed empirical research can benefit the profession, not only by enhancing our professional credibility, but also by helping us build a core of knowledge about our field upon which sound principles for practical application can be based. First, I hope to clear up some confusions about the use of the term “case study” and present some insights into why one would choose to do a case study; next I discuss what constitutes a carefully designed case study and what strategies others have found useful in doing a case study. In this discussion, I use examples from my own research in writing and from the research of others in both composition and professional communication.

Case studies in writing were first used by researchers in composition who found them an important tool for developing an understanding of how writers (both novices and experts) plan, draft, and revise their writing (cf. [2]–[4]). Case studies have also helped us better understand writing in the nonacademic workplace (cf. [5]–[7]) and in academic settings (cf. [8], [9]). Case study research in all these areas has helped technical communicators find answers to problems and translate new insights into effective practice. When done well, case studies also foster increased respect for the profession.

CLEARING UP THE CONFUSION

The first step in better case study research is to clear up the confusion about labels. Personal histories of practitioners (e.g., *How We Did X* at ABC Corporation) and teachers (e.g., *How I Teach the Concept of X* in my Professional Communication Course) are very useful because they add examples of what worked for someone else and may work for us in our own jobs (cf. [10]). However, they are not case studies [1]. A more accurate label for these narratives is “case history” because, like the stories we tell on our first visit to a new physician, they are based on our memories: the author looks back on what happened and reports from the viewpoint of the *end* of the project. That is not to say case histories are invalid or inaccurate; most of us do remember significant events, dates, feelings, and so forth relatively well. But a narrative based on our after-the-fact memories is not really a formal, empirical case study. A genuine case study is planned in advance so that data that can be examined by others are collected both in a manner that reduces the possibility of bias and at a time as close as possible to the occurrence of the events of interest [1], [11].

Another area in which the term “case study” is often misused is the classroom [1]. Teachers and workshop leaders often use cases in much the same way as a rhetorician does: to help their students or workshop participants understand a concept by illustrating it with a description of a particular situation. Teachers and trainers also use descriptions of real or fictional situations to help students or workshop participants learn to solve problems in writing, management, marketing, and so forth. In this instance, the teacher or seminar leader provides students with a “problem case” to work on as an exercise. For example, the exercise might begin with a brief narrative about an individual whose boss has asked her to respond to a customer’s

letter of complaint about a recent purchase; the student assumes the role of the respondent, and the letter she produces is then evaluated to see how well she has been able to apply the principles for answering letters of complaint. Using the term “case study” in this situation is inappropriate because the purpose of such assignments is not research in the sense of trying to discover new information; rather, the assignments are given as simulation exercises to help students learn to apply principles they have been taught in much the same way as astronauts prepare for space flight by carrying out various activities in a capsule or trainer that simulates weightlessness. A more appropriate term for such exercises in a classroom or workshop is “case material” (cf. [12]).

WHY SHOULD ONE CHOOSE TO DO A CASE STUDY?

Case studies providing descriptive details about communications in the workplace are badly needed because our profession still lacks empirical findings on many issues that technical communicators face daily, such as how production of documents is best handled, or whether reaction to aspects of visual presentation are gender-driven, and so forth. In the early stages of inquiry into a problem or an area of interest, researchers often turn to case study methodology [1], [11]. Case study research is a qualitative tool; as such, it aims to provide a rich description of an event or of a small group of people or objects. Because the scope of a case study is so narrow, the findings can rarely be generalized; but a case study can provide insights into events and behaviors, and it can provide hypotheses for testing [1], [11], [13].

Opportunities for case studies in the workplace often occur when a company changes procedures (e.g., when a company sets up a different record-keeping system or establishes a word-processing center);

at such times, technical communicators involved in the change could do a case study that could help in developing theories that other technical communicators can test, or at least try, when facing similar changes. The findings from projects like these can also be helpful to technical communicators who are trying to persuade their employer that certain techniques work better than others. The list of areas needing research is practically limitless because only in the last decade or so have technical communicators begun to use empirical methods to investigate how writing tasks are carried out in the workplace.

Case study research is possible in almost any area of communication. In rhetoric, for example, case study research can be used to learn the typical rhetorical strategies used by salespeople in a department store; in medicine, case study research can be used to learn what strategies doctors use to convince patients that they should follow dietary guidelines; and in engineering, case studies can be used to learn what strategies are effective in getting clients to change their minds about some aspect of a project. In all these instances, the researcher is investigating strategies for persuasion, and it is quite possible that some congruence in the findings could lead to the development of principles to help practitioners. Thus although developing generalizations is not the purpose of case studies, as the body of knowledge produced by case studies in various areas grows, readers may generalize unconsciously just as they would from their own life experiences [14]. However, in thinking about whether a case study is the proper methodology to use, one should consider its advantages and disadvantages.

Advantages The purpose of a case study is to increase understanding of the particular—i.e., one situation, one event, one person, one group of people, one set of documents or records. This in-depth focus on the

particular means that case studies can help provide

- a holistic view of an event or situation, a view that includes the context as well as the details of an individual event [1], [14]. For example, one could study a user trying to access on-line help. Such a study could lead to a better understanding of a typical user's goals, actions, and attitudes, as well as the impact of various aspects of the design of the on-line help;
- rich detail that can lead to a more complete understanding of some aspect of a person, group, event, or situation [1], [14], [15]. For example, in the study of a user of on-line help, a researcher may want to record the specific word a puzzled user first looked for in the on-line help index;
- affective information that cannot otherwise be collected [1], [14], [15]. For example, one might want to explore the feelings aroused at the moment the user could not find a certain word in the on-line help index or the strategies the user contemplated before taking his or her next action in that situation; such information could shed light on the effectiveness of the design of the interface; and
- a more precise definition of a research question. Case studies are frequently used to explore a problem that is not well defined or understood [1], [14]. In such instances, the case study can identify hypotheses that can be tested in follow-up experiments. For example, in studying a single user of on-line help, one might begin to wonder whether the success of on-line help depends on the comprehensiveness of the index. This is a question for which an experiment could help find the answer.

Thus a case study of a particular person doing a particular task with

a particular type of equipment could contribute in several ways to a body of knowledge that would be extremely useful to both practitioners and professional communication teachers. Case studies are also often used to test the effectiveness of products while they are in the early stages of development.

Disadvantages Case study as a research method, however, is not without disadvantages. Case study research can come under attack because

- case study methodology is often misunderstood, so it is susceptible to poor research design or misapplication of the term "case study" [1];
- case study results are usually tied to specific situations, so the results are not generalizable. For example, Janet Emig's 1971 monograph, *The Composing Process of Twelfth Graders*, has often been attacked because it relies so heavily on what one subject (Lynn) did and said. Furthermore, Lynn does not seem to fit in with the other eleven students in the study because she writes easily and receives a lot of positive feedback [2];
- case study research is often regarded as inherently flawed—as kind of a "soft" science because it supposedly involves less rigorous methods than are used in the "hard" sciences [1], [16]–[19]. For example, the charge is often made that because case studies are typically carried out by one person, the information collected is subject to researcher bias—i.e., the researcher found just what he or she was looking for;
- case studies are sometimes expensive to conduct. For example, case studies that involve tape-recorded interviews incur the expensive task of transcribing the interviews [14].

Note that the first three disadvantages are issues of reliability and

validity. Because randomization is usually not possible with case studies, threats to validity and reliability are almost impossible to overcome. However, as experts have often pointed out, even carefully constructed laboratory experiments can never perfectly control every variable that might provide grounds for a rival hypothesis [13], [20].

Case studies should be appreciated in terms of what they *do* provide: a humanistic, holistic understanding of a complex situation. Indeed, case studies are a valuable research tool, especially for areas that have not received much research attention. For example, over the past fifteen years, writing researchers have used case studies to learn how experts and novices revise [21]. Based on these studies, teachers and textbooks in technical communication have begun to devote time and space to teaching students how to revise. On the other hand, some case studies of writing in the workplace indicate that experts spend little time revising [6]. As more evidence accumulates, it could change the way technical writing and professional communication courses are taught and the way production processes are managed in the workplace.

WHAT EXACTLY IS A CASE STUDY?

Perhaps one way to define case study research is to examine the characteristics that distinguish it from other types of qualitative empirical research methods such as ethnographies. Some confusion arises because many of the strategies used in case study research are the same as strategies used in other empirical projects: interviews, questionnaires, examination of artifacts, and so on. To distinguish case studies from other types of research, it is helpful to think of them as having a very narrow focus. A case study is often defined as a study of a *single unit*: a person or group of related persons, an event or group of related events, a document or

group of related documents [1], [14]. Stake even suggests that one can do a case study of oneself [14]. In addition, most case studies are conducted over a fairly short period of time—usually less than a year, although it is possible to conduct a case study over a much longer period.

A case study can also be a combination of several studies of individual cases [14]. For example, Rachel Spilka's study of oral and written discourse was really six separate, but simultaneous, case studies, each focusing on the evolution of a major document such as a report, a contract, a request for proposal, and so forth [7]. Her methods included 1) structured interviews with the six subjects and associated people such as bureau directors and communications specialists; 2) a collection of physical artifacts such as minutes of meetings and plans and drafts of papers; 3) on-site observations of social interactions; 4) logs kept by the subjects; and 5) open-ended interviews based on recollections of processes and pieces of discourse such as drafts. She also frequently asked subjects for feedback on her interpretations of the data.

A case study with fewer techniques and a very short period of time can also be quite effective. For example, Philbin and Spirek's excellent study of revision of manuals used only hour-long interviews with 20 subjects [22].

On the other hand, ethnographers study whole communities and usually over much longer periods; Vidich and Lyman mention a researcher who spent almost his entire life studying the lifestyle of African-Americans [19]. Usually the ethnographer's focus is much broader and deeper than that of the case study researcher. The purpose of most ethnographies is to understand a community as a community, primarily in terms of relationships: the relationships between members of the community; the relationship between a community's culture and

customs and its history; the relationship between the community and its environment; the relationship between a community and its neighbors; and so on. An example from professional communication is Jennie Dautermann's two-year study of a medical discourse community consisting of 14 nurses who were attempting to revise a hospital's nursing regulation system. Dautermann used participant observer strategies in her role as a consultant. In addition to field notes and interviews, she collected audio tape recordings and physical artifacts such as plans and texts produced by the group and previously published texts that the group assembled as resources [23].

Although a case study is usually less complex than an ethnography, for a case study to be considered well done, the researcher follows a procedure usually consisting of five mostly sequential steps: 1) choosing and defining the problem to be investigated; 2) planning the investigation in advance; 3) systematically collecting data that can be examined by others; 4) interpreting the data and verifying the interpretations; and 5) disseminating the findings [1], [14], [15].

Choosing and Defining the Problem I am often asked how researchers find or choose the problems they work on. Some work I have done in this area indicates that curiosity—wondering why things happen—stimulates research [24]. I also found that a rich source of problems for investigation is one's own experience of gaps in information, clashes of opinion, and violated expectations (see also [14] and [25]). However, researchers must also be alert to the needs of the field as a whole; otherwise, they run the risk of lack of interest in their research because it has little relevance to the tasks technical communicators typically face in their daily work [26], [27]. Relevant problems often arise when practitioners encounter some new situation for which no guidelines have been developed [25].

For example, corporate mergers and downsizing have recently created problems in realigning staff responsibilities for those remaining with the company, as well as job crises for those let go. In this area, as in any problematic area, good research begins when the problem is carefully defined in terms of what information is needed to better understand it and possibly minimize the negative effects. A researcher could conduct a case study of a company that has recently experienced a merger or a downsizing to try to identify strategies that helped workers cope and what aspects of the situation made it difficult for the workers to cope. The crucial step here is to narrow the focus to a poorly understood area [16].

In many instances, careful definition of a problem points the way to the appropriate research methodology [1]. For example, one researcher was curious about how adults who have had little prior education in writing and who are new to a particular workplace develop the writing skills needed in that specific discourse community. Accordingly, he asked for permission to study the next 10 persons hired at the Bank of Canada where he worked [28]. A similar study could find out how a typical student in technical communications adapts to the discourse community of the business world when he or she begins a new job after graduation.

Planning the Study Researchers can do much to improve the quality of and increase the respect for case studies in writing in general and for their own findings in particular if they plan their research project carefully. Planning usually involves two areas: choosing the subject or subjects of the case study and choosing and testing the data collection methods.

Selecting Subjects: Researchers will want to select their subjects with care [15], [25]. Most case studies focus on one of two types of subjects: unique instances or typical ones [14]. Sometimes researchers

select a unique subject or situation because so little is known about that person or event. For example, one of my colleagues, who is very committed to getting feedback and revising when writing, was astonished during a faculty seminar to hear a rather high-level administrator state that she never revises. Afterward, my colleague asked this administrator if she would be willing to be the subject of a case study examining her writing process. From this study of what we assumed was a unique case, we learned a lot about the factors that influence this particular person to forgo revising. Our results suggest that the case was not as unusual as we had assumed: some of the factors influencing our subject's revision practices have also been noticed by other researchers (cf. [6]). Although case studies usually do not produce results that can be generalized, such a congruence of findings may lead to a new understanding of revision practices in the workplace and subsequently to changes in the way writing is taught.

In other situations, a researcher will want to select a subject(s) who is(are) typical of some area of interest to begin to build a general theory—a process often called “purposeful sampling.” In this situation, researchers often ask some knowledgeable person to suggest a possible subject. Janet Emig, for example, asked local school teachers to suggest students who might make good subjects for studying a typical student's writing [2]. On the other hand, in a study of authority in teamwork in professional communications, Loehr used two criteria to select one site out of several possibilities and four criteria to select a particular project team from that site. One of her criteria for team selection was a low level of confidentiality so that she would be free to discuss questions of authority in team work [29].

If several subjects are to be studied, then the researcher may want to

consider how to best achieve a representative sample. A good example of careful selection of a representative sample is Philben and Spirek's selection of 30 possible subjects by using the Society for Technical Communication's biennial Profile. Of these 30, 20 agreed to participate [22]. There is no rule on how many subjects are needed for a case study to be effective. In fact, some experts claim that, by its nature, a case study focuses on one event, one situation, one person, or one group [14]. Of course, if the subject of the study is chosen on the basis of his or her uniqueness, then there will be just one subject in the study. On the other hand, if the subject of the study is a classroom or a project team, the number of subjects may include every member of the class or the team unless that number is so large that the researcher's resources would limit the data collection to fewer subjects. In such a situation, the researcher may decide to focus on a few representative members of the team or class.

Selecting Methods of Data Collection: Researchers can choose from numerous techniques for data collection in a case study—too many techniques, in fact, to do justice to here. However, in a later section of this article, I will discuss a few of the more popular ones in some detail. For now, I will stress five points.

First (and obviously) researchers will want to select methods that will produce the type of data needed [16], [25]. For example, if you want to know how long it takes to carry out a specific task, you could ask people who frequently do the task to tell you how long it takes (interview) or you could use a stopwatch to time people doing the task (observation). Which method you choose would depend on how accurate you want the answer to be.

Second, researchers should select a method that will produce data that can be examined by others when the research is finished [11], [13]. Let me use a nameless example

from the literature. An author once reported that a program he had conducted to train a certain group was very successful according to what he had been told by the participants. In this case, it would have been easy to have passed out anonymous evaluation forms at the end of the training. Instead, the author relied on what certain participants told him when they ran into him later in the hallway or in another building. Such a method should raise questions in a reader's mind. Would anyone have stopped this author in the hall to tell him that the seminar he gave was utterly useless? One might suggest that interviews could provide better data in this case than chance encounters in the hall; however, the person conducting the interview should not be the person who is being evaluated.

Interviews are subject to researcher bias in other ways as well because we often hear what we want to hear rather than what the interviewee is actually saying. Thus transcribed tape recordings of interviews provide stronger evidence against researcher bias than notes—even those in meticulous handwriting—taken by the researcher during an interview, although taking notes is better than relying on memory for what was said [11]. Transcriptions have the additional advantage of providing a researcher with useful quotations that capture nuances in the subjects' responses. Other types of data that can be examined by others to allow verification of findings include interviews, logs, visual protocols (videotapes and movies), and verbal protocols—all of which I describe in more detail later.

Third, researchers should use triangulation (i.e., multiple measurement instruments) so that more than one measure will converge on an issue [1], [11], [14]–[16], [25]. Converging measures usually provide a more comprehensive and accurate view of an issue. For example, in an educational setting, a researcher who

wants to measure student verbal ability could collect both the grade students earned on a particular piece of work, their grade in the course, and their SAT scores. In a professional setting, the researcher who wants to know the effectiveness of a particular manual could collect opinions from users on the quality of a manual (using interviews or questionnaires), data on the frequency of use of the manual (using logs), and protocols (visual or verbal) of persons using the manual to do a task. Using multiple measurement instruments increases the rigor of the study and thus the credibility of the results [16], [25].

In almost every case study, a researcher will employ more than one tool to achieve triangulation. A good example of triangulation is Spilka's study of oral and written discourse described earlier [7]. By looking for patterns in data gathered through a variety of research tools (e.g., interviews, pieces of writing, logs, and on-site observations), Spilka gained insights into issues of ethos and power. Similarly, in an investigation of computer-mediated communication as in voice-mail, D'Ambra and Rice used two surveys, three focus groups, observations of three different training sessions, and coding of 192 incidents from the focus groups; then the researchers used factor analysis and other statistical procedures to analyze their data [30].

Fourth, researchers should test procedures in advance of data collection. Not only will this step ward off criticism of the results, but it will also improve the chances of successful data collection. The surest way to learn whether a particular procedure is effective is to try it out—a strategy that writers of instructions and manuals have learned is essential. Another help in planning successful data collection is consultation with a knowledgeable colleague. As all writers know, it is extremely difficult to assess the impact of our own phraseology and word choice,

and it is extremely difficult to edit our own writing because knowing the intended meaning obscures problems. Thus good writers often ask knowledgeable colleagues for feedback. Similarly, a researcher may be so caught up in his or her plans for a case study that it is difficult to see the glitches in the plans. In such cases, asking a colleague for feedback on the plans can often save valuable time and help the researcher avoid pitfalls.

One might be tempted to reject doing advance planning and testing of methods for a case study on the basis that planning such strategies as interview questions in advance will inhibit the researcher from capitalizing on unexpected opportunities, such as conversations that arise in chance encounters in the hall or the parking lot. On the contrary, advance planning of questions can act as a prompt to serendipitous data collection [17]. The pitfall lies in the other direction: the researcher who does not plan and test data collection methods risks his or her credibility. Good case study research benefits from both planning and testing.

Fifth, the methods used should be described in the article reporting research findings so that readers can assess the worth of the findings; Morse calls this “the audit trail” [25, p. 230]. From my example above about the author reporting on the success of his training program, you can see that readers need to know precisely what methods were used in order to evaluate the quality of the findings. And describing the methods need not take a lot of space in your article; for example, Vest *et al.* detailed the selection and interview process for their interviews with six engineers in about nine lines, or less than one-tenth of a page in a seven-page article [31]. However, if your project is complicated, then you owe the reader a more detailed description; for example, D'Ambra and Rice used forty-seven lines—a full half page out of a nine-page

article—to describe their complex methods [30].

Collecting the Data As you can see from the section on selecting methods, the data collection techniques influence how much value readers will place on your findings. In most cases, you should plan to collect data contemporaneously with the events you are interested in [1]. For example, in the case of obtaining opinions about a new product or procedure, you will want to collect these while the product or the procedure is still new. Where possible, you should collect data from subjects along the way, rather than retrieve information from your own memory at the end of a project. However, in other situations, you may want to examine materials that have been in existence for some time, say a set of memos written during a production process or the reference lists of articles in a particular journal over a particular period of time. Note that you are not relying on memories, but are examining artifacts that others can also examine if they wish. For useful information on examining artifacts, see Hodder [32].

Another strategy for successful data collection is to be systematic [1]. Collecting data systematically reduces the probability of researcher bias. For instance, case study researchers often use interviews with multiple subjects and, as anyone who has ever been interviewed will testify, the shape of the question determines the shape of the information provided in the answer. However, if the same questions and probes are used with every person in the study, then the researcher reduces the risk of biasing answers from some of the interviewees [17]. Using identical words with each subject is very important if the question is a vital one, is apt to be misunderstood, or involves some sensitive area. Likewise, setting up a specific time and place for the interview provides more reliable data than simply asking a question of someone during an

encounter in the hall or during an impromptu or social office visit. On the other hand, questions designed in advance can possibly inhibit spontaneity of answers. To reduce the artificiality, some researchers use their previously designed questions only as guidelines during an interview so they will feel free to jump ahead to a particular question if the topic comes up in relation to a previous question and to use different phraseology when it seems needed [17].

Interpreting the Data Although I have put this step near the end of the case study research process, in many circumstances the interpretation of data begins before the data collection is complete, simply because the researcher begins to form impressions as the amount of data increases [1], [14], [25]. For example, in an interview one may begin to get a sense that certain topics discomfort the interviewee. Perhaps he or she does not like to discuss salary, supervisors, or some particular working conditions. The reason could be a sense of loyalty to the firm that makes the interviewee shy away from any area in which the firm is not without faults. But the interviewee's discomfort could just as easily have another cause, such as feelings of inferiority or lack of expertise in some area. So, although the researcher may begin to form some tentative conclusions about the meaning of the data being collected, he or she must try to remain as objective as possible until all the data are in and can be examined as a set.

Data collected in case studies are often so rich in detail that they are hard to interpret and difficult to summarize in a research report. Most experts advise researchers to look for patterns and/or categories in the data, especially if more than one subject is involved [1], [11], [14]. In a research project with just one subject, a researcher will want to consider which of the many details recorded best capture the essence of the subject.

Next, the researcher will want to verify his or her interpretations and conclusions. This verification can be completed in at least two ways. First, a researcher can test the validity of his or her interpretations by asking an outside rater to examine the collected materials [25]. For example, to organize the data gathered in transcribed interviews, the researcher could look for patterns, provide category labels and descriptions, and then ask an independent judge to use the labels and descriptions in classifying at least part of the data. If the judge's independent decisions closely match those of the researcher, the researcher has an effective counter to the charge of researcher bias. One useful source for help with the coding procedure is Strauss and Corbin [33]; for help with transcripts of interviews, Silverman [11] not only gives simple transcription symbols, but also various procedures for analysis.

Another source of verification of interpretations is the subjects themselves [15]. Some researchers bring drafts of their research reports back to their subjects, asking their opinion as to the accuracy of the interpretations (cf. [7]). Even so, the researcher, herself, has the final responsibility for determining how much to rely on the subjects' assessments. In addition, the literature in the area can help with verification. Perhaps another researcher in a similar situation has reached very similar or entirely different conclusions. In this case, the researcher can ask herself how similar the two cases are. She can search for evidence of disconfirmation of either interpretation in the two sets of data.

Disseminating the Findings Many experts claim that no research project is complete until the findings have been disseminated [1], [19], [34]. Some researchers choose to present findings first at a conference where they can obtain some feedback from their audience and later use the feedback to strengthen their final

report. Many audiences are adept at suggesting alternative explanations to a researcher's interpretations. Such suggestions, even though they seem entirely wrong to the researcher, can at least sensitize the researcher to problematic areas.

When reporting the results of any research project (regardless of method used or strength of findings), researchers can enhance their credibility by qualifying their claims. Although the researcher may have accumulated strong evidence that doing handbook exercises does not help writers master punctuation, readers of a research report will be less apt to challenge the findings if the researcher says, "The data *indicate* that doing handbook exercises does not help writers master punctuation," rather than "The data *prove* that doing handbook exercises does not help writers master punctuation."

FREQUENTLY USED TECHNIQUES IN CASE STUDY RESEARCH

Researchers can choose from a variety of data-gathering techniques in designing a case study. As I explained earlier, the choice of techniques depends to a large degree on what questions the researcher is hoping to answer. For example, if the researcher is interested in attitudes or prior activities that may have contributed to the circumstances of current interest, one tool is the interview. Almost all case studies rely to some extent on interviews. Another tool is examination or analysis of archival information; archival information can often provide a paper trail of how a decision was made. For instance, a researcher could examine back issues of a local newspaper or court records and other government documents. Or in a business setting, a researcher could examine prior inter-office memos, invoices, organizational charts, and other administrative documents.

In a brief article such as this, I cannot cover all the possible tools that might be used in an empirical case study. However, I do present some brief descriptions of frequently used tools in Table I. In the sections that follow, I describe in more detail four tools (interviews, logs, and visual and verbal protocols) that are particularly associated with case study research.

Interviews Case studies tend to rely heavily on interviews, which are also used extensively in other qualitative research designs such as ethnographies, focus groups, and surveys. Many qualitative researchers consider interviews their most important data-gathering tool (cf. [35]). An interview can help a researcher gather facts, opinions, goals, plans, and insights that may not be available from any other source. Frequently, people who will not make the effort to fill out a questionnaire will consent to an interview.

Interviews have an additional advantage over questionnaires in that they can also help develop a respondent's answer more fully. For example, a questionnaire can ask a "why" question after it has asked for a specific answer, as in the case where one question asks if the respondent prefers to work under fluorescent lighting or incandescent lighting and the next question asks why. But in an interview, the subject can also be asked follow-up questions such as "Tell me more about that," or "What happened then?" Also, in a face-to-face interview, the respondent's attitude is often evident from tone of voice or body language.

Interviewing techniques, therefore, vary along a continuum from informal conversations to formal surveys. In an informal interview, the researcher usually has at least one topic in mind, but the wording of the questions and the order of the topics are very flexible so the interviewer

can take advantage of interview conditions. In more structured interviews (often used when several subjects are being interviewed individually), a list of questions is prepared, but the interviewer can still vary the order according to the circumstances. Survey interviews resemble questionnaires in that the same wording and the same order of questions are used for each subject. Whatever the type of interview structure, interviewers are always alert to possibilities of probing more deeply with follow-up questions.

Disadvantages: Interviews do have several disadvantages. First, they are liable to the challenge of interviewer bias. Tape recording the interviews helps reduce this threat, but many people are uncomfortable speaking into a tape recorder. To make interviewees more comfortable, it is often a good idea to open the interview with nonthreatening, general questions. For example,

TABLE I
RESEARCH TOOLS COMMONLY USED IN CASE STUDY RESEARCH

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- Interviews
 - Logs
 - Protocols
 - Verbal
 - Video
 - Questionnaires
 - Examination of Archival Records, e.g., newspapers, court records, and invoices
 - Examination of Artifacts or Products, e.g., memos, proposals, and student writings
 - Tests
 - Created especially for the project
 - Standardized, e.g., SAT, IQ, and Myers-Briggs
 - Observations
 - Environment
 - Actions
 - Body Language
-

in an author/editor study [36], my colleagues and I first asked telephone interviewees questions that could be easily answered such as, "Was your article solicited by an editor or guest editor?" and "Had you previously submitted this article to another journal?" After we had established a kind of rapport, we then posed questions on more delicate issues such as, "Did the editor make changes in your article without consulting you?" and "Were all requests for revisions reasonable?"

A second disadvantage to interviews is the threat to validity. When a respondent gives a history of an event, that history may be inaccurate to a lesser or greater degree because the events are being recalled through the filter of hindsight. One way to help overcome a tendency to faulty memory is to ask the respondent for the details of the location of an event of interest before asking what the respondent did or thought at that time. This grounding in physical facts can help memory. Biased information also results from poorly worded questions. For example, the leading question, "What kind of problems did you encounter?" assumes that problems were bound to have happened. A better question would be: "Did you encounter any problems?" Even this question should be kept until near the end of the interview so that the whole focus of the respondent's answers about what happened in a certain situation will not be the problematic aspects, i.e., this question can be seen as stimulating the respondent to think of some problem to report in a situation that otherwise would have been regarded as very

positive by the respondent. A less biased question would be to ask the respondent to describe what happened.

A third disadvantage is time spent by the researcher. One-to-one interviewing costs more time than asking respondents to fill out a questionnaire at their convenience. Further, transcribing tape recordings can be very time-consuming and expensive. If one is transcribing from an ordinary tape player, it is often necessary to rewind and re-listen to understand what the respondent is saying [7]. Some transcribing machines facilitate the process by backing the tape up a bit when the person using it stops to type what he or she has just heard. However, such machines cost about \$300 U.S., and the tape must still be played in segments that allow time for transcribing. But in most cases, researchers feel the cost is worth the rich detail that interviews provide.

Tools: A tape recorder (which you have tested in advance and for which you have backup batteries) is the most reliable tool for collecting data in an interview, since you cannot possibly record every word by hand. Journalists often use two tape recorders at the same time in case one fails. And most journalists take notes as well because, even if the tape recorder works perfectly, accidents can happen to the tape before transcription is completed. An additional advantage of using a tape recorder is that it will also preserve hesitations and tone of voice. The hesitations can be captured in a transcription, though tone of voice cannot. Still, researchers interested in tone of voice could replay the

tape and make notations on the transcript about the tone of voice.

However, in any case study, opportunities for asking questions may arise unexpectedly. A researcher may have to rely on handwritten notes in such instances. Also information-gathering opportunities may arise when taking notes would inhibit the participants. In such instances, experts suggest that the researcher should write notes immediately afterward, even to the extreme of going to a restroom and writing on toilet paper if nothing else is available [17]. Of course, handwritten notes cannot capture the wealth of detail that a tape recording can; even if the note-taker knows shorthand, keeping up with the speed of speech is difficult. However, if you must rely on handwritten notes, you can make these more detailed by devising a set of abbreviations that you practice using in advance so you do not have to think about them as you take notes. For example, in my notes when reading or interviewing I always use capital "T" to mean "teacher," and capital "S" to mean "student"; "Ts" means "teachers," and "Ss" means "students." These abbreviations have become so ingrained that I even find myself using them when I write comments on student papers or notes to colleagues. Some note-taking conventions have become somewhat standardized in empirical research (see Table II).

Other common abbreviations are "altho," "info," \$ for money or cost, \neq for "does not equal," and \therefore for "therefore." Additionally, some experts in qualitative methods provide standard formats for taking field

TABLE II
NOTE-TAKING CONVENTIONS

" "	used to enclose direct quotes
' '	used to enclose paraphrases
()	used for context information or researcher interpretation

notes (see, for example, [11] and [13]).

Researchers can also maximize the benefits of interviewing by following these guidelines.

- Establish rapport with brief opening chit-chat about the day, the weather, or whatever. Use a conversational tone, but be professional.
- Maintain eye contact, but do not stare. Use conversational body language. For example, you could pull two chairs fairly close together at a slight angle rather than sit in chairs facing each other on opposite sides of a desk.
- Give positive feedback such as nodding the head and saying “uh huh” or “I see.”
- Allow the respondent time to answer. Use pauses for eliciting further details, but do not drag the interview out. Be alert to respondent weariness.
- Use follow-up prompts such as “Could you tell me more about that?” or “What happened next?”
- Clarify answers when needed by asking questions such as, “What do you mean?” In some instances, you may want to check your understanding by paraphrasing the answer as in, “Let’s see if I got this right: you felt that ...” and so forth.
- Thank the respondent at the end. You can sometimes even offer to send him or her a copy of the final report if the respondent is someone you anticipate future contact with; but avoid over-obligating yourself—make this offer on limited occasions.
- Type up your notes or transcribe your tapes as soon as possible while your memory is still fresh enough to clear up any ambiguities caused by illegible handwriting or inaudible comments on the tape.

Logs Much as a ship’s captain keeps a log of where the ship has been and what new land or conditions have been sighted, in some projects a researcher keeps a log to chart the steps taken in the project and the development of insights. For example, if a researcher is investigating a document approval process, the researcher may want to keep a log to track the dates that different drafts were submitted and approved or returned for revision. On the other hand, a researcher investigating interactions between employees involved in producing a document cannot expect to follow even one subject all day, every day, during the production process because such a process could go on for several weeks. In such a situation, the researcher could ask subjects to keep logs in which they note their own interactions with others involved in the process. Such logs would probably include the date, time, location, persons participating, and the topic of the interaction; the log could also include information on agreements or disagreements that occurred and feelings or reactions of the log keeper. Linda Flower once required that I (and other graduate students in her class) keep a log in which we jotted down the time and place every time we thought about the topic of the paper we were assigned to write. I gained a new insight about prewriting from this exercise: I was amazed to learn that I did a lot of mental work on a paper (in the shower, on the way to work, while fixing dinner, etc.) before I ever sat down to write a draft. And by requiring her whole class to do this exercise, Flower collected evidence that showed that much prewriting is done before pen or pencil ever touches paper.

Logs are also useful for helping determine costs and patterns of behavior. For example, if one wanted to calculate how much a proposal really costs, asking the proposal writers to keep logs of both their thinking and writing times would provide some interesting material

on the actual costs of written products in the workplace. Behavior patterns also show up in logs. For example, it might be interesting to know how many members of a team of writers tend to pick over word choice and how much time is expended in that area. If each member of the team kept a log that specified time spent on each task, the researcher could compare the data in the logs with data gathered in interviews with team members. In the interviews, the researcher might ask each team member his or her opinion on a number of issues to learn answers to such questions as 1) Are word choices typically based on personal preferences, company policy, or audience analysis? 2) Is word choice a serious concern or a nonissue? 3) How do team members react to word choice suggestions from others?

Computer logs are also helpful to many researchers. Computer programs can be set up to log the amount of time users spend writing with a word processing program or creating page layouts, and so forth. Computer programs can also record keystrokes so that a researcher can determine the number of deletions and insertions a typical writer or student makes when working on a document.

Visual Protocols Visual recordings (movies and videotapes) are the best tools when you want to capture body language or groups of people interacting. However, videos and movies come under a lot of criticism as being a reactive tool, i.e., their very presence can cause subjects to behave unnaturally. Anyone who has a relative or friend with a camcorder knows that this criticism has some validity. Still, a video can make a record that is more complete than field notes or tape recorded interviews because it can capture nonverbal behavior that might be overlooked by a person engaged in making on-the-spot field notes [17]; for an in-depth discussion of the use of video recordings, see Harper [37]. Videos have the further advantage

that they can be shown to other members of a team and reviewed over and over so that nuances of behavior that were missed at the initial screening can be identified or analyzed. This kind of follow-up analysis is limited with field notes, because the person asked to review the notes has only the data that the note taker decided to record—after all, it is impossible to record everything in notes.

However, recording data via a videotape or movie is not the end of the matter. For one thing, some bias will still exist because the person in charge of the camera decides what or who to focus on. This is an important issue when several persons are being filmed at once. Camera angle is also an issue in terms of what the researchers most want to capture. For example, is it more important to capture the words and letters as they are being produced with a pen on paper (i.e., the view from over the writer's head or shoulder), or is it more important to capture the writer's facial expression (i.e., straight-on view). Two cameras might be an answer, but it could be difficult to tell which facial expression matched which word being written. Some researchers once told me that they had tried filming from underneath a glass table to try to capture both.

After the film is made, even trickier work begins: identifying patterns and interpreting actions. To increase the validity of their interpretation of behavior recorded on videos, researchers need to clearly define their categories and then ask a fellow researcher to use the definitions to sort the observed behaviors. If agreement is lacking, then the researcher may need to re-examine his or her interpretations. If the two researchers obtain a high percentage of agreement in using the categorization scheme, then the interpretations are less subject to the criticism of researcher bias.

Verbal Protocols A verbal protocol is usually an audio-tape recording of a subject carrying out some task while thinking out loud, i.e., subjects are asked to say whatever pops into their mind while doing the task. Verbal protocols or “thinking aloud” protocols have been even more roundly criticized than visual recordings as being a highly reactive tool. Again, the criticism is justified: saying what you think while doing a task is unnatural behavior for most people. Also, thoughts come and go faster than one can articulate them, so a verbal protocol only captures those thoughts the subject can get said, and probably only those the subject is willing for someone else to hear.

On the other hand, we really have no other tool to help us gain insights into mental processes. Verbal protocols are like very small windows into the mind. As Linda Flower has explained, what is recorded is similar to those sightings we might experience of a porpoise lifting its head out of water now and then as it swims—from these, we can infer the direction the porpoise has traveled, but we certainly cannot claim to have seen the complete details of its journey [38].

One type of research that relies heavily on verbal protocols is evaluative research in which a product (e.g., a computer manual) is being tested. Verbal protocols can help an evaluator identify trouble spots easily because frequently when the subject experiences uncertainty, he or she begins to speak more slowly, and doubt creeps into his or her voice. Like videos, a verbal protocol can be biased if the role of the researcher during the data collection is not carefully controlled. Some researchers like to sit out of the subject's sight and hearing, but close enough to know when the subject has quit talking because subjects often get so wound up in the task they are doing that they fall silent and need to be reminded to “please, keep talking.” For most authors, it is very disconcerting

to listen to a subject get lost in the instructions they have written. When I require my students to collect a verbal protocol of a user test of their manuals, I often find that the writer just cannot resist putting in his or her two cents to clarify things for the subject. For example, I can remember one writer who interjected, “What do you mean ‘It's not clear’—the instructions are right in front of you!”

The text that follows is from a verbal protocol of a reading task Linda Flower asked me to do when I took her class in process tracing. I have used italics for my comments and underlining for the text I was reading.

I'm opening the passage to read it. Passage #1 is entitled, “Waves,” and there are lots of wavy lines around it. The passage begins with blacked-out lines on both sides, and the word “Haystack” is in the center with quotation marks around it—not your normal beginning of a paragraph. The text begins sort of in the middle of the second line.

Like all river waves...

which seems odd to me when there's a haystack there.

Like all river waves, these stand stationary while the water rushes through...

River waves stand stationary? I don't understand. Wait! Backing up,

Like all river waves, these stand stationary while the water rushes through on its downstream course.

It may be spotted by its characteristic scalloped and long length. Also by the fact that they appear in groups...

I don't know what this is about.

...the characteristic scalloped shaped long length and by the fact that they appear in groups, a half dozen or more together, spaced at even downstream intervals. These waves...

I guess they're really not waves.

These waves are a vibration associated with the dissipation of velocity energy when shallow fast current reaches a deeper, slower place in the river.

I didn't understand that sentence at all.

If we examine my reactions to the task, we can clearly see that I was puzzled by what I was reading. But we can also notice something else: when puzzled, I reread. Another student in the same class did not reread even one word while doing this task. Instead, she made comments about the writing style, such as, *They could use another connective here instead of the two "ands."* and *This gets to be more technical. It starts out general and gets more technical. It would be harder to understand for some people.* We might infer that this student is developing ideas for revising; and she confirms our inference near the end of her reading when she says, *I really don't know enough about it to revise it. It's just not logical.*

Coding (categorizing and interpreting) verbal protocols can be very tricky. Depending on the type of information a researcher is looking for, a protocol can be broken into either sentences or phrases that can be identified as separate thoughts, or "episodes" that are collections of related statements, thoughts, and actions. For example, if we examine my protocol, we can see at least two types of reaction: noticing oddities and finding the text incomprehensible. Under noticing oddities, we could also have two categories:

1) reaction to the layout: *Passage #1 is entitled, "Waves," and there are lots of wavy lines around it. The passage begins with blacked-out lines on both sides, and the word "Haystack" is in the center with quotation marks around it—not your normal beginning of a paragraph.*

2) reaction to the content: *which seems odd to me when there's a haystack there*

If we then used this classification scheme to examine the second protocol, we find instances of another category—reaction to the structure of the text: *They could use another connective here instead of the two "and's" and It starts out general and gets more technical.* Of course in longer protocols, there are many more classifications that could be developed. For one thing, we might want to categorize readers' goals for reading. From these two protocols, we might infer two possible goals: 1) to comprehend meaning and 2) to analyze for possible revision. For a good description of protocols and coding, see articles by Hayes and Flower [38], [39].

OPPORTUNITIES FOR CASE STUDY RESEARCH IN THE WORKPLACE

Because professional communication is a relatively new field [40], the job world offers many rich opportunities for conducting case study research that could help define principles and strategies for more effective technical communication [5], [26], [38], [39]. For example, most companies experience change in some way—possibly new equipment is purchased or a new management system is adopted. Such changes present bountiful opportunities for collecting data before, during, and after the change, through structured interviews with persons involved in the change, logs of participant activities, and production records. A carefully designed case study of change at a particular place of work can often provide

insights into better ways to carry out tasks common to technical communicators.

Unfortunately, what usually happens is that someone involved in the change writes an account after the change without having collected data systematically. In such cases, the writer can only describe what he or she remembers, and the description is colored by the fact that it is written after, rather than during, the change. If the overall change was successful, the writer may not remember small problems that arose even though these problems could be major stumbling blocks at another firm.

Another rich possibility for a case study arises when a technical writing practitioner encounters a problem or some frustration in his or her workplace. In this instance, the practitioner could design a case study of the workplace or situation to help pinpoint sources of the difficulty or at least develop a better understanding of it. Practitioners can also help develop principles for effective technical communication when they encounter advice that does not seem to fit their own work situation; here, what is needed is an analysis of how their workplace differs from the one described in the typical technical communication textbook.

To illustrate these opportunities, let us consider the current enthusiasm for using collaborative writing assignments in the technical writing classroom. Many technical writing teachers use collaborative assignments because research suggests that in nonacademic workplaces, collaborative writing is the norm rather than the exception (cf. [41]). However, much remains to be learned about collaborative writing in the workplace. Some questions one might want to investigate in this area are the effects of the work environment (e.g., Do private offices inhibit collaborative efforts?), the effects of interpersonal skills (e.g., Are there identifiable skills that

facilitate the collaborative process?), the effects of subject matter knowledge (e.g., How much subject matter knowledge is needed for a technical writer to be a successful member of an engineering design team?), the effects of education (e.g., What skills, training, and/or principles should technical communication programs cover to prepare students for collaborative efforts in the workplace?). And these are just a few of

the possibilities in this particular area.

These questions and a host of others like them are ripe for investigation. To begin to find answers for them, practitioners and academicians alike need to become better acquainted with case study methodology. And professional communicators need to exercise care in their use of the label "case study," reserving its use to labeling a carefully

designed project to systematically collect in-depth information about a single unit, whether person or group of persons, event or group of artifacts. Such case studies will enable all of us—practitioners, teachers, and researchers—to do our jobs more effectively; in turn, improved practice will enhance the reputation of our discipline.

REFERENCES

- [1] R. K. Yin, *Case Study Research: Design and Methods*. Newbury Park, CA: Sage, 1989.
- [2] J. Emig, *The Composing Processes of Twelfth Graders*. Urbana, IL: NCTE, 1971.
- [3] L. Flower, "Writer-based prose: A cognitive basis for problems in writing," *College English* vol. 41, pp. 19–37, 1979.
- [4] L. Flower and J. R. Hayes, "Plans that guide the composing process," in *Writing: The Nature, Development, and Teaching of Written Communication*, C. H. Frederiksen and J. F. Dominic, Eds. Hillsdale, NJ: Erlbaum, 1981, pp. 39–58.
- [5] L. Odell, D. Goswami, A. Herrington, and D. Quick, "Studying writing in nonacademic settings," in *New Essays in Technical and Scientific Communication: Research, Theory, Practice*, P. V. Anderson, R. J. Brockmann, and C. R. Miller, Eds. Farmingdale, NY: Baywood, 1983, pp. 17–40.
- [6] J. Selzer, "The composing processes of an engineer," *College Comp. and Commun.*, vol. 34, no. 2, pp. 178–187, 1983.
- [7] R. Spilka, "Moving between oral and written discourse to fulfill rhetorical and social goals," in *Writing in the Workplace: New Research Perspectives*, R. Spilka, Ed. Carbondale, IL: Southern Illinois Univ. Press, 1993, pp. 71–83.
- [8] J. Rymer, "Scientific composing processes: How eminent scientists write journal articles," in *Advances in Writing Research, Volume Two: Writing in Academic Disciplines*, D. A. Joliffe, Ed. Norwood, NJ: Ablex, 1988, pp. 211–250.
- [9] M. M. Williamson, "A model for investigating the functions of written language in different disciplines," in *Advances in Writing Research, Volume Two: Writing in Academic Disciplines*, D. A. Joliffe, Ed. Norwood, NJ: Ablex, 1988, pp. 89–132.
- [10] D. C. Amsden and A. A. Amsden, "The Kiva story: A paradigm of technology transfer," *IEEE Trans. Prof. Commun.*, vol. 36, pp. 190–195, 1993.
- [11] D. Silverman, *Interpreting Qualitative Data: Methods for Analyzing Talk, Text, and Interaction*. Thousand Oaks, CA: Sage, 1993.
- [12] J. Procter, "You haven't heard a word I said: Getting managers to listen," *IEEE Trans. Prof. Commun.*, vol. 37, pp. 18–20, 1994.
- [13] J. Kirk and M. L. Miller, *Reliability and Validity in Qualitative Research*. Newbury Park, CA: Sage, 1986.
- [14] R. E. Stake, "Case studies," in *Handbook of Qualitative Research*, N. K. Denzin and Y. S. Lincoln, Eds. Thousand Oaks, CA: Sage, 1994, pp. 236–247.
- [15] V. J. Janesick, "The dance of qualitative research design: Metaphor, methodolaty, and meaning," in *Handbook of Qualitative Research*, N.

- K. Denzin and Y. S. Lincoln, Eds. Thousand Oaks, CA: Sage, 1994, pp. 209–219.
- [16] N. K. Denzin and Y. S. Lincoln, "Introduction: Entering the field of qualitative research," in *Handbook of Qualitative Research*, N. K. Denzin and Y. S. Lincoln, Eds. Thousand Oaks, CA: Sage, 1994, pp. 1–17.
- [17] A. Fontana and J. H. Frey, "Interviewing: The art of science," in *Handbook of Qualitative Research*, N. K. Denzin and Y. S. Lincoln, Eds. Thousand Oaks, CA: Sage, 1994, pp. 361–376.
- [18] E. G. Guba and Y. S. Lincoln, "Competing paradigms in qualitative research," in *Handbook of Qualitative Research*, N. K. Denzin and Y. S. Lincoln, Eds. Thousand Oaks, CA: Sage, 1994, pp. 105–117.
- [19] A. J. Vidich and S. M. Lyman, "Qualitative methods: Their history in sociology and anthropology," in *Handbook of Qualitative Research*, N. K. Denzin and Y. S. Lincoln, Eds. Thousand Oaks, CA: Sage, 1994, pp. 23–59.
- [20] D. T. Campbell, "Foreword," in R. K. Yin, *Case Study Research: Design and Methods*. Newbury Park, CA: Sage, 1989, pp. 7–9.
- [21] L. Flower, J. R. Hayes, L. Carey, K. Schriver, and J. Stratman, "Detection, diagnosis, and the strategies of revision," *College Comp. and Commun.*, vol. 37, pp. 16–55, 1986.
- [22] A. I. Philbin and M. M. Spirek, "The paradox of revision: A study of writing as a product in the revision of manuals," *IEEE Trans. Prof. Commun.*, vol. 39, pp. 30–37, 1996.
- [23] J. Dautermann, "Negotiating meaning in a hospital discourse community," in *Writing in the Workplace: New Research Perspectives*, R. Spilka, Ed. Carbondale, IL: Southern Illinois Univ. Press, 1993, pp. 98–110.
- [24] M. S. MacNealy, "Creativity in literary scholars," in *Empirical Studies of Literature*, E. Ibsch, D. Schram, and G. Steen, Eds. Amsterdam, The Netherlands: Rodolpi, 1991, pp. 281–288.
- [25] J. M. Morse, "Designing funded qualitative research," in *Handbook of Qualitative Research*, N. K. Denzin and Y. S. Lincoln, Eds. Thousand Oaks, CA: Sage, 1994, pp. 220–235.
- [26] L. R. Smeltzer, "Emerging questions and research paradigms in business communication research," *J. Bus. Commun.*, vol. 30, no. 2, pp. 181–198, 1993.
- [27] J. Yates, "The opportunity of qualitative research," *J. Bus. Commun.*, vol. 30, no. 2, pp. 199–202, 1993.
- [28] J. MacKinnon, "Becoming a rhetor: Developing writing ability in a mature writing-intensive organization," in *Writing in the Workplace: New Research Perspectives*, R. Spilka, Ed. Carbondale, IL: Southern Illinois Univ. Press, 1993, pp. 41–55.
- [29] L. Loehr, "Composing in groups: The concept of authority in cross functional project team work," *IEEE Trans. Prof. Commun.*, vol. 38, pp. 83–94, 1995.
- [30] J. D'Ambra and R. E. Rice, "Multimethod approaches for the study of computer-mediated communication, equivocality, and media selection," *IEEE Trans. Prof. Commun.*, vol. 37, pp. 231–239, 1994.
- [31] D. Vest, M. Long, L. Thomas, and M. E. Palmquist, "Relating communication training to workplace requirements: The perspective of new engineers," *IEEE Trans. Prof. Commun.*, vol. 38, pp. 11–17, 1995.
- [32] I. Hodder, "The interpretation of documents and material culture," in *Handbook of Qualitative Research*, N. K. Denzin and Y. S. Lincoln, Eds. Thousand Oaks, CA: Sage, 1994, pp. 393–402.
- [33] A. Strauss and J. Corbin. *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*. Newbury Park, CA: Sage, 1990.
- [34] R. A. Day, *How to Write and Publish a Scientific Paper*, 4th ed. New York: Oryx, 1994.
- [35] D. M. Fetterman, *Ethnography: Step by Step*. Newbury Park, CA: Sage, 1989.
- [36] M. S. MacNealy, B. W. Speck, and N. Clements, "Author/editor interaction from the viewpoint of successful authors," *Tech. Commun.*, vol. 41, pp.

- 240–259, 1994.
- [37] D. Harper, "On the authority of the image: Visual methods at the crossroads," in *Handbook of Qualitative Research*, in N. K. Denzin and Y. S. Lincoln, Eds. Thousand Oaks, CA: Sage, 1994, pp. 403–412.
- [38] J. R. Hayes and L. S. Flower, "Identifying the organization of writing processes," in *Cognitive Processes in Writing*, L. W. Gregg and E. R. Steinberg, Eds. Hillsdale, NJ: Erlbaum, 1980, pp. 3–30.
- [39] ———, "Uncovering cognitive processes in writing: An introduction to protocol analysis," in *Research on Writing: Principles and Methods*, P. Mosenthal, L. Tamor, and S. Walmsley, Eds. New York: Longman, 1993, pp. 206–220.
- [40] T. E. Pearsall. *The Elements of Technical Writing*. Boston, MA: Allyn and Bacon, 1997.
- [41] L. Ede and A. Lunsford, *Singular Texts/Plural Authors: Perspectives on Collaborative Writing*. Carbondale, IL: Southern Illinois Univ. Press, 1990.

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