

course in college, but one which had an enormous impact on his writing. He also credits his MA thesis director at Northwestern with inspiring him to take special pride in his writing. Like many engineers, Nelson recognizes the importance of good writing to his work. He sometimes even volunteers to do the writing associated with a project instead of some of the technical work, and he enjoys publishing professional articles on engineering, even though such articles do little to advance his career. Except for those articles, Nelson says, the writing he does at work is typical of the writing done by most engineers at a similar career stage within his particular engineering sub-discipline.

3. Emig, *Composing Processes*; Charles R. Cooper and Lee Odell, ed., *Research on Composing: Points of Departure* (Urbana, IL: National Council of Teachers of English, 1978).
4. Flower and Hayes describe protocol analysis and the results it can generate in "Identifying the Organization of Writing Processes" and "The Dynamics of Composing: Making Plans and Juggling Constraints," both in *Cognitive Processes in Writing*, ed. Lee W. Gregg and E. R. Steinberg (Hillsdale, NJ: Erlbaum, 1980), pp. 3-50. A good introduction to the effects of researchers on the phenomena they study is in Eugene Webb, et al., *Unobtrusive Measures* (Chicago: Rand McNally, 1966). For a critique of protocol analysis as a research tool, see Faigley and Witte, p. 412.
5. C. H. Knoblauch, in "Intentionality and the Writing Process: A Case Study," *College Composition and Communication*, 31 (May, 1980), 153-59, has also discussed how writers at work juggle multiple aims.
6. Janet Emig, for example, has shown that arrangement occupies little of the time of student writers and that even professional writers often do little detailed arranging, especially if their material is narrative, descriptive, or lyric. See *Composing Processes*, pp. 20-24.
7. The pressure to conform to "company practice" is greater at some engineering firms than at others. Nelson's present employer decides only very minor details about his writing—e.g., abbreviations, résumé formats, report covers. On the other hand, Nelson has also worked for companies that allowed him much less autonomy, companies that "second guessed" (Nelson's term) nearly every writing decision he made, even minor stylistic decisions.
8. The Critical Path Diagram and the Project Task Flow are remarkably analogous to models of the writing process. In fact, when I talk to my students about the writing process, I compare it to the processes engineers go through in the course of an engineering project—gathering data, planning, designing, implementing, evaluating.
9. Donald Murray, "Write Before Writing," *College Composition and Communication*, 29 (December, 1978), 375-81, and "Internal Revision: A Process of Discovery," in Cooper and Odell, pp. 85-103; Sommers, "Revision Strategies." For more work on revision, see Faigley and Witte; Perl; John D. Gould, "Experiments on Composing Letters: Some Facts, Some Myths, and Some Observations," in *Cognitive Processes in Writing*; and Ellen Nold, "Revising: Toward a Theory," unpublished paper delivered at the Conference on College Composition and Communication, Minneapolis, April, 1979.
10. Cooper and Odell, p. xiv.
11. Sondra Perl, "Understanding Composing," *College Composition and Communication*, 31 (December, 1980), 363-69. See also Nancy Sommers, "Revision Strategies" and "Response to Sharon Crowley," *College Composition and Communication*, 29 (May, 1978), 209-11; and Linda Flower and John Hayes, "A Cognitive Process Theory of Writing," *College Composition and Communication*, 32 (December, 1981), 365-87.

## WRITING IN AN EMERGING ORGANIZATION

### *An Ethnographic Study*

STEPHEN DOHENY-FARINA

Rereading this piece for the first time in many years leaves me somewhat conflicted. I still find value in the study, not because it focused on exemplary workplace writing but because it was, for the time, a somewhat extreme embodiment of the emerging understanding of workplace writing-as-socially-embedded discourse.

This significance derived from the fact that while I had done nearly a year's ethnographic research on writing in the organization—thereby examining dozens of documents, observing the writing processes of numerous employees, and conducting a variety of discourse-based interviews about emerging documents—I ultimately focused on the writing of one sentence, one key statement in a business plan. If the genesis of a mere sentence could be traced over time through such a complex of social interactions and play such a crucial role in the development of the business, then maybe workplace writing was indeed something worthy of study; maybe our research—as others were saying long before me—should have import beyond the analysis of texts; maybe those in other disciplines who studied the way organizations develop and evolve would need to seek out and learn our disciplinary concerns to do their work.

What disappoints me today about the article is its form, a narrative constricted by all that analytic compartmentalization. What I am seeking and not finding in the article is the impact of the drama: a story of highly flawed efforts to create new products that might revolutionize the way businesses worked, of office intrigues, dubious accounting practices, visionary software geeks hopped up on caffeine, cabals within cabals, and secret meetings at undisclosed locations. One day near the end of my time there I was actually "slipped" a piece of paper with a phone number scrawled across it and quietly instructed to make a call from a phone booth in order to learn where and when a crucial, secret meeting would happen. At that meeting I was not allowed to write notes and my presence was not recorded by a company manager who took the "official" minutes—just in case it all ended up in the courts. Limit the paper trail. We don't need this ethnography guy telling all to the outside world, they said.

None of this survived my writing process. Instead, I see that I fit the complex story into a somewhat scientific form that largely removed me from the events I recorded even as I was shaping those events with every observation I wrote. The article's form reflects, I think, less the

rigors of objectivity and more the gatekeeping forces that I was negotiating as I tried to produce an acceptable dissertation and later publishable article.

When I consider the legacy of this article and others like it, I find myself wondering whether or not academic publishing is a fruitful avenue for ethnographies, which by definition will generate too many words and too much detail, while the readership has too little time to read too many papers, books, Web sites, etc. Perhaps, though, robust research ethnographies can flourish in hypermedia environments, the links allowing for optional navigation of greater and greater depth and description with little added cost to publishers.

So if I were writing this today, I would still want that analytic significance to come through—hey, I worked with outstanding gatekeepers to produce this article—but I would want to subordinate it all to the narrative: a tale that would not only explain the crucial nature of workplace writing for the evolution of the company but would also pull back the frame to reveal me as a character generating a story. And of course that character would be writing a story that included details like whispered instructions and crumpled papers with phone numbers on them. (Wouldn't it have been cool if I had been told to disguise my voice with a handkerchief?)

*Stephen Doherty-Farina*

In a report on their investigation of writing in the Vai (Liberia) culture, Scribner and Cole (1981, p. 76) point out that our perceptions of writing—writing problems, the “writing crisis”—are dominated by our knowledge of academic writing.

Most of our notions of what writing is about, the skills it entails and generates, are almost wholly tied up with school based writing. . . . This approach binds the intellectual and social significance of writing too closely to the image of the academic and the professional member of society.

Scribner and Cole (1981, p. 76) argue for the need of a body of research on nonacademic writing:

What is missing in this picture is any detailed knowledge of the role and function of writing outside of school, the aspirations and values which sustain it, and the intellectual skills it demands and fosters.

Such studies can be useful for two reasons: First, they provide insight into writing as a social process. Recent case studies in nonacademic settings have attempted to focus on the writer's interpretations of social context and the social interaction that the writer engages in when writing. Second, knowledge about writing in nonacademic contexts can inform the

teaching of writing—especially technical, business, and professional writing. By learning more about nonacademic contexts for writing, we are learning more about the kinds of rhetorical demands faced by many of our college graduates.

One major new source of information about writing in nonacademic settings has been the findings of a number of recent surveys (Anderson, 1985; Barnum & Fischer, 1984; Bataille, 1982; Faigley & Miller, 1982; Golen & Inman, 1983; Van Dyck, 1980). These surveys tell us that writing on the job (a) is a complex act, one that requires workers to address diverse audiences for diverse purposes, and (b) fills important functions for both the writers and their organizations. Yet, although these surveys provide some valuable information about the processes and functions on such writing, they do not yield information that describes these processes and functions in terms of the social context within which the writing is done. Scribner and Cole (1981, p. 84) call for research into nonacademic writing that does.

Since our social order is so organized that access to better-paying jobs and leadership positions commonly requires writing, there are . . . powerful economic and political incentives at work to encourage interest. . . . Ethnographic

studies of writing in different communities and social contexts . . . might help broaden existing perspectives.

To date there have been few investigations that have explored the social aspects of writing in specific nonacademic contexts. Paradis, Dobrin, and Miller (1985) note that one consequence of the lack of this type of research is that the complexity and significance of writing in some nonacademic settings often goes unrecognized and is little understood. They speak specifically of writing in an industrial setting:

Writing is commonly viewed as a pragmatic routine of transferring and archiving information; it is not often seen as a social process that creates and sustains the personal and professional relationships of individuals. . . . Nor is it believed that writing activities can deeply influence the inner workings, and thus the success, of the industrial organization.

Recent research has uncovered some valuable information about the relationship between writing and organizational contexts. In particular, such research has begun to discover (a) how social and organizational contexts influence writing and (b) how writing influences the organization.

#### SOCIAL AND ORGANIZATIONAL CONTEXTS INFLUENCE WRITING

By exploring the meanings that writers attribute to their rhetorical choices, Odell and Goswami (1981) and Knoblauch (1980) present evidence that these choices are very much socially motivated. That is, writers' rhetorical choices result from their conceptions of their rhetorical situations—conceptions that have been significantly influenced by the writers' interpretations of their social and organizational contexts. Although these investigations indicate that writers' conceptions of rhetorical situations are expressions of social and organizational contexts, they do not tell us how these conceptions arose. They do not detail the sources of, for example, the writers' conceptions of audience, purpose, or ethos; nor do they tell us how these conceptions evolved over time. Thus, this leads to the first set of research questions that guided my research:

- In a given nonacademic setting, how are writers' conceptions of rhetorical situation formulated over time?
- How do writers' perceptions of their social and organizational contexts influence the formulation of these conceptions of rhetorical situations?

While the previously mentioned investigations focused mainly on completed texts, other research in nonacademic organizations has begun to explore the influence of context on actual writing processes.

The research cited by Bazerman (1983) and the findings of Selzer (1983) and Odell (1985) indicate that invention processes in various nonacademic settings involve many types of social interactions, such as face-to-face dialogue, formal and informal meetings, brainstorming sessions, phone conversations, and so on. Through such social interactions, the writing process is influenced by interpretations of the organizational context. For example, Odell analyzed a case of social invention and found that the writer employed heuristic strategies to gather and consider information—strategies that were influenced by the writer's interpretations of the demands of the office in which she worked.

To understand better how context influences writing processes in a nonacademic organization, my research investigated the writing of a document from its inception to its completion in order to answer a second set of research questions:

- What are the social elements of writers' composing processes?
- How do writers' perceptions of their organizational contexts influence these processes?

#### WRITING INFLUENCES SOCIAL AND ORGANIZATIONAL CONTEXTS

None of the investigations cited in the previous section focuses on the role of composing in the development of an organization or social group. Faigley (1985), however, calls for research that does. Faigley suggests that future research into writing in nonacademic settings needs “to study how individual acts of communication (including writing) define and organize social groups.” The findings of Paradis, Dobrin,

and Miller (1985) have begun to uncover aspects of the role that composing can play in the development of an organization. In an industrial organization, the researchers found that writing was "a primary means of bringing the activities of different groups and individuals into phase with one another." Thus, writing serves an organizing function.

To date, however, there has been little research that has explored in detail how writing in a nonacademic organization shapes that organization—possibly because previous research has been conducted in organizations that are so well established that the effects of composing on the organization may be difficult to perceive. My research assumed that by investigating writing in a forming community, the organizing function of writing can be explored. Thus, my final research question was this:

- How do writing processes shape the organizational structure of an emerging organization?

To answer this question I conducted research at a newly formed company in which writing was an important element of the workers' jobs. Specifically, I investigated the collaborative writing process of a group of executives of a computer software company as they wrote a significant company document.

### THEORETICAL ASSUMPTIONS

My guiding assumptions are summarized as follows:

- Rhetorical discourse is situated in time and place, and as such is influenced by particularities of that time and place, such as exigence, audience, purpose, and ethos. (See, for example, Cicero's concept of *propriety* in *Orator*, xx-xxii.)
- The rhetor conceives of these situational factors through interactions with persons, events, and objects that exist external to the rhetor. (See, for example, Consigny's (1974) mediation between Bitzer, 1968, and Vatz, 1973.) Through such interactions, social groups arise. (See Blumer, 1969; Mead, 1956.)
- The researcher attempts to explore human interaction as it is evident in social and cultural settings. Ethnographers look at individuals and

their symbolic actions in terms of the groups or communities in which they live and work (Mead, 1956).

- A microscopic investigation of important parts of a culture can elicit an understanding of that culture. Such an event can be understood "as a unique, individual, peculiarly eloquent actualization—an epitome—of [the culture]" (Geertz, 1965, p. 154). Thus, the whole can be extrapolated from a very small part.
- Individuals act on the basis of the meanings that they attribute to the persons, events, and objects of their worlds. In order to understand a participant's behavior, the researcher must elicit these meanings from the participants (Blumer, 1969).
- Because any act can have multiple meanings, researchers seek diverse interpretations of the acts under study. This can be achieved by exploring participants' actions from differing points of view, and collecting data that concerns these actions through several methods (Denzin, 1970; Shatzman & Strauss, 1973).
- The researcher is the primary research instrument, and as such he or she must play a dual role. On one hand, he or she must develop an empathetic relationship with the individual under study in order to see from the participant's perspective. At other times, the investigator must distance himself or herself to view the action from the observer's outside perspective (Wilson, 1977).

### PROCEDURES

#### THE SETTING

Microware, Inc., founded in January 1982, is a company in a Northland State University (NSU) project known as the Start-Up Project. (Note: all names are pseudonyms.) This project was designed to help spawn new high-technology companies—"start-up" companies. Microware was founded by a group of ten NSU undergraduate and graduate students. Of these ten original founders, five actually held the top management positions in the company. In the Spring of 1983, one year after incorporating, the company's personnel consisted of approximately 25 full-time

employees. The company was also served by a board of directors, a law firm, and by outside consultants.

#### DATA COLLECTION

I visited the company from three to five days a week for approximately eight months. Each visit lasted from one to eight hours. Most of my data were collected during formal and informal staff meetings in offices, hallways, and open areas in two different Microware buildings. My key informants were the five top executives, two middle managers, and two outside consultants. I collected data four ways:

1. Field notes (Shatzman & Strauss, 1973). These consisted of observational notes (ON), theoretical notes (TN), and methodological notes (MN). In all, I collected approximately 400 pages of field notes.
2. Tape-recorded meetings (TRM): I was able to tape record two crucial meetings that concerned the writing of the document that was the central focus of my research results.
3. Open-ended interviews (OEI): I employed open-ended interviews to record the participants' accounts of the history of the company.
4. Discourse-based interviews (DBI): One version was modeled after the method developed by Odell, Goswami, and Herrington (1983). A second version was an adaptation of that method: I collected the drafts of a piece of writing from the first draft to the final draft. During interviews with writers and readers, I compared passages from early drafts with a corresponding passage from the final drafts. I then asked if the earlier version could have been kept as was. My intention was to stimulate the participants to discuss the meanings of the revisions. In all, I conducted approximately 30 open-ended and discourse-based interviews.

#### DATA ANALYSIS

Data analysis followed the Constant Comparison Method of Glaser and Strauss (1967): As I reviewed the data chronologically, I established analytical categories and the properties of those categories. Some of the categories were unique to the particular setting that I studied, categories such as *promotion reality*.

Other categories, such as *ethos*, were concepts that connected participant behavior to my theoretical assumptions. After establishing categories, I linked them to form the major theme and subtheme. The themes, which are explained later in this report, provided the framework for answering the research questions.

In general, my analysis describes the writing of an important company document, Microware's 1983 Business Plan. This analysis explains the relationship between the writing of the Business Plan and the organizational context within which it was written. In particular, I focused on two rhetorical choices that epitomized the interdependence of the organizational context and the process of writing the document.

### RESULTS: WRITING A BUSINESS PLAN

#### INTRODUCTION

The results of this study show how the writing of Microware's 1983 Business Plan both shaped and reflected the company's organizational context. My analysis of this reciprocal relationship between writing and the organization begins with an overview of the exigence for writing the 1983 Business Plan.

In general, the exigence for writing was closely tied to the financial status of the company. On August 25, 1983, less than two years after it began, Microware was on the brink of bankruptcy. The company was not generating any sales revenues, because it had yet to complete any marketable software products. In addition, the venture capital investments that it had received in its first year and a half were nearly depleted. In late July 1983, the company hired a consultant, Dr. Bob Hatlin, to help improve the company's production system. Hatlin worked with those who headed various parts of the company's production effort, the company's four vice presidents and several other managers. He helped them devise an organized production system, which required that each segment of the company work as a team; programming, quality control, marketing, and finance would all be integrated in a chronological sequence of steps geared to produce finished, marketable software products. Each of the four vice presidents would control certain aspects of this system, and the president was to monitor the overall operation.

Unfortunately for Microware, the financial crisis was already upon it by the time that Hatlin's production system had been designed. Because this new system could not immediately save the company, the president and vice president agreed that the immediate solution to the crisis was to appeal to outside investors to save the company by investing in it. They agreed that the primary way that they would attract investors was to write a Business Plan that would explain the company's history, its purpose, and its goals for the next five years.

On October 13, 1983, the executives met to make the final revisions to the new Business Plan. During this meeting, which lasted approximately 2 hours, the executives collaborated on dozens of rhetorical choices. Two of these choices, however, took up approximately 30 minutes of the meeting. This 30-minute segment concerned a brief, but particularly controversial passage of the Plan. The passage was one of a list of statements under the heading *1984 Milestones*. Before the passage was revised, it read:

- Purchase of sophisticated computer graphics production lab to generate graphic frames used in laserdisc/microcomputer consumer products (Graphics Systems Corporation's Image Animation System).

The revised passage read:

- Initial staged development of sophisticated computer graphics production lab to generate graphic frames used in laserdisc/microcomputer consumer products (contingent upon capital raising).

Whereas the original stated that the company would buy an entire computer graphics lab in 1984, the revised passage stated that the development of the lab would be done in stages and this development would depend on whether the company received enough money to do so. Although these changes may not seem to be particularly significant, the process of making these rhetorical choices had a profound impact on the organization. In addition, these choices involved very complex social interactions. In order to explain the relationship between the writing of the 1983 Business Plan and the organizational context of Microware, the following briefly summarizes the

process of collaboration that began on August 25, 1983.

#### THE WRITING PROCESS: A CHRONOLOGY

Whoever had power to establish the company's goals had a large measure of control over the evolution of the company. The company's goals influenced action; they gave direction to the day-to-day activities of the employees and they were the means of attracting much needed venture capital investment. Because Microware's goals were established in the Business Plan, the writer of that Plan wielded a powerful control over the company's future. Originally, the 1983 Business Plan was to have been written by the company's president, Bill Alexander. Bill had written the company's first Business Plan in 1982 and he assumed that he would be in control of writing the new one as well. In general, Bill wielded control over all large-scale company decisions and had done so since the company was founded in 1982. From Bill's point of view, he would collaborate with the other executives only if he needed to use them to provide some technical information for the Plan. Thus, on August 25, 1983 the president of Microware began to write the company's vitally important 1983 Business Plan. The vice presidents, however, inspired by the newly designed production system, wanted the writing of the new Plan to be a team project.

Several days after Bill began the plan on his own, he left town on a week-long business trip. While he was away, the vice presidents began to work on the new Business Plan in a manner similar to the way they were running the company's new production system: Each of the vice presidents took responsibility for his area of expertise and together the group began to consider how the Plan should be written. During this collaborative invention process two significant things happened: (1) for the first time ever, the vice presidents made large-scale company decisions without the approval of the president; and (2) the vice presidents came to believe that the financial crisis occurred not only because the company had suffered from a previously unorganized production system, but also because the president had seriously mismanaged the company's finances. The latter discovery arose as the vice presidents tried to organize

the company's financial records for the new Business Plan. As a result of the financial revelation, Microware's board of directors decided in a dramatic and emotional meeting that the president's autocratic rule must end. Thus, the act of writing led to a change in the corporate structure. That is, the writing process not only influenced the substance of what was written, but also influenced the organization.

In addition, the change in the authority structure also had a reciprocal influence on the writing process. When Bill returned on September 7th, the board imposed a new structure of authority on the company's top management—a structure based upon the collaborative process that had recently developed among the vice presidents. The president and the four vice presidents were all appointed to be members of an executive committee. This committee had ultimate authority in the company. Each member contributed his own expertise to the committee, and decisions were made by consensus. Shortly thereafter, on September 11th, the executive committee officially stipulated that the process of writing the 1983 Business Plan was to be a collaborative process: each member of the committee was to write the section(s) of the Plan that dealt with his area of expertise. Once these sections were completed, the committee planned to hold a meeting in which they would collaboratively revise the Plan and produce a finished product. Thus, as the writing process enabled a change in the company's authority structure, that change, in turn, affected the writing process.

The board of directors hoped that collaborative management would foster a team approach to decision making. They hoped that the president would become a part of that team. Bill, however, had only reluctantly accepted the new authority structure. He claimed that it was inefficient and would not work. For a month after September 11th, many major decisions were made only after bitter arguments between the president and the vice presidents. In addition, the collaborative writing process that the executive committee sanctioned did not proceed as planned. A few of the vice presidents produced incomplete or poorly written sections for the new Plan. After several weeks, the executive committee decided that the president should complete a draft of the Plan on his own, and then the committee could meet to revise it.

After taking over the task of writing again, Bill came to feel that little had really changed. Bill acted as if he was still the company's voice, and that he had *de facto* control of the company because of it. On October 5th, he was completing the Plan and he told me that the way this plan was being written was the same way that he had written the 1982 Business Plan:

I have not changed the way I have put together the Business Plan. What has changed is the others' attitudes towards this process. Their input is minimum, but their conception of their input is maximum. The process hasn't changed, they just think it has changed. (ON, 10/5/83)

Bill was sure that there would be no big objections to any part of the Business Plan when the management group met to discuss it. "The only thing they do is read what I write and make comments on grammar and little things. That is not a significant change in the process, but they think it is" (ON, 10/5/83). From Bill's point of view he had the significant power in the company because he was the one making the substantive rhetorical choices in the Business Plan. He was the one setting the company's goals. The executive committee, according to Bill, was only concerned with minor stylistic issues, not content choices. Bill appeared to be as much in control of the company at this point as he was before the board changed the structure of authority. On October 13th, Bill discovered that this was not so. As noted earlier, on that date the executive committee met to make final revisions to the draft of the Business Plan. During that meeting the president and the vice presidents engaged in a climactic confrontation for control of the company—a confrontation that was stimulated by the graphics lab passage.

The conflict over the graphics lab passage reflected two basic themes of the organizational context. These themes help to explain the rhetorical activities of the executives. The following two sections first discuss the nature of these themes and then show how the themes related to the executives' collaborative writing process.

#### ORGANIZATIONAL CONTEXT: THEMES

Two closely related themes explain the organizational context of Microware: Promotion versus Pro-

duction and Entrepreneurial Control versus Committee Management. These themes describe opposing views of reality, which gave rise to conflicting views of the rhetorical context for writing the 1983 Business Plan.

The president held a promotional view of reality, a view described by an informant who worked with him:

[He] think[s] that what is, is what you can convince somebody else it is, or what you can convince yourself it is, or what you can convince the bank to keep paying [for] to promote what it is. (OEI, 7/14/83)

During Microware's first year and a half, when he controlled the company, Bill made company decisions on the belief that if he could convince employees and investors that the company could achieve a certain goal, then the company would actually achieve that goal. Bill's primary promotional strategy was to excite his audience by describing long-term prosperous effects of an immediate cause—a cause that Bill would want enacted. For example, during a September 20, 1983 meeting, Bill tried to convince one of the vice presidents that Microware should purchase a highly specialized type of computer system. In doing so, Bill employed two persuasive strategies: (1) He emphasized the profits that Microware would make from the sale of the specialized software packages that could only be produced with the proposed system, and (2) he argued as if it was the proposed system that would do all the work necessary to produce profitable software. He never discussed the role or capabilities of Microware's production staff. Although this meeting was an instance of internal promotion, the president relied on similar tactics when promoting the company to outsiders. Sales pitches to potential investors on the great production potential of Microware purposefully glossed over production details.

Because of Bill's presidential authority, his promotional view was an extremely powerful force within the company. Bill's authority stemmed from his entrepreneurial ambition. He had been the company's entrepreneurial leader through most of the company's first two years. That is, he had generated the initial ideas, spirit, and impetus for the company,

and had wielded controlling authority over all of the company's operations; he had been the only one who could make important company decisions on his own. Through his entrepreneurial leadership, the company reflected his point of view. In fact, Microware came into existence primarily on the strengths of Bill's promotional vision. As Bill stated, he created the company in 1982 largely by writing the company's 1982 Business Plan:

It [the 1982 Business Plan] was everything. Without a product, without money, without furniture, without machines, without anything, the Business Plan [was] it. That's your whole case for existence. That's what attracted money. That's what kept us in the [Start-Up] program. That's what got most of the Board members into it. That's what got a lot of the employees into it. It did a lot of things. (OEI, 7/18/83)

In spite of the importance that Bill attributed to it, the writing of the 1982 Business Plan had been criticized by a Northland State professor, Dr. Murphy, who had been advising the young company during its inception. Murphy had urged Bill and the other founders to develop an effective production system first, then write a Business Plan and promote the company to investors. Instead, Bill wrote a Business Plan before the company was able to produce marketable software.

Clearly, the 1982 Business Plan had been a success in one important way: It attracted outside support and investments. In a more significant way, however, it was a failure: It inhibited successful production by setting far-reaching goals without providing a production plan designed to achieve those goals. For the first year and a half, the company's software production floundered, because the company was built upon a promotional vision and not upon a clear plan of production. As a result, the company achieved a tenuous existence: It was able to survive on outside investment, but unable to produce profit-generating products. Hence, there was a serious flaw in Bill's promotional view: Persuading investors and employees to believe in his goals did not guarantee that the company could achieve those goals.

By the fall of 1983 the president's authority and vision faced opposition from the vice presidents, who

had developed a production view of reality. This view grew out of the design of the new production system spawned by Dr. Hatlin. Before Hatlin arrived, the production organization was what one vice president called, "one fluid mass" (ON, 4/15/83). The production managers struggled unsuccessfully to organize all of the production ingredients needed to produce profitable software. After Hatlin, the vice presidents and several other managers had clearly distinguished the different elements of production and organized them into a team production system.

Those who held a production view of reality believed that one could only show that something could happen by pointing, not to the future, but to the past. The primary strategy of those who held this view was to base projections of future activity on past and present performances, so that there was an integrated, chronological sequence of steps connecting the past to the future. For example, in late August 1983, three managers who held a production-oriented view proposed that the company produce a new line of computer games. The manager's argument was based upon a detailed sequence of steps, built upon certain already demonstrated production capabilities. This sequence integrated all elements of production from programming to sales, and led sequentially to the projected outcomes: marketable products in time for the Christmas 1983 selling season. This type of production point of view—which put all of the company's operations under the guidance of a management team—gave rise to a committee management authority structure.

#### RHETORICAL CONTEXT: THEMES

The differences between the president's promotional/entrepreneurial view and the vice president's production/committee management view spawned differing conceptions of the rhetorical situation for writing the 1983 Business Plan. The collaborators held essentially similar views of their audience and purpose, but held significantly different views of the exigence that spurred the collaboration, and the ethos that should be projected by the Plan.

Everyone agreed that the purpose of the Business Plan was to show what the company produced, what it would produce in the future, how the company was structured, how much money the company was seeking, and how much control the major investor would

have by investing that amount. They also agreed that the primary audiences for the Plan were: (1) approximately 30 venture capitalists, and (2) the company's employees, because the completed plan would give guidance to their work.

The collaborators held differing views, however, concerning the exigence for writing, the financial crisis. The president believed that poor production led to the exigence for writing, whereas the production group (the vice presidents) came to believe that the exigence arose in part because the company's finances had been mismanaged by the president.

The collaborators clearly differed in their conception of the ethos that the Plan should project. The president, through his promotional view, wanted to write a Plan that expressed a bold, risk-taking ethos—the kind of ethos necessary, he thought, to attract investors. Bill sought to show that Microware was innovative and capable of fast growth. He decided that he could do this by including in the Business Plan a projection that the company would soon purchase an exciting new computer graphic production system—the graphics lab—and begin producing a whole line of sophisticated computer graphic software products. "This must be in the Business Plan," he said on September 8th.

The production group, on the other hand, was wary of the president's past record of setting inflated goals that were beyond the company's production capabilities. The vice presidents were also wary of Bill's judgment on crucial purchasing issues in light of some of his questionable past financial decisions. In addition, the vice presidents wanted the company's goals to express a carefully detailed production system. One vice president argued that "we need to say what we've done to date, then project" (ON, 9/11/83). Projections, he argued, should be detailed and sequential over a specified period of time: "If you have 30 pages (in the Business Plan), 28 should be specific plans of the (next) 18 months, and then two pages of puffery" (ON, 9/12/83). This conservative production ethos inevitably clashed with Bill's promotional ethos.

By October 13, 1983, these opposing views reached a climactic impasse when the collaborators tried to revise the graphics lab passage of the Business Plan. In revising the passage the executives had to answer two seemingly simple questions: (1)

Should we state that we are going to purchase the graphics lab in 1984? (2) If so, how should we write that statement? On one side was the president, who believed that Microware should purchase the entire lab in 1984. He believed that if he could persuade investors and Microware's employees that a graphics lab could be implemented in 1984, then it indeed would be.

In opposition to the president were three of the four vice presidents. (The graphics lab had been a pet project of one of the vice presidents long before the company's financial crisis; thus, he had mixed feelings on the issue. He liked the project, but he still subscribed to the production view of planning future activities.) The vice presidents were concerned that: (1) This claim was unsupportable—they did not believe that the company could afford to build and operate the entire lab in 1984; and (2) the project would not appear to fit with the kind of work that the company had done to date.

At stake in these apparently simple rhetorical choices were complex social issues: the autocratic decision-making power of the entrepreneur versus the team decision-making system of the production group. The opposing views were so entrenched, the confrontation so angry, that when the impasse was reached, the president threatened to resign—a move that would have sabotaged Microware's chances of attracting a significant investor. At that moment, the failure of the executives' collaborative writing process meant the failure of the company.

However, when the collaborative process seemed completely deadlocked, an alternative way of looking at the issue was proposed by the one vice president who had not fully sided with the president or the other vice presidents on this issue. The vice president envisioned that the graphics lab system would develop as did the production system of some of the company's current software: in small stages. This alternative led the president to propose a compromise.

A close analysis of the October 13th meeting shows that the goal that both sides argued over was not the primary obstacle to successful collaboration. The real obstacle was how the goal was articulated—how the goal was argued. The president argued for his goal with promotional tactics—predicting bountiful profits from the graphics lab. However, the pro-

duction group opposed that goal, arguing that it was not "realistic" to expect that the company could implement such a system in 1984. Bill recognized that this was a clash of differing views of reality: "Fine, it's your idea of realism versus mine!"

When the debate came to a stand-off between the two competing realities, the central issue became the control of the company. That is, the debate over the rhetorical choices was a struggle for power. Immediately after Bill said that it was his reality versus theirs, one of the vice presidents (Dave) expressed the ideal of committee management: The group must come to an agreement that satisfied each one of them. But Bill countered with his one last attempt to assert his entrepreneurial power:

*Dave:* I mean we all have to believe in this a hundred percent and I don't believe in this.

*Bill:* But we also don't have to have every [expensive] decision be a compromise so that everybody has to agree, otherwise it doesn't even get put down on paper. That's what it's been up to this point and I'm getting tired of it!!!

*Dave:* Well, Bill, I'm sorry to say but based on past performance, that's the way it's going to be for awhile.

*Bill:* Well, we'll see about that.

*Dave:* That's the way it's going to be.

*Bill:* We'll see about that.

*Dave:* Bill, you can argue about it as much as you want.

*Bill:* And I'll say I'll walk out that door right now and you can finish the Business Plan. Raise the rest of the money among yourselves! See if [a major potential investor] gets involved!

Regardless of the official sanctioning of the executive committee's authority, as long as that group of executives included individuals separated by such different points of view as that which separated Bill from the production group, the teamwork ideal of the board of directors would not be achieved by the executive committee. However, just as the process of writing the Business Plan brought this confrontation to the surface, the writing process was also the means by which these realities were merged. The compromise that finally led to an agreement on the graphics lab passage served as an instance of the cooperative

teamwork that the executive committee was designed to achieve.

It was only when the president took on the point of view of the production group and made the argument using production's strategy that a bridge between the opposing points of view was built and a compromise was reached. After the mediating vice president likened the graphics lab project to past Microware attempts at large-scale production, the president came to see the graphics lab not as a glamour item, but as a process—a sequence of stages that had to proceed according to the company's capabilities. As shown earlier, the president thus proposed to change the passage in two ways: (1) He revised "Purchase of . . ." to "Initial staged development of . . ." (2) He replaced the brand name of the graphics lab with a parenthetical statement that projected that the company would purchase only what it could afford: "(contingent upon capital raising)." Only when the president altered his view of the project, and thus altered his plan to implement the project, did he and the vice presidents achieve a common ground. This common ground enabled the executives to achieve a balance between the promotion and production realities. It provided the basis for a collaborative rhetorical choice. The process of writing thus provided an opportunity for the committee management structure to function as it was designed—as a team: The president would provide promotional vision and the production group would help to translate that vision into achievable goals. Once this impasse was resolved, the executives completed the 1983 Business Plan with little controversy. The Plan was sent to venture capitalists and eventually the company attracted financial backing.

#### TYPICALITY OF RESULTS

The themes that influenced the graphics lab rhetorical choices also influenced the collaborators' thinking about other aspects of the company's operation that were included in the 1983 Business Plan. Although the graphics lab conflict provided a particularly insightful opportunity to view the influence of the themes on the writing process, this influence was not an anomaly. In all, the October 13th meeting encompassed 51 decisions about the Plan. Those 51 choices consisted of two general types: 21 content-

related choices and 30 stylistic choices. The content-related choices, which included the graphics lab debate, showed the influence of the themes. The stylistic choices did not.

## DISCUSSION

The answers to the research questions form a provisional model that describes a reciprocal relationship between writing and the social and organizational contexts in an emerging organization.

### SOCIAL AND ORGANIZATIONAL CONTEXTS INFLUENCE RHETORICAL CONTEXTS

**QUESTION:** *In a given nonacademic setting, how are writers' conceptions of rhetorical situations formulated over time? How do writers' perceptions of their social and organizational contexts influence (1) their conceptions of rhetorical situations, and (2) their writing processes?*

#### *The Influence on Rhetorical Situations*

When the participants perceived a disorder in the organization, which they attempted to solve rhetorically, there arose differing views of rhetorical situation. The executives' differing view of the rhetorical situation were manifestations of their differing interpretations of their social and organizational context. These differing interpretations reflected the two dominant views of reality that were held among the participants: the promotion/entrepreneurial view of reality and the production/committee management view of reality.

#### *The Influence on Collaborative Behavior*

The process of collaboration reflected the relative authority of the collaborators. On August 25th when direct collaboration began, Bill was still very much the entrepreneurial leader of the company. The collaborative process reflected this structure of authority: Bill was the principal writer and voice of the company.

By September 7th, the company's authority structure had changed from entrepreneurial control to committee control. The collaborative writing process mirrored this change by proceeding along the lines of the production group's team/committee approach to decision making. Each committee member was to

write the parts of the Plan that covered his or her areas of responsibility or expertise. Final revisions were to be made by consensus.

From September 7th until October 13th, the relative authority of the executive committee and the president was unsettled. Likewise, the collaborative writing process was unsettled, too. The authority that had officially been given to the executive committee had effectively reduced the authority of the president to that of the other vice presidents. In practice, this authority structure was problematic. Because of their differing views of reality, the president and the members of the production group were not yet integrated into a committee that worked as a team. The writing process was also not proceeding as a team process. The committee approach to writing the Plan had not been successful. Not everyone wrote their sections to the satisfaction of the others, and thus the executive committee gave Bill the authority to finish the Plan on his own. After completing a late draft of the entire Plan, Bill expressed the belief that his control over decision making, although not officially sanctioned, was, for all practical purposes, still intact.

By the October 13th collaborative writing session, the authority structure of the company was still in question and the collaborative writing process still reflected this uncertainty. These uncertainties reached a climax during the moments when the graphics lab debate was deadlocked. Simultaneously, the company's authority structure and the collaborative writing process were threatened: The collaborators could not agree on certain rhetorical choices and Bill threatened a power struggle for control of the company. The company's authority structure was split by the clash of opposing realities. As a result, crucial rhetorical choices concerning the graphics lab could not be agreed upon. Thus, the process of collaboration reflected the status of power within the executive group.

#### RHETORICAL ACTIVITY INFLUENCES THE COMPANY'S ORGANIZATIONAL STRUCTURE

QUESTION: *How do writing processes shape the organizational structure of an emerging organization?*

The collaborative writing process played a significant role in the reapportionment of authority among the participants by challenging the president's au-

thority and by providing an opportunity to resolve the power struggle between the president and the other members of the executive committee. The collaborative process first served as a challenge to Bill's authority when the production group began to collaborate on writing the Business Plan. This challenge occurred in two ways: (1) While collaborating, the production group made decisions about the company's future. These decisions began a process of reshaping the company through the writing of the Plan. Thus the production group began to usurp some of Bill's control over planning the company's future. (2) While collaborating, the production group evaluated certain past decisions that had been made by Bill. These evaluations led the production group to question Bill's judgment as the company's prime decision maker. The process of writing the Plan allowed the production group to make decisions about the company that reflected their production/committee management view of reality, and thus challenged Bill's promotional/entrepreneurial control of the company.

Second, the process of collaborating served as a means of resolving the climactic impasse of the promotion versus production conflict that occurred during the October 13th meeting. By employing the strategy of the production ethos to rewrite a proposal that was primarily an expression of a promotional ethos, the participants integrated opposing realities. In this instance, the collaborative writing process achieved a balance that was necessary for the committee management structure to function as it was intended—as a team. Thus, the writing process helped to resolve the power struggle, shaping the social reality of the top management of the company.

#### IMPLICATIONS FOR THEORY BUILDING

My research indicates that writing a brief passage of the company's 1983 Business Plan involved a complex social process. Within the last 15 years, researchers have begun to develop models that describe writing as a complex process. A major process model of composing is the cognitive process theory developed by Flower and Hayes (1980, 1981). In Flower and Hayes's (1981, p. 370) model, the context for writing is embodied in a writer's "long-term memory," and conception of the "task environment."

These conscious and unconscious aspects of context may include situational elements that influence writing, such as exigence, audience, ethos, and purpose, as well as what the authors label "stored problem representations." The latter are stored plans that the writer may draw upon when writing:

Writers do no doubt have many such representations for familiar or conventional problems, such as writing a thank-you letter. Such a representation would contain not only a conventional definition of the situation, audience, and writer's purpose, but might include quite detailed information about solutions, even down to appropriate tone and phrases. (Flower & Hayes, 1980, p. 25)

In addition to the above contextual factors, Flower and Hayes also include the "text produced so far" as being a part of the context for writing.

Although this model provides valuable insight into the role of context in composing processes, some critics (Bizzell, 1982; Cooper & Holzman, 1983) argue that cognitive process models are significantly incomplete if they exclude aspects of social contexts for composing. Investigations of writing in nonacademic settings begin to explain the functions of social aspects of composing in three ways:

1. These studies expand the definition of the context for writing by showing that the writer's conception of his or her social context impinges upon writer's rhetorical choices.
2. They expand the definition of writing activity to include social interaction as a part of the process. Instead of limiting the act of writing to the moments when the writer encodes, research into the social process of writing traces the writer's activities through time, exploring how life experiences impinge upon the rhetorical choices that writer makes.
3. They begin to uncover how the "stored problem representations" arise. Flower and Hayes, by employing data-gathering methods designed to keep writers from relying on these stored plans, do not explore how these representations influence writers' rhetorical choices. Cooper and Holzman (1983, p. 288) explain that the Flower and Hayes theory shows neither how these stored plans arise nor how they are used:

With Flower and Hayes, the question of how writers are to develop plans to accomplish their goals remains unanswered, and the scripts (stored problem representations) that skilled writers unconsciously use are not described.

If a researcher observed only the October 13th writing session that occurred during my research, that researcher might have recognized that the production group wanted to write a Business Plan that followed certain rules, such as (a) the claims about the company should be listed chronologically; (b) the predictions of the future should be tied to the company's past actions; and (c) the predictions of company activities should show that they are all integrated into a cohesive plan. The researcher might have assumed that these rules were a part of a stored plan that the production group shared. The researcher would not have been able to describe how this stored plan arose. Research into social aspects of composing provides opportunities to discover both the evolution of such plans for writing, and the ways in which these plans relate to the writer's view of reality.

#### IMPLICATIONS FOR TEACHING

My research posits a reciprocal relationship between writing and the development of an organization. Teachers would do well to recognize this reciprocal relationship when integrating collaborative team projects into their technical, business, and professional writing courses. First, the team members' perceptions of social forces around them will impinge upon the collaborative decisions that groups make. Students' conceptions of the demands of the course, the teacher, and their peers will impinge upon their collaborative effort. Second, the team members' collaborative effort will build an organization. Once a project gets started, the composing activities of the group will delineate the relative authority of the team's members, thus creating some degree of structure in the team. What teachers need to do is to make this process of organization building one of the primary topics of the project—that is, in addition to the ostensible goal of producing a written product.

The Microware findings suggest that a successful organization fosters collaboration among individuals

who represent different constituencies and who have differing interpretations of the organizational context. Thus, teachers should try to put students into situations in which they need to incorporate differing points of view within their group project. Like the software company executives, students who have differing points of view should be required to integrate their differing views to achieve a common goal. How can teachers ensure that groups will bring together students with differing views? An example of one way would be to simulate a product development cycle in class, requiring groups to produce several pieces of documentation that support the cycle. Each group must be made up of individuals who will represent the needs of the various factions in a typical cycle: technical development, quality control, marketing/sales, finance, and so on. Each student will first learn the needs of his or her own constituency and then be forced to deal with each others' constituencies as they collaborate on the project.

The major pitfall of the Microware collaborators suggests an important strategy for effective collaboration that can also inform the teaching of collaborative writing. From the time that the executives constructed their conceptions of exigence until the impasse that they reached during the October 13th collaborative writing session, the collaborative writing process was dominated by adversarial behavior—behavior characterized by an agonistic relationship between those who held differing views of reality. And yet, the collaborative team approach that the executive committee was supposed to foster did ultimately succeed. It did so through a compromise that created a bridge of shared meaning between the opposing sides of the issue. This bridge was constructed by describing the promotion argument in terms of the production strategy. The bridge enabled the revisions that satisfied both points of view.

Although it may be fruitful for writers to take an agonistic stance toward their intended audiences, the example of the Microware participants indicates that it is probably best for collaborators to seek, in a Rogerian sense, areas of shared understanding among each other. By enabling our students to collaborate with peers who hold differing views of the writing task at hand, the students will need to develop collaborative strategies in order to succeed. In such

cases, teachers of writing should urge the collaborators to take a Rogerian stance toward their fellow collaborators. That is, each collaborator should try to discover the point of view of the other writer(s), state that point of view, and recognize how and in what cases that point of view is valid. Most important, the collaborators should be prepared to alter their own views as they strive to understand those of their fellow collaborators. The use of a Rogerian approach to rhetoric that my research suggests differs from a major application of Rogerian theory that has been developed by Young, Becker, and Pike (1970). Whereas Young et al. urge writers to use their opponents' arguments within the writer's arguments in order to manipulate the opponents' point of view, my research suggests that collaborators need to develop a negotiatory attitude with each other, so that the collaborators can alter their own views to achieve a shared bridge of meaning. Bator (1980, p. 431) identifies this last ingredient as the essence of Rogerian rhetoric: "The basic assumption of Carl Rogers is that through discovery of each other's points of view, we are all encouraged to revise our image of the world."

In short, then, we must teach students to develop interpersonal skills so that, by interacting with other collaborators, they can learn the views of those collaborators. Odell (1985) makes a strong claim for the need to teach writing students interpersonal skills:

We need to give students frequent opportunities to practice the interpersonal skills that will enable them to function effectively in a dialogue or in a group discussion. It will not be enough to ask students to work in groups; we will have to make sure that they know how to do so effectively.

Overall, teachers need to be concerned not only with the products of collaborative writing projects, but also with the social processes that the students must undertake to achieve successfully those products.

### IMPLICATIONS FOR FURTHER RESEARCH

The implications for further research concern not what I did during my study, but what I did not do: Although I carefully followed the writing of the 1983 Business Plan, I did not follow the use of that com-

pleted document. Faigley (1985) suggests that through writing research in nonacademic organizations should explore the ways texts are written, such research should also

follow the completed text, examining how it is disseminated, who has access to it, who reads it and who doesn't, what is read, what actions people take upon reading it, and how it influences subsequent texts.

If, for example, I had followed the use of the Business Plan, I might have answered the following questions:

- Once the Business Plan was written, how was that Plan perceived as an entity?
- How was that Plan perceived to function in the company?
- Did these perceptions change the company's direction?
- Did they change the company's daily operations?
- Did they change the daily activities of the company's top management? If so, how were the activities of the lower management and employees affected by these changes?

### NOTE

I would like to express my gratitude to Professor Lee Odell of Rensselaer Polytechnic Institute for his invaluable assistance on this research.

### REFERENCES

- Anderson, P. (1985). What survey research tells us about writing at work. In L. Odell & D. Goswami (Eds.), *Writing in non-academic settings*. New York: Guilford.
- Barnum, C., & Fischer, R. (1984). Engineering technologists as writers: Results of a survey. *Technical Communication*, 31(2), 9-11.
- Bataille, R. (1982). Writing in the world of work: What our graduates report. *College Composition and Communication*, 33, 276-280.
- Bator, P. (1980). Aristotelian and Rogerian rhetoric. *College Composition and Communication*, 31, 427-432.
- Bazerman, C. (1983). Scientific writing as a social act: A review of the literature of the sociology of science. In P. Anderson, R. Brockmann, & C. Miller (Eds.), *New essays in technical and scientific communication: Research, theory, practice*. Farmingdale, NY: Baywood.
- Bitzer, L. (1968). The rhetorical situation. *Philosophy and Rhetoric*, 1, 1-14.
- Bizzell, P. (1982). Cognition, convention, and certainty: What we need to know about writing. *PRE/TEXT*, 31, 213-243.

By answering questions such as these, this research would have further described and explained the influence of writing on the organization.

### CONCLUSION

This research, in answering its major research questions, provides a model of a relationship between writing and organizing in an evolving organization. I wish to emphasize that this model is quite provisional. The research results that form this model describe and explain the rhetorical and organizational activities of a particular case, and as such can be generalized only very tentatively. Although there has been little research into the relationships between writing and the evolution of an organization, aspects of this model do support results of research cited at the outset of this report. Although the particulars of my results are unique, these findings, like Newkirk's (1984) unique findings, can serve as an example in a "heightened and intensified form" of certain aspects of the relationship between writing and organizing.

Odell (1985) states that "we have scarcely begun to understand how organizational context relates to writing." Ethnographic research in nonacademic settings is beginning to bring this relationship to light.

- Blumer, H. (1969). *Symbolic interactionism: Perspective and method*. Englewood Cliffs, NJ: Prentice-Hall.
- Cicero. (1972). *Orator*. H. Hubbel (Trans.). In T. Benson & M. Prosser (Eds.), *Readings in Classical Rhetoric*. Bloomington: Indiana University Press.
- Consigny, S. (1974). Rhetoric and its situations. *Philosophy and Rhetoric*, 7, 175-186.
- Cooper, M., & Holzman, M. (1983). Talking about protocols. *College Composition and Communication*, 34, 284-296.
- Denzin, N. (1970). *The research act*. Chicago: Aldine Publishing.
- Faigley, L. (1985). Nonacademic writing: The social perspective. In L. Odell & D. Goswami (Eds.), *Writing in non-academic settings*. New York: Guilford.
- Faigley, L., & Miller, T. (1982). What we learn from writing on the job. *College English*, 44, 557-569.
- Flower, L., & Hayes, J. (1980). The cognition of discovery: Defining a rhetorical problem. *College Composition and Communication*, 31, 21-32.
- Flower, L., & Hayes, J. (1981). A cognitive process theory of writing. *College Composition and Communication*, 32, 365-387.
- Geertz, C. (1965). *The social history of an Indonesian town*. Cambridge, MA: MIT Press.
- Glaser, B., & Strauss, A. (1967). *The discovery of grounded theory: Strategies for qualitative research*. New York: Aldine Publishing.
- Golen, S., & Inman, T. (1983). An analysis of supervisory banking personnel. *Journal of Technical Writing and Communication*, 13, 221-228.
- Knoblauch, C. (1980). Intentionality in the writing process: A case study. *College Composition and Communication*, 31, 153-158.
- Mead, G. (1956). *The social psychology of G. H. Mead* (A. Strauss, Ed.). Chicago: University of Chicago Press.
- Newkirk, T. (1984). Anatomy of a breakthrough: A case study of a college freshman writer. In R. Beach & L. Bridwell (Eds.), *New Directions in Composition Research*. New York: Guilford.
- Odell, L. (1985). Beyond the text: Relations between writing and social context. In L. Odell & D. Goswami (Eds.), *Writing in non-academic settings*. New York: Guilford.
- Odell, L., & Goswami, D. (1981). *Writing in non-academic settings* (Grant no. NIE-G-78-0224). Washington, DC: National Institute of Education.
- Odell, L., Goswami, D., & Herrington, A. (1983). The discourse-based interview: A procedure for exploring tacit knowledge of writers in non-academic settings. In P. Mosenthal, L. Tamor, & S. Walmsley (Eds.), *Research on writing: Principles and methods*. New York: Longman.
- Paradis, J., Dobrin, D., & Miller, R. (1985). Writing at Exxon ITD: Notes on the writing environment of an R&D organization. In L. Odell & D. Goswami (Eds.), *Writing in non-academic settings*. New York: Guilford.
- Selzer, J. (1983). The composing process of an engineer. *College Composition and Communication*, 34, 178-187.
- Scribner, S., & Cole, M. (1981). Unpackaging literacy. In M. F. Whiteman (Ed.), *Writing: The nature, development, and teaching of written communication* (vol. 1). Hillsdale, NJ: Lawrence Erlbaum.
- Shatzman, L., & Strauss, A. (1973). *Field research*. Englewood Cliffs, NJ: Prentice-Hall.
- Van Dyck, B. (1980). *On-the-job writing of high-level business executives: Implications for college teaching*. Washington, DC: Conference on College Composition and Communication. (ERIC no. ED185584)
- Vatz, R. (1973). The myth of the rhetorical situation. *Philosophy and Rhetoric*, 6, 154-161.
- Wilson, S. (1977). The use of ethnographic techniques in educational research. *Review of Educational Research*, 47, 245-265.
- Young, R., Becker, A., & Pike, K. (1970). *Rhetoric: Discovery and change*. New York: Harcourt Brace Jovanovich.

## ENGINEERING WRITING/ WRITING ENGINEERING

DOROTHY A. WINSOR

When I was offered the opportunity to reflect on "Engineering Writing/Writing Engineering," I jumped at the chance because, secretly, this article has always been my favorite among the articles I have written. Writing it led me to an "aha" moment about the function of language in the world that engineers and I both live in, and that moment has shaped my work ever since.

Yet as I reread it, I realize that today I would never conduct a "study" like the one described in it, nor would I write in the essay form the article uses. When I wrote this article, rhetoric had very few studies of people writing in what we ethnocentrically called "nonacademic settings." The paucity of our knowledge is shown in this article's rather short list of twenty-five references, many of which are from outside of rhetoric. I was fortunate enough to know an engineer who was willing to talk to me about his writing, and almost anything I said about him would be news to my disciplinary colleagues. My kairos was right.

So I had little need to create specific research questions and develop rigorous methods to answer them. There is no effort in this article to justify my choice of my single participant, no triangulation, no explanation of how I analyzed my interview transcript or even of what questions I asked. Like the field in general, I have since learned much about how to generate convincing knowledge claims, and when I research and write today, I draw on that knowledge. From that point of view, "Engineering Writing/Writing Engineering" seems primitive and outdated.

But along with things I would do differently, I also see aspects to this article that seem as relevant now as they did in 1990. The fact that it draws on sources outside of rhetoric, for instance, can be seen as a sign of our field's commitment to interdisciplinary work, a commitment that is necessary because of the way that writing crosses the boundaries of the knowledge fiefdoms we so arbitrarily construct. I still like the way that theory and the scant data that I had enlightened one another and led me to rethink my understanding of each. And I still believe that I succeeded in making the strange familiar and the familiar strange, one of the goals that ethnographers aim for in their examinations of the worlds that others around us create.

Most of all, I sheepishly admit that I still love the ending of this article, in its reflexive uncertainty. I remember that I hesitated to include it because it seemed quirky. Yet today, that sense of uncertainty about knowledge, even knowledge based on data, is what seems freshest to me. As a researcher, I am firmly committed to the importance of gathering data, but as a scholar, I

From *College Composition and Communication* 41.1 (1990): 58-70. Copyright 1990 by the National Council of Teachers of English. Reprinted with permission.

believe that the most important thing we can bring to our research is a willingness to surrender our sense of certainty and embrace the unexpected insights that turn our worlds upside down.

Dorothy A. Winsor

Knowledge is not found ready-made in nature. Instead, knowledge is constructed in the interplay between nature and the symbol systems we use to structure and interpret it. (See Bazerman, *Shaping Written Knowledge*, 291–317, for a discussion of the way nature and the statements we make about it limit one another.) Over the last ten years, this notion of the construction of knowledge has become increasingly accepted by those of us in the humanities and social sciences. We talk, therefore, of language, and particularly written language, as a tool for constructing ideas, of a given field of knowledge being created by the interaction of its practitioners' texts, and of knowledge itself, including scientific knowledge, as rhetorically shaped. (See, for instance, Lefevre; Bruffee; Nelson et al.; and Latour, *Science in Action*.)

We accept the idea that our knowledge is shaped by our language. But this view of language and writing is not necessarily accepted in other parts of our campuses, as those of us who teach engineers, for example, can attest. Engineering defines itself as a field concerned with the production of useful objects. In keeping with this concern, engineers tend not only to see their own knowledge as coming directly from physical reality without textual mediation, but also to devalue the texts engineers themselves produce, seeing them as simple write-ups of information found elsewhere.

Scholars and teachers of technical writing have, to some degree, tended to share this view. Several of our most significant studies of engineers' writing, for instance, examine the way writing is used to transmit engineering knowledge rather than to generate it (Allen; Paradis et al.; Broadhead and Freed). Technical writing textbooks, too, often present writing solely as a means to report on what the engineer already knows. Mathes and Stevenson's influential *Designing Technical Reports*, for instance, enjoins the engineer to shift out of a technical mode and into a report writing mode when getting ready to write

(3–8). Writing is viewed as part of an engineer's job but not as part of engineering, which presumably happens in some separate, prior realm (cf. Anderson 3–6; Houp and Pearsall 8–9; Lannon 8). Insofar, however, as engineering is knowledge about objects and how to build them rather than the actual building itself, it is necessarily a symbol-bound field. That is, even this field, which seems so tied to physical reality, is necessarily accomplished through language.

While our theory says, then, that engineering, like all knowledge, is filtered through language, studies have not yet shown how engineers' writing would look when contemporary views about the textual shaping of knowledge are applied. This paper is an attempt to fill that gap. The basis for this paper is (1) a file of engineering documents, (2) comments made on those documents by a mechanical engineer who had participated in the engineering activity they described, and (3) the engineer's own activity as he wrote a technical paper he later presented at a professional conference. The engineer, whom I will call John Phillips, had a Ph.D. in Mechanical Engineering. Phillips had about fifteen years of work experience and was a middle-level manager in the Research and Development department of a large manufacturing company. He had the file of documents because he was using them to write a paper to be presented at the national convention of the Society of Automotive Engineers. His paper described his research group's efforts to lower an engine's emissions in order to meet new standards issued by the Environmental Protection Agency (EPA). Phillips anticipated that other researchers would find the information useful in working toward lowering their own engines' emissions, although his results would have to be adapted by them to suit their own engines' different configurations. Examination of the texts Phillips used and the one he produced suggests the way engineers write both their knowledge and themselves.

## WRITING ENGINEERING KNOWLEDGE

Textual mediation of knowledge is difficult for engineers to accept because they see themselves as working directly on physical objects. Examination of the documents Phillips was using, however, showed that most of the reports he had were based on written material more or less distant from lab results and that lab results themselves were writing. In the lab, engineers use instruments, which are materializations of previous knowledge, to translate physical objects into written data which can then be manipulated and studied. Some lab instruments, such as a spectrograph or computer, actually write directly on a piece of paper. Others, such as a temperature gauge, translate physical phenomena (such as heat) into a useful written form (such as numbers). As Karin D. Knorr says,

In the laboratory, the "texts" are provided by constantly accumulated combinations of measurement traces (graphs, figures, printouts, diagrams, tables, etc.). (352)

These "texts" are then interpreted in order to become engineering knowledge. Numerous researchers have established the degree to which data fail to speak for themselves and are instead the subject of interpretation (see, for example, Knorr; Law and Williams; Latour, *Science in Action*). For the most part, this interpretation too is carried out in writing.

This reliance on writing has been shown to be present in the work of scientists. In *Laboratory Life*, their study of laboratory scientists, Bruno Latour and Steve Woolgar noticed the omnipresence of writing. Latour and Woolgar concluded that the objective of lab activity is inscription, the conversion of physical reality into written documents ranging from lists of numbers to published papers. Inscription can be seen as happening in a chain because, although documents are written as though they refer directly to physical reality, they actually refer to and are based on other documents. Documents produced later are valued as they are able to generalize the content of a larger number of earlier documents. For instance, a lab report giving pieces of specific data can be used, along with other such reports, to create a curve showing a trend. The curve can then be used to support a theoretical claim in a paper. Knowledge is thus con-

structed through texts, not discovered in the original process of lab work.

Moreover, the textual construction of knowledge is social in nature because each document must convince other people of its validity in order to be accepted as knowledge. Only documents that do convince others are used. Documents that for any reason cease to be convincing cease being treated as containing knowledge. Thus, for instance, twentieth-century scientists do not treat the contents of astrology texts as knowledge, although fourteenth-century scientists did. In effect, knowledge may be defined as that which most people in a discourse community are convinced of, and what a discourse community is convinced of is indicated by the texts it has accepted. (See Bazerman, "Scientific Writing," for a survey of research in the social construction of scientific knowledge. See Dobrin for a discussion of the relationship between objectivity and social construction.)

## ENGINEERS' RELIANCE ON WRITING

The phenomenon of inscribed knowledge, which Latour and Woolgar observed among scientists, is also seen in the engineering documents studied here. To some degree, this sameness is surprising because engineering differs from laboratory science in that it more immediately aims at practical application (cf. Miller, "Ethos"; Miller and Selzer). It is supposed to result in a physical product (in this case a low-polluting engine) whose success or failure in the marketplace is the measure of the engineer's work, as an influential, frequently cited paper is of the scientist's. For the technologist, writing is a means to the end of producing an object. Knowledge is built for this end, rather than valued for itself. The engine, rather than a document, is "final publication" for the engineer. There is, therefore, a temptation to see engineering writing in the way engineers do, as incidental to the project at hand.

Examination of Phillips' work, however, reveals that, while for him writing is not the final product, it is an essential means by which that product is created because it is the essential means by which engineering knowledge is created. Thus, when Phillips sat down to write his paper, he did not begin by looking at the engine. For one thing, as a subject for a conference paper, the engine both existed too publicly

and did not exist at all. It existed too publicly in that it was being produced, and other engine researchers could buy one and look at it directly, so they did not need the paper to know about the engine. (According to Phillips, however, it was unlikely competitors would look at the actual engine. They too would be most likely to consult a document—in this case certification reports filed with EPA—rather than the object.) The engine discussed in the paper did not exist at all in that the actual numbers for fuel economy, pollution, power, etc., reported in the paper came, not from engines actually being produced, but from engines set up in lab test cells. Those engines had long since been torn down and the cells devoted to other purposes. So the paper necessarily drew, not on contemporaneous physical lab results, but on results and analysis already written and interpreted in other documents.

In writing his own paper, Phillips used a file of documents written by other people in his workplace. The bulk of the documents he had were, in order of their production, data sheets, handouts from oral presentations, and what his company called Progress Reports and Technical Reports. Data sheets are computer-produced lists of numbers generated in a test cell. They are produced by placing a probe in the engine to measure a variable (for instance, nitrous-oxide emissions) and then changing a condition (for instance, temperature) in a controlled way. The computer records results at various points and prints them out in a list engineers analyze to determine their success or failure in meeting government-mandated emission standards. Data sheets were unique among the documents Phillips had because they were the only ones produced by looking directly at physical reality. Every document subsequent to them was produced by looking at least partly at other documents. Thus, the computer was the only "writer" here not writing from previous texts.

Though the computer writes directly from observation of an object, its writing is still socially shaped. First, the computer and its attached instruments are materializations of previously agreed-upon ways of structuring the world. The temperature scales used, for instance, are human constructions, as is the language through which the computer functions. Thus, while nature certainly acts upon the computer, the reading the computer gets is coded by the society

which built the computer. Second, the computer's activities are determined by the research program of Phillips' company and, in this case, of the larger society represented by EPA, which directed that low-pollution engines should be built. Thus even the de-personalized writing of the computer is socially shaped.

Phillips had a few computer-generated data sheets but not many because, as will become apparent, the information in the data sheets had usually been transformed into a more generalized form in another report. Phillips found these later forms more meaningful and more useful. One can distinguish here between a document's authority and its usefulness. Data sheets were the most authoritative evidence in that later documents could not contradict them once they had been accepted as accurate. But data sheets were also the least useful for Phillips in writing his paper because, despite their socially constructed aspects, they contained the least interpretation, the least meaning. Interpretation and meaning were provided in later, supplemental documents.

The most common later documents were figures from oral presentations. Phillips had eight sets of handouts from presentations given by two people who worked for him. At one point, he called these handouts, not the engine, "the raw material" of his paper. In Phillips' company, most decisions about research are made in meetings at which engineers orally present their progress to management (cf. Paradis et al. 297). Phillips said progress was reported orally rather than in writing because meetings took less time than writing and gave an opportunity for group discussion, that is group interpretation, of the data—social construction of facts. As he said, "People can look at the data and make different comments than other people might. Or they'll say 'gee that's good but that's not so good.'"

The oral nature of these meetings, however, does not mean that they are free of writing. At the beginning of these meetings, speakers pass out handouts. Each page in the handout is a copy of a slide or transparency the engineer will show in his or her presentation. That slides or transparencies are on film rather than paper does not change their written nature. The handouts are simply a more conventional version of that writing, provided so that each participant can have a record of agreed-upon knowledge. Those

present at the meeting use their handouts to make notes on, thus modifying the speaker's text to reflect and solidify the agreement reached orally at the meeting. Thus Phillips had made pencilled additions to the various sets of handouts. In one set, for instance, he bracketed two curves on one page and indicated that the difference between them was 20%, as those at the meeting analyzed how much progress they had made. On another page, he supplemented a graph showing what would happen to one pollutant under a given condition with numbers showing what would happen to a second pollutant not originally shown, as those at the meeting discussed how conditions that would help reduce the first pollutant might increase the second.

In addition to reflecting group interpretation, these handouts were more useful to Phillips than data sheets because of their graphic form. Usually the first sheet of the handout gives the title and perhaps an outline of the presentation, and then all the others are graphs of some sort. These graphs are sometimes hand-plotted from data sheets or more often plotted directly by the computer using the same data it uses to create data sheets. The graphs are thus a more generalized version of the data sheets. They are also more selective, since the speaker doesn't present all the data but only those which are, as Phillips said, "relevant." The graphs' generalized, selective nature thus makes them more interpretive than the data sheets. Charles Bazerman has noted the degree to which graphs are an interpretive form:

Graphs, in addition to displaying data, show trends and allow comparison with other data and with theoretical predictions displayed on the same or neighboring graphs.

Thus, in contrast to tables, in graphs,

the display of data [is] more purposeful, interpretive, intellectually complex, and intertwined with the theoretical argument of the paper. ("Modern Evolution" 180)

The interpretive nature of the graphs from the oral presentations was part of what made them useful to Phillips.

The importance of these handouts to Phillips' writing is shown in his listing as co-author the subordinate who made six of the sets of handouts and gave

those six presentations. Phillips had decided on his own to write the conference paper and had prepared a draft before a co-worker suggested that Phillips' subordinate should be listed as co-author. Phillips agreed and added the subordinate's name to his own on the draft. The subordinate's name actually appeared on the draft for several weeks before anyone told him he was a co-author. His involvement in the putting of words on paper came before Phillips wrote the conference paper, but Phillips saw it as vital, as is shown by his response when I asked if his subordinate had done any of the writing:

No. I gave him a copy after I finished drafting and he's supposed to be editing it. But, of course . . . when he finished the work on the naturally aspirated engine, he wrote an internal R&D memo which is normal, standard procedure. . . . And [the subordinate] had, of course, put on oral presentations throughout . . . so I had . . . oral presentations that he had done.

The subordinate made only a few minor changes in Phillips' draft. His "co-authorship" was thus based on the development work he had done, as inscribed in the documents Phillips was using.

The other documents Phillips used heavily were Progress Reports and Technical Reports, which are both written after a body of research has been completed and which document what has happened. Progress Reports are sent by research engineers to another of the company's divisions, which is responsible for getting the engine onto the market. This other division actually requests the research and pays for it. Technical Reports are progress reports which stay within the R&D (research and development) area. They go to technical people who have been involved, their management, and the company library. Phillips had several Technical and Progress Reports, and he used them because they summarized and interpreted a large amount of activity. These reports reflected final, agreed-upon knowledge, and it was in them, not the engine, that the knowledge lay for Phillips.

#### KNOWLEDGE OF DOCUMENT EQUALS KNOWLEDGE OF THING

The result of all this is that for Phillips, knowledge of the engine and knowledge of documents about the

engine were identical. This was evident in a conversation I had with him about how he wrote his own paper. His paper was on the engine's development and was intended to give information about engine behavior which researchers had picked up along the way rather than to describe the final engine configuration, which, as I have said, was readily available in the marketplace. He used the documents I have mentioned by ordering them chronologically, selecting a starting point, and then using the order created to provide content and structure for his paper. Using the documents, he said, he

could start with the one I had decided was appropriate and say the first thing we did was test this . . . and then here are the results. Then I went through various things that we tried that were successful and unsuccessful.

When I asked him, Phillips said that by "going through various things," he meant going through various handouts. Thus a document describing a "thing" is substituted for the "thing" itself.

The blurring of the line between document and thing is also evident in the conference paper Phillips finally produced. The first page and a half of the eleven-page paper describe the physical configuration of the engine and contain five photographs of engine parts. These photographs and the accompanying sentences seem to refer directly to physical reality: "The engine uses a lightweight, linerless block with an open-face fire deck (Figure 1)." In the second half of the second page, however, the figures change from photos to graphs, and photos never return. Graphs are, of course, a written trace several steps further removed from thing than photos are. Sentences like the following begin to appear: "This modification of the fuel/cycle curve was accomplished by using a thin, rectangular feed port for the plunger for the 8.2L injector instead of the normal round hole." Note that this sentence talks about altering the "curve" on a graph (that is, writing) and altering the engine as if the two were equivalent. The next sentence continues this treatment of engine and writing: "Figure 6 shows that this unusual feed port increases the fuel/cycle at higher speeds (due to throttling of fuel escaping during the feed port closure)

and the result is reduced fuel/cycle slope." Here, writing (that is, Figure 6, which is a line graph) is evidence for engine behavior (an increase in the amount of fuel per cycle) which in turn alters writing ("slope," a characteristic of graph lines). Writing about the engine and the engine itself are unclearly differentiated. For Phillips, at any rate, engineering knowledge was knowledge of documents at least as much as knowledge of things. This is not to say that he had no knowledge of the thing, only that he had no knowledge that was not inextricably bound up with writing.

### WRITING THE ENGINEER

Engineers think of themselves as gathering facts and then acting. They usually view reports either as a means of presenting facts to management so that action can occur or as a way to store facts for future use. Examination of the documents Phillips used and produced, however, suggests that, in his case, they also have what Clifford Geertz refers to as an "interpretive" function for the engineers themselves. As Geertz says cockfighting is for the Balinese, for Phillips and his colleagues a report is often "a story they tell themselves about themselves" (448). Like the Balinese cockfight, such reports have a free element of art or ritual or play about them, supplementing their practical uses. In this case, the reports are designed to show the writers' respect for fact-based actions and thus show that they belong to the community of engineers.

This function of reports is demonstrated, for instance, in the form of what Phillips' company calls Technical Reports. These reports summarized a body of research which might have happened over periods as brief as a month or as long as two years. Phillips thought of them primarily as a resource for future researchers. They went to his company's library, where they were, he said, "the only permanent record we have of what happened." The reports' design, however, does not match this archival purpose. For one thing, Technical Reports always include a list of recommendations despite the fact that they are written after development work has ceased and decisions have already been made. Many of the recommendations made in a Technical Report have actually al-

ready been carried out. Thus, for example, one recommendation in a report Phillips was using reads "Re-evaluate and clarify tip spray angle effects," although tests to accomplish this were already being carried out before the report was written and distributed. According to Phillips, any recommendation which had not already been acted upon was not likely to be. So why include the recommendations at all? After pondering this question, Phillips said he did not know. Their inclusion was simply customary.

A similar pattern was observable in the Progress Reports sent to the company division requesting and budgeting for the research. These reports were written after work had been concluded and decisions made. Their recipient had already been given all the information contained in them in oral presentations used for decision making. The Progress Report's purpose, then, was to "go to [the division] in a kind of formal way and they would have it and it would show why we were doing what we were doing and what the result was." That the division already had this information was irrelevant. In other words, these documents justify decisions already made but are written as though they are the basis of the decision and would logically come before it, not after it.

This puzzling inclusion of recommendations and reasons for already-made decisions suggests a function for these documents beyond their practical one. These documents were not intended to fool anyone. Most of them would never actually be read by anyone. What, then, could be the function of the documents' supplementary elements? One possible explanation is that the primary object of such writing is to interpret these engineers' activities to match engineering ideals. Engineering decisions are often made in the middle of research where conclusions are not clear at all. They are necessarily based at least partly on hunches, creative instinct, and tacit knowledge gained from past experience. But these factors have no place in engineering ideals, which stress logic and relying on facts that will speak for themselves and make decisions obvious. These writers seem to be explaining their actions to one another and most importantly to themselves so that those actions would square with their ideal notion of themselves and their work. They were, in other words, writing themselves as engineers.

### LOGIC AS A PLAUSIBLE STORY

Scientists have previously been described as performing a similar kind of self-interpretation. In an article called "Is It Possible to Reconstruct the Research Process?" Bruno Latour discusses the published papers produced by a group of scientists working on protein synthesis. Of the scores of possible protein analogs, the scientists worked on only a few. The analogs to be worked on were not chosen totally randomly, but neither were they chosen as part of a totally logical research program. Analog choice, for instance, could come about because a scientist working elsewhere had published a paper which made trying one analog easier than trying another; or equipment could be available to make one choice more plausible than another. No matter how the choice was made, however, published papers presented the analogs in logical groups. Although the groups and therefore the logic used varied from paper to paper, groups of analogs were always presented as though only logic had determined their selection (64). Latour sees what we might call this "creative accounting" as a kind of logic. "If logic," he says,

was taken out of the laudative meaning that it has [had] since Aristotle and was understood as logos or path, then we could say the [purpose of the] research process is to build paths, or, to use another source of metaphor, to tell plausible stories. (66)

Scientists create rather than describe a logical world in which they themselves behave logically.

In Phillips' account of writing his own paper, the creation of a logical, engineering self is evident. Phillips even used terms similar to Latour's. He repeatedly described himself as "telling the story" of the engine's development, and he knew he sometimes rearranged the facts for the sake of the "story." When he went through the handouts from the oral presentations, for instance, he had to decide what to include. "In some cases," he said,

there are some anomalies in the data that are hard to explain and you have to think how am I going to explain them or how am I going to avoid showing them so that we don't have to explain them and so we have a nice, consistent story to present.

He included one finding that was, he said,

A little bit misleading because the improvement we made to meet '88 [emission] standards we'll actually undo for 1991 standards because we've learned it's detrimental to 1991, but we won't tell people that.

He departed from his original list of items to be covered because, as he said, sometimes "you find out you don't have good information on that or the test was not accurate or quite confusing so you might say 'I'll skip that subject.'" His difficulty, Phillips said, was "trying to figure out how to make a sensible, clear story out of data . . . and yet [not] confuse by showing other results." For Phillips, as for the other writers who produced the Technical Reports and so on described earlier, telling a "sensible, clear story" was important not only because it would be easier for the reader to follow, but also because it would create the writer and the knowledge community he represented in a desirable way.

Because knowledge communities have a stake in how those representing them appear, communities both aid and limit individual members in creating desirable selves. They do so through the forms of writing available (cf. Miller, "Genre"). The standard formats available in any discipline control the way a writer can create his or her self. Thus, for Phillips, the inclusion of recommendations in a Technical Report is a matter of custom, and so he does it. He thus demonstrates his mastery of what Toulmin calls a discipline's "transmit," its forms of explanation:

[T]he core of the transmit . . . is the repertory of intellectual techniques, procedures, skills and methods of representation, which are employed in "giving explanations" of events and phenomena within the scope of the science concerned. (159)

For an engineer to be accepted as an engineer, he or she must write and speak in the already-created forms and tongues of engineering. Thus, while it is possible to say that engineers create themselves in texts, it is also possible to say that they are created by the texts available to them.

## CONCLUSION

This study is, of course, extremely limited in its scope, and further research needs to be done. Phillips is only one writer in only one company. There are, moreover, certain aspects of his work which may make him more dependent on writing than other engineers would be. First, he works in a Research and Development department and thus could be seen as functioning more like a scientist, more like a knowledge generator than, say, an engineer in one of the plants producing the engine he helped design. Second, his research is on engine emissions which are, for the most part, invisible to the naked eye and thus may depend more on translation to writing than other research areas. I suspect, however, that observations of engineers in the work place will reveal a large dependence on writing, particularly if they include observations of writing such as instrument traces, data sheets, and log books. Selzer, for instance, observed an engineer consulting numerous documents as an inventing technique. These pre-report documents are important parts of knowledge generation whose study has been largely neglected in favor of knowledge-transmitting reports.

In addition, despite the factors mentioned earlier, there are reasons to believe Phillips and his company are fairly typical in the way they work with writing. Phillips' communication skills were rated "Outstanding" in his most recent evaluation, and thus his writing cannot differ much from what his company desires. Moreover, the paper he produced was accepted by and presented at the national conference of the Society of Automotive Engineers, suggesting that his writing also fits the expectations of his discipline. In addition, engineers leave Phillips' company to work elsewhere and come from other companies to his. Phillips himself worked at another company for two years before joining his present employer. Though different companies do, of course, have different local practices, people seem to have little trouble adjusting, suggesting that the practices described here are common ones.

I used to tell my engineering students that writing is what engineers do. By this, I meant simply that they would spend more of their work time writing than they probably thought they would. This study

suggests that writing is, indeed, what engineers do. They inscribe a written representation of physical reality and then use more writing to build agreed-upon knowledge and their own characters as engineers. In inhabiting a world of language, engineers are not unique. Indeed, as I said in the opening of this article, they resemble the rest of us, just as our theories would predict. The engineer differs from the rest of us, perhaps, only in showing greater resistance to knowing that language mediates experience. For those who choose to work with machines, belief in their direct presence is very important because direct presence can allow direct mastery of and power over reality. That the mastery comes through language raises the distressing thought that it may be "only" mastery of language.

Exertion of power through language is obviously not limited to engineers. As I worked on this paper, I was uncomfortably aware that I, too, was attempting

to exert power. In particular, I am one of a group of researchers outside technology and science who claim that scientists have no special way of knowing unavailable to the rest of us. It seems to me that in part we are reacting to the privileged position our culture awards science and technology as ways of knowing. It is therefore likely that we exaggerate the irrational aspects of science. As a scholar of writing, it is great fun to say that engineers are actually writing about other writing, a field I presumably know more about than they do. They think their field, their way of knowing is superior? Nonsense! Their field isn't even their field; it is mine. But I also bow to privileged scientific ideology by posing as knowing empirically with nothing between me and what I see. Unmediated knowledge, however, is not possible for any of us. All writing, including mine, constructs the world which the writer can bear to inhabit.

## WORKS CITED

- Allen, Thomas J. *Managing the Flow of Technology: Technology Transfer and the Dissemination of Technological Information in an R&D Organization*. Cambridge: MIT P, 1977.
- Anderson, Paul V. *Technical Writing: A Reader-Centered Approach*. San Diego: Harcourt, 1987.
- Bazerman, Charles. "Modern Evolution of the Experimental Report in Physics: Spectroscopic Articles in *Physical Review*, 1893-1980." *Social Studies of Science* 14 (Winter 1984): 163-96.
- . "Scientific Writing as a Social Act: A Review of the Literature." *New Essays in Technical and Scientific Communication*. Ed. Paul Anderson, R. John Brockmann, and Carolyn Miller. Farmingdale: Baywood, 1983. 156-84.
- . *Shaping Written Knowledge: The Genre and Activity of the Experimental Article in Science*. Madison: U of Wisconsin P, 1988.
- Broadhead, Glenn J., and Richard C. Freed. *The Variables of Composition: Process and Product in a Business Setting*. Carbondale: Southern Illinois UP, 1986.
- Bruffee, Kenneth A. "Social Construction, Language, and the Authority of Knowledge." *College English* 48 (December 1986): 773-90.
- Dobrin, David N. "Is Technical Writing Particularly Objective?" *College English* 47 (March 1985): 237-51.
- Geertz, Clifford. *The Interpretation of Cultures*. New York: Basic Books, 1973.
- Houp, Kenneth W., and Thomas E. Pearsall. *Reporting Technical Information*. 6th ed. New York: Macmillan, 1988.
- Knorr, Karin D. "Tinkering Toward Success: Prelude to a Theory of Scientific Practice." *Theory and Society* 8 (April 1979): 347-76.
- Lannon, John M. *Technical Writing*. 3rd ed. Boston: Little, 1985.
- Latour, Bruno. "Is It Possible to Reconstruct the Research Process?" *The Social Process of Scientific Investigation*. Ed. Karin D. Knorr, Roger Krohn, and Richard Whitley. Dordrecht, Holland: D. Reidel, 1981. 53-73.
- . *Science in Action: How to Follow Scientists and Engineers Through Society*. Cambridge: Harvard UP, 1987.
- Latour, Bruno, and Steve Woolgar. *Laboratory Life*. Beverly Hills: Sage, 1979.
- Law, John, and R. J. Williams. "Putting Facts Together: A Study of Scientific Persuasion." *Social Studies of Science* 12 (Fall 1982): 535-58.
- Lefevre, Karen B. *Invention as a Social Act*. Studies in Writing and Rhetoric. Carbondale: Southern Illinois UP, 1987.

Mathes, J. C., and Dwight W. Stevenson. *Designing Technical Reports: Writing for Audiences in Organizations*. Indianapolis: Bobbs-Merrill, 1976.

Miller, Carolyn R. "The Ethos of Science and the Ethos of Technology." CCCC Convention. Washington, Mar. 1980.

———. "Genre as Social Action." *Quarterly Journal of Speech* 70 (May 1984): 151–67.

Miller, Carolyn R., and Jack Selzer. "Special Topics of Argument in Engineering Reports." *Writing in Nonacademic Settings*. Ed. Lee Odell and Dixie Goswami. New York: Guilford, 1985. 309–41.

Nelson, John S., Allan Megill, and Donald N. McCloskey.

*The Rhetoric of the Human Sciences*. Madison: U of Wisconsin P, 1987.

Paradis, James, David Dorbin, and Richard Miller. "Writing at Exxon ITD: Notes on the Writing Environment of an R&D Organization." *Writing in Nonacademic Settings*. Ed. Lee Odell and Dixie Goswami. New York: Guilford, 1985. 281–307.

Selzer, Jack. "The Composing Processes of an Engineer." *College Composition and Communication* 34 (May 1983): 178–87.

Toulmin, Stephen. *Human Understanding: The Collective Use and Evolution of Concepts*. Princeton: Princeton UP, 1972.

## WHAT EXPERIENCED COLLABORATORS SAY ABOUT COLLABORATIVE WRITING

NANCY ALLEN, DIANNE ATKINSON, MEG MORGAN, TERESA MOORE, AND CRAIG SNOW

While attending the 2003 annual conferences for the Association of Teachers of Technical Writing (ATTW) and the Conference on College Composition and Communication (CCCC), I noticed how much attitudes toward collaboration have changed since our group had done our early research on collaboration. It was a happy coincidence, then, when I was asked to reflect on this project formally. It gave me a chance to look at my fleeting observation a little more closely.

When we began our work, Kenneth Bruffee's writing pedagogy for including collaboration in classrooms was gaining a lot of attention. At the 2003 conferences, collaborative groups were taken for granted as part of teaching writing as a process, and the social construction of knowledge, collaboration's theoretical fellow traveler, was a well-established concept. The collaboration we had researched did not concern classroom response groups, but our focus on shared responsibility for preparing documents dealt directly with the social construction of knowledge and some of its complexities.

Much has changed in our understanding of how writing is prepared and knowledge developed, but some attitudes toward collaboration have not changed at all. When my students include a collaborative project in their portfolios or present a group project as a writing sample, they are asked by professionals to describe what part they played in the project, that is, what part of it was theirs or what parts they wrote. Today's employers apparently still see collaborative projects as ones in which group members divide a large workload or contribute particular expertise. These are good reasons for collaboration, but they overlook what I find to be the greatest values of working with a group: the deeper understanding of a rhetorical situation that comes from batting ideas back and forth with co-authors, or the sense of common purposes and respect that can result from shared interests and discussions.

When I reread the article, it brought back memories of the people we had interviewed. We were surprised at how seriously they had thought about their writing and the collaborative process, and how openly they described their experiences. I also remembered that our group spent over a year developing and pretesting the structured interview form before we even began the interviews. The open questions and optional follow-ups had allowed us to learn about these writers' experiences in detail, even if they also resulted in hours of transcription. I still have all those pages—somewhere. We had learned a lot about collaboration from our own efforts and struggles together.

From the *Journal of Business and Technical Communication* 1.2 (1987): 70–90. Reprinted by permission of Sage Publications.

On reviewing the article I was glad to see that we had in part focused on conflict, the feature of group work so many fear. Much to our surprise, our respondents had found conflict to be quite beneficial to the quality of a group's final product. It was by working through conflicts, they believed, that groups could come to creative insights that moved them beyond initial concepts to more productive solutions. This is one lesson from this study that has stayed with me. We need not fear disagreement and conflict. When handled positively, they can be catalysts for creativity.

Nancy Allen

## WORK CITED

- Bruffee, Kenneth A. "Collaborative Learning and the 'Conversation of Mankind.'" *College English* 46 (1984): 635-52.

Heightened interest in writing on the job has uncovered, almost by accident, another writing issue of recent and growing concern: collaborative writing. For several years researchers have been aware that collaborative writing exists in the professional setting. In 1982 Faigley and Miller, for example, surveyed 200 professionals about their on-the-job writing and learned that 73.5% of these professionals wrote collaboratively on the job (561).

However, in spite of this established frequent occurrence of collaboration, most writing research has concentrated on other aspects of on-the-job writing. Writing instructors interested in collaboration have had to glean facts from research directed toward other topics. As a result, the information we have about collaborative writing is fragmentary and unfocused.

One recent source of information is Odell and Goswami's collection of studies of non-academic writing. Although none of these studies explored collaborative writing as its primary focus, many revealed secondarily the collaborative nature of writing on the job. In one study from this collection, Paul Anderson cites several surveys that reveal the predominance of collaborative writing on the job (50-51), reconfirming Faigley and Miller's finding. Anderson also notes that many kinds of collaboration occur under many different circumstances.

Odell's own article in the collection concerns a study to "investigate some of the relations between organizational contexts and writing" (250). Yet much

of the article describes the specific interactions between a legislative analyst and the agency attorney, as the analyst prepares to write a document on a piece of legislation. Odell points out that the agency where both worked "encouraged discussion and collaboration not only on this sort of topic, but on others as well, as part of the process of inquiry" (260).

A final example from the Odell and Goswami collection, Paradis, Dobrin, and Miller's article on writing at Exxon, also reveals instances of collaboration. In this study, collaborative writing is most apparent in the authors' descriptions of how a document "cycles" from the staff person who researches and drafts it to the supervisor who edits the draft. At a luncheon meeting with younger staff members, the writing researchers learned that "those who did not interact with supervisors at the planning stage of the writing process generally had trouble at the editorial stage" (294). (Readers might also want to see other articles in this collection, such as Couture et al. and Lauerman et al., for further incidental information on collaborative writing.)

Because, as with Odell and Goswami, the uncovering of collaborative-writing settings has been peripheral to most writing research available to date, little specific information on collaborative-writing processes emerges. From these studies we gain little sense of the details or range of variation in the processes collaborative writers use, few clearly articulated reasons for employing a collaborative effort as

opposed to an individual effort, and no coherent evaluation of collaboration from the writers themselves.

Some of these omissions are overcome in the Doheny-Farina ethnographic study of writing in an "emerging" software company. Although the focus of this study is again broader than collaborative writing, Doheny-Farina does trace the history of a collaboratively written business plan as it moves through the organization. He reports that critical decisions affecting the philosophy and direction of the company were made as the president and vice presidents discussed a draft of this business plan.

However, only Ede and Lunsford have focused their research efforts on collaboration. In 1983 they published an article relating their own experiences writing together. Then in 1986, after an initial survey using a questionnaire mailed to 530 members of six professional organizations, they explored the nature of collaborative writing in greater detail through on-site visits. The results of these studies provide the only detailed information now available on collaboration. (See both Ede and Lunsford under References for specific 1986 citations.)

It is clear from the studies cited that collaborative writing can include a range of activities:

- a supervisor's assignment of a document that is researched and drafted by a staff member but carefully edited by the supervisor (Paradis, Dobrin, and Miller)
- collaborative planning of a document that is drafted and revised by an individual (Odell)
- individual planning and drafting of a document that is revised collaboratively (Doheny-Farina)
- a peer's critiquing of a co-worker's draft (Anderson)
- the coauthoring of a document (Ede and Lunsford)

It is also clear that using the term "collaborative writing" to describe all these very different writing activities raises questions as to how to interpret research results, such as Faigley and Miller's. In fact, a panel entitled "The Role of Collaboration in the Writing Process: Three Perspectives" at the 1986 Conference on College Composition and Communication included three presentations by four well-known re-

searchers (Gere, Hilgers, Lunsford, and Ede), all describing completely different collaborative-writing situations.

The range of possible collaborative-writing situations reflects the range in discussions of collaborative learning and writing at a more philosophical and theoretical level. Mason, concerned with what he perceived as authoritarian and ineffective pedagogies in British schools, based his pedagogy on a learning philosophy that emphasized groups of students working together to solve problems. Mason encouraged the use of this group approach "to get something done about the state of the world" (125).

Bruffee recently articulated a philosophical base for his previously described pedagogy ("Collaborative Learning" 635-52). He called upon the works of Oakeshott, Vygotsky, Kuhn, and Rorty to focus on the connections between human thought and conversation, on knowledge as socially derived belief, and on normal and abnormal discourse. Bruffee, however, in his early applications of collaborative learning, centered his concern on peer-group editing of individually written drafts. In this kind of group work, the single author is free to accept or reject the peers' advice.

Wiener makes a distinction between this sort of "group work" and collaboration. He asserts that consensus is necessary to create a truly collaborative situation (55). That is, individuals must share power in making decisions that can be accepted by the group as a whole. Without consensus as a criterion for decision making, individuals retain all power and responsibility just as if they were solitary writers.

Other studies of "collaboration" in the classroom also discuss it as "group work" rather than as "consensus." Gere and Abbott limit their inquiry into collaboration to include only peer responses to individually written drafts; Gebhardt calls for peer response throughout the writing process, in planning as well as revision, but these responses are still directed toward individually written work. Although Clifford calls for a collaborative pedagogy, he discusses groups of students working together in non-consensual situations.

Only a few recent studies offer pedagogies that involve group consensus. Goldstein and Malone (1985) describe a classroom methodology in which groups of students design a single shared document.

O'Donnell et al., in an empirical study comparing group and individual performances on a writing task, demonstrate the effectiveness of consensus-based writing groups in producing a better document at the college level. Finally, Daiute, in a case study, suggests the kinds of learning that can occur when students in elementary school engage in a collaborative-writing task. Although consensus operated within these three collaborative situations, its effects on group writing are not explored.

Two problems emerge from reviewing this research. First, very little detail is known about collaborative-writing processes in general. Second, many studies have covered a wide range of activities without focusing on the special characteristics of collaboration involving group authorship. Clearly there is a need for an in-depth study of the features of collaborative writing in the meaning discussed by Wiener: a situation in which decisions are made by consensus.

It is this kind of collaboration that interested us as researchers. We wanted to investigate collaboration as it existed in the activities of experienced collaborators on the job—professional people who had worked together throughout the planning, drafting, and revising activities of a single document. We chose, therefore, to examine what we felt were the most interesting and unstudied aspects of collaborative writing. We looked for answers to these questions:

- What kinds of people form collaborative-writing groups and what kinds of tasks do they undertake?
- What are the writing processes used by experienced collaborators?
- What significant group processes emerge in collaborative-writing groups?
- How do experienced collaborators feel about the costs and rewards of collaboration?

### METHODS

Our objective was to conduct an exploratory study of the experiences of active collaborative writers from the business and professional worlds. To get at the detailed nature of their processes, we sought qualitative responses to open questions in interviews with professionals who had collaborated on a wide range

of projects. The following paragraphs describe the specific methods used to reach this objective.

### PARTICIPANTS

Study participants were recruited by the researchers to represent a wide range of collaborative settings and projects. The sample of respondents, therefore, was purposive and non-random. A total of 20 respondents were interviewed, 14 men and 6 women, who reported on 14 separate collaborative projects. Most respondents were from the Midwest, though one was from New York and one from Washington state. Collaborators who were also writers by profession were excluded from the list, as they were considered to form a separate group that may or may not perform in the same manner as general writers from the business and professional worlds. Table 24.1 lists the professional areas represented in the sample and the number of respondents drawn from each area. No potential respondent refused to participate in this study.

In order to obtain detailed descriptions and varied perspectives of group interactions and processes, all five members of one group (a group of teachers) were interviewed. These interviews resulted in a large number of teachers being included as respondents.

### STRUCTURED INTERVIEW FORM

A structured interview form was developed to assure complete and comparable coverage of each collaborative project. Initial questions elicited demographic information about the respondent and his or her professional position. Subsequent questions concerned the membership of the collaborative group, the roles played and contributions made by various group members, the writing process used, and the nature and frequency of group interaction. Final questions asked

Table 24.1. Professional Areas of Respondents

Area	Number Interviewed
Small Business	1
University Teaching	7
Scientific Research within a University	4
Scientific Research within a Corporation	2
Government Agency	2
Community Service	3
Law Firm	1

for respondents' evaluations of the document produced and of the experience as a whole. The majority of the interview questions were open-ended, and prompts were used to encourage detailed description.

### RESPONDENT INTERVIEWS

Each respondent was interviewed in person by one or a pair of the researchers, using the structured interview form. Each interview lasted for approximately two hours and was audiotape recorded and later transcribed. Respondents were asked to recount a "particularly memorable" collaborative-writing experience. The interviewers did not define "particularly memorable," nor did they ask the respondents to explain why they chose a particular experience as their subject.

During the interviews, respondents were encouraged to formulate observations, evaluations, and conclusions concerning any aspect of their collaborative-writing project and to illustrate these observations with specific details. All interviews were conducted between February and September of 1985.

Two of the experimenters also observed and tape recorded several meetings of the group of university teachers preparing a textbook.

### ANALYSIS

Analysis of the interview transcripts proceeded in two stages. In the first stage, the relatively closed-ended questions elicited basic demographic profiles of the group members and collaborative projects: the who, what, where, when, and why. These profiles provided information about the variety of people who participated in these collaborative projects and the range of problems addressed.

In the second stage, respondents' detailed observations of the processes and evaluations were collated. These responses provided information on the operation of the collaborative process, the nature of collaborative interactions, respondents' likes and dislikes concerning collaboration, and respondents' suggestions for making collaborative projects rewarding.

### RESEARCH FINDINGS

The results of this study provide some answers to our research questions. Because of the small sample interviewed, these answers are not complete, but the in-

formation obtained in this study allows us to draw some tentative conclusions concerning the people, tasks, and processes involved in collaborative writing. These results are presented according to the two approaches used in our analysis. Demographic information and information about the collaborative process is presented first, followed by the respondents' observations on the collaborative process itself.

### DEMOGRAPHIC INFORMATION

#### Range of Tasks and Group Affiliations

Our respondents reported that during their professional careers they had worked in groups on a wide variety of written-communication tasks, covering almost every kind of document written professionally. When asked to describe an especially memorable project in detail, they chose to report on proposals, books, articles, goals statements, reports, and legal briefs. The distribution of these tasks among groups and the organizational affiliation of each group are shown in Table 24.2.

The tasks our respondents chose to report on were ones which they felt were "successful." That is, the respondents ranked themselves as "satisfied" or "very satisfied" with the document produced and

Table 24.2. Writing Tasks and Group Affiliations

Writing Task	Number of Interviews	Number of Projects	Group Identifier & Affiliation
Proposals	4	4	(A) Small Business (B) University (C) Government (D) Corporation
Books	7	3	(E) University* (F) University (G) University
Articles	3	2	(H) University (I) University*
Goal Statements	2	2	(J) Community (K) Corporation
Reports	3	2	(L) Community* (M) Government
Legal Briefs	1	1	(N) Partnership
Totals	20	14	

\*More than one group member interviewed

with the experience as a whole. In their discussions, three respondents also mentioned some experiences with unsatisfactory collaborations, but they did not choose those projects to describe in detail. The projects they did describe encompassed a fairly broad range of tasks.

#### *Diversity of Group Membership*

We found that groups varied, from those whose members had little in common except the collaborative project to those whose very similarities had brought them together. There were also many gradations between "different" and "similar" groups.

Nine of the groups we studied were made up of members whose backgrounds, training, and specialties differed. Consequently, individual members of these groups brought diverse skills to their projects. Group A, for example, comprised a medical doctor, a pharmacologist, and a business manager, all of whom were partners in a small business. The members of Group B all came from the same university department, but each had a different specialty, and one had had very different training and experience from the other two. Both of these groups prepared proposals for the National Institutes of Health (NIH), and the members represented the different areas of expertise necessary for the research each group planned to conduct.

Other groups showed similar variety in their membership. One corporate group, Group K, included managers from each of the five divisions of a corporation that would work on the same project. The five members of a volunteer community-task force, Group L, represented residents with varied occupations from several social sectors of the same community; the qualification they shared for involvement in this project was that of being a concerned parent. Group H included members living in California, Indiana, and Mexico, who performed research in different but related areas.

Five groups were made up of members who had similar training and professional interests. The tasks they engaged in did not require diverse specialties but instead were large tasks, some of which had strict time deadlines.

Though some projects required breadth of skills and others were more focused, this difference was

not necessarily reflected in the *general* project type. Proposals, textbooks, professional articles, and reports were prepared both by groups whose members had diverse skills and by those whose members had similar skills. Both goals statements were prepared by groups whose members had diverse skills, and the legal brief was prepared by a group whose members had similar skills.

#### *Task Restrictions*

The restrictions imposed by the form and content requirements of the final documents for these writing tasks varied. Most respondents began their tasks knowing the type of document they were to write and its general format, but they were reasonably free as to the content. Groups A and B, however, were following the NIH guidelines for proposals and consequently had very specific format and content-area requirements. Group L, preparing a report for a local school board, was least restricted. They had no format instructions at all and, in fact, knew very little about appropriate report format in general. Their instructions were simply to present recommendations to their board.

#### INFORMATION ABOUT THE COLLABORATIVE PROCESS

##### *Group Writing Processes*

All groups reported handling the planning activities for the document as a whole before working on subparts. No group planned and completed one section of their document before proceeding to the next section. The two goal statements and one report were maintained as a single writing task throughout the groups' entire projects and were not divided into subparts.

Respondents reported that the major and most satisfying collaborative effort usually took place at the beginning of a project, while group members planned the document. In this phase, members of most groups met to discuss the project's goals and the document's purpose, content, organization, and audience.

The initial period of group planning was most often followed by periods of relatively independent materials research and drafting, during which individuals worked alone. In fact, members of 10 of the

14 groups reported that actual words-on-paper drafting was always an individual effort. Some respondents reported that attempts at group drafting produced only frustration.

Six Groups (B, C, E, F, G, and M) divided the drafting task, with individual members drafting the sections most familiar to them or falling within their areas of expertise. This approach was the most common among the writers we interviewed. Groups D and H followed another common approach in which one member produced a working draft after considerable group planning. The other members then commented extensively on the draft, and they discussed their comments as a group. One member of Group J used notes he had taken during group discussions to produce a draft for the group. Everyone then commented on the latest draft at subsequent meetings. In one corporate group, K, each member drafted a complete version of the entire goals statement, and succeeding group meetings involved coming to agreement on one combined version. These discussions sometimes became quite heated. In the small-business group, A, the head of the company roughed out a complete draft, which was then turned over to the other two group members. They filled in their special areas, and one of them assumed responsibility for all stylistic editing. They seldom met as a group to discuss changes or additions, feeling that changes in one section did not affect the others.

Group L began drafting together, but haggled over words and sentences, so that they were unable to get any completed ideas on paper. After a few abortive tries, the group asked one member with some writing experience to do the drafting. At each subsequent meeting, that member listened to and made notes of the discussions, took his notes home, and translated them into a rough draft, following a process similar to that of Group J. He then brought his draft and notes back to the group, who haggled over his interpretation, as well as his prose. Although this method didn't eliminate all the group's writing problems, it did provide a completed draft, and the members reported being quite satisfied with this approach.

Two members of Group E attempted composing some sections together but found that their styles were so different that they were not able to compose well together. They agreed to divide their tasks and

compose separately; each then commented freely on the other's sections for revision.

The members of Group G tape recorded their brainstorming sessions and used transcriptions of these tapes to prepare drafts, dividing the sections between them. Occasionally they would compose small amounts of text together orally during their taping sessions (their entire introduction was drafted in this way), but most of their composing was done individually, using the brainstorming transcripts as notes. They exchanged drafts for comments and revision until both authors were satisfied with all parts.

Initial drafts of legal briefs were usually prepared by individuals in Group N's law firm, but our respondent chose to tell us about a collaborative experience that was unusual for him. Because the scope of this particular task was large, he worked with a collaborator. They divided the research, and each prepared outlines of separate sections. Then, using past similar briefs as references, they began composing their brief together, sentence by sentence. As sections were completed, secretaries prepared word-processor copies for them to use in revision. During this stage, one would revise while the other worked on a new section. They sat at opposite ends of a table, taking turns with the actual handwriting or dictating, for a period of a few days, working until 2 or 3 a.m. and once overnight, until a complete draft was finished. The draft was then reviewed and revised both within this firm and by other firms associated with the case. The respondent estimated that the brief might have gone through 50 drafts by the time it reached its final form.

Only one group, Group I, reported composing together on a fairly regular basis, word by word, sentence by sentence. The two members of this group have written several articles together, and in their typical process, either one of them can be responsible for producing a working draft. They then work very closely on revision, often composing sentences together. They reported that their finished documents reflect such a melding of their writing that neither can identify who wrote what words, nor do they remember which of them wrote the working drafts for many of their papers. These group members write articles individually on other subjects but write together on the area in which their interests overlap. They have

neighboring offices and have been writing together successfully for 15 years. One of their publications has been cited over 2000 times in the past 10 years.

As these reported writing processes show, revision, like planning, was a group activity for our respondents, and it often involved renewed planning. As group members went over a draft, they were stimulated to think of new ideas for their document and to change some of their old ideas. As a result, revision was both global and detailed. In one instance, the members of Group F changed the entire organization of their book after they decided that their initial partial drafts "didn't work." In another instance, a member of Group E remembered trying to "informalize" the style of one writer to match the style of others in the group. The actual presence of a draft also focused group members' attention on the written word, and many respondents reported stylistic and wording changes. One member of Group F noted that changes were made concerning "clarity of exposition." The 50 revisions of the legal brief mentioned above changed that document from more than 100 pages to 68.

#### *Group Interaction*

Members interacted extensively during the early stages of a project to set goals, design research plans, generate alternative solutions, discuss past experiences, divide work, and draw conclusions from their research on the project problem. These interactions occurred for all groups without correlation to the drafting procedure eventually used by the group. Most occurred face to face, but some respondents' interactions occurred through telephone conversations or via computer modem.

Some respondents reported this initial planning interaction to be the most rewarding part of collaboration. One respondent from Group E said, "It's easier as a writer to get a sense of audience and purpose because you have to articulate those things and you have to make decisions about them."

While actual drafting was often done individually, all groups again reported extensive interaction concerning revision. As was shown by several of the examples described earlier, these interactions concerned revisions at all levels.

We found three aspects of group interaction that were particularly interesting and deserve separate

elaboration: the ability of the group to act as a first-line audience, the role of conflict, and group interaction via computers.

**Group as First-line Audience.** For the groups in our sample, the intended readers were usually members of outside organizations: granting agencies, judges, fellow professionals, students, and boards of directors. Consequently, group interaction was sometimes centered around group members consciously or unconsciously assuming the role of audience for the document. Members of the collaborative groups often discussed problems in the document that they thought intended readers might perceive later, trying to clear up those problems in advance. The respondent from Group F expressed his concern with "clarity of exposition" explicitly as a concern for their intended readers. He thought his collaborator "might have taken certain things for granted because of his background that . . . were not clear enough to a person with a slightly different background." The members of Group B purposely played the roles of proposal evaluators in one of their meetings. One researcher from Group H, describing the cost and benefit of this aspect of group work, said, "You have to have people who are willing to challenge things that are very dear to you, even if it becomes personally hurtful. If it isn't going to stand up to that kind of challenge, then maybe it isn't going to stand up."

**Group Conflict.** Group conflict, which many people fear may occur, did occur in all our respondents' groups, ranging from a relatively minor conflict over the use of a particular term to major conflicts over research conclusions. Our respondents indicated a range of tolerance for group conflict, referring to it in terms that went from the "least satisfying" aspect of collaboration or "painful but necessary" to "exhilarating." One experienced academic researcher said, "It's easier to become creative when you work with somebody and have them confront you . . . and you do the same to them" (Group F). Another collaborator, an academic researcher from Group H, suggested that instead of calling the process collaborative writing, it should be called "collaborative fighting." He added:

Most of the conflicts I've been involved in in the end have been productive. In the interim, they

have had all sorts of negative effects—self doubts, doubts about other people, and all sorts of things. I've had my stomach turned in knots a couple of dozen times by this guy [his associate] because of the way in which he marks up my manuscripts, but then I also know that although I may take it personally, I'm gonna get over that, and I'm gonna be able to deal with it; and in the long run probably two thirds to three fourths of the comments he made—if I'm gonna implement them in some fashion—are gonna make that into a better paper. So it checks and balances in a way.

This same respondent remembered a battle with an associate over a paper they were co-authoring with a graduate student. The two senior collaborators shouted at each other while the graduate student cowered in a corner. The battle was uncomfortable, but it settled issues and "helped make that paper a classic."

Not all conflicts were handled this directly. One respondent from Group E reported that conflicts over "sensitive matters" were resolved outside of group meetings.

The respondent from Group F not only supported the advantages that can result from conflict but also saw conflict as a necessary part of collaboration. While he agreed that mutual respect between collaborators was important, he also believed that too much respect would prevent members from challenging one another and would thereby lessen the group's creativity. He said:

What's interesting is in many of these collaborations you have as much disrespect for the other person as you have respect. And it's necessary. In fact, I think that's a very important ingredient of creative work—lack of respect—because if you have total respect for other people and you're totally awed by them, it is impossible to go beyond them. So you have to entertain this notion that they are screwballs at some level, and they are wedded to their notions, . . . they're in their own ruts as you are in your own, and that's a very healthy viewpoint.

**Computer-Aided Interaction.** Three groups used the computer to replace face-to-face interaction. Two of these groups communicated over long distances

via a modem, sharing planning activities and drafts. These groups have been collaborating since the mid-seventies, initially either meeting face-to-face at conferences or using the telephone. A third group, A, used the computer differently. The group leader roughed out his ideas for the entire draft of their document on the computer, storing it on disk; then the other two members individually filled in their contributions in specialized sections. The three members rarely met as a group to discuss their document, even though they were partners in the same business and worked part of the time in the same building.

#### *Group Decision Making*

The group members we interviewed shared decision-making power in two ways. First, any one person in these groups could object to any decision made in the group or even decisions made by the group leader. Second, they shared decision-making power only within this specific group and for their collaborative task. The power they shared in the collaborative context did not extend to other contexts.

For our respondents' groups, an individual member's decision-making power and behavior were not dependent on leadership style within the group. In Group E, a group with a relatively autocratic leader, members still felt free to suggest ideas, make changes, and generally voice their opinions. In Group B, a group with a more democratic leader, one of the three members went along with the leader's decision when it was accepted by the third group member, even though he didn't agree.

Within these groups, the right to question a decision did not mean the right to change a decision. As in the example just mentioned, the decisions made within these groups were ones that all members could accept, even though they might not entirely agree with them. Our respondents reported a strong sense of commitment for themselves and their fellow group members toward completing the project. This commitment encouraged the groups to move forward with "acceptable" decisions when absolute agreement could not be reached.

#### *Group Leadership*

Most of these groups were organized around group leaders who provided a central point for organizing

the details of running the group, such as calling meetings and setting completion dates for subtasks. In nine groups the leadership position was assumed because of seniority or rank. In two groups the leader was appointed by the larger organization under which this group operated. Leadership in one group rotated, depending upon time available or idea initiation. Two groups operated with no leader. Though the majority of groups clearly reflect a tendency toward structure through leadership, the two groups with no leader show that leadership structure is not essential.

#### RESPONDENTS' OBSERVATIONS ON COLLABORATION

The writers we interviewed found the benefits of collaboration to be worth the costs. Although our respondents mentioned costs of time, of energy, and sometimes of ego, they stated that the documents they produced were definitely better than those any one of them could have produced alone. As mentioned earlier, these collaborators rated themselves as "satisfied" or "very satisfied" with these collaborative experiences and with the documents they produced. Of course, this positive result would not be true for all collaborations. Because these collaborators chose to tell us about successful experiences, their evaluations were necessarily skewed.

The costs of collaboration mentioned most often were time and ego. All respondents felt that collaboration required large amounts of time. Though the respondent in Group N reported composing sentences with his partner in this collaboration, he said that he would not do this again because it was "too time-consuming." The respondents' concern with ego prompted the collaborator from Group G to advise others who might participate in collaboration to "check your ego at the door." He said that collaborators should be "confident in their own abilities and yet able to take criticism." He felt this was the hardest part of collaboration.

All of these respondents recommended collaboration, at least for large or complex projects. They reported either that their group document was better than a document any one of them could have done alone or that the document couldn't have been done at all by one person.

### DISCUSSION

The results of this research suggest three important points that merit elaboration: the functions of conflict within collaborative groups, the features that distinguish the kind of collaboration in which a group produces a single document, and the basic types of collaborative groups found within this sample, based on the advantage that group work offered for each task.

#### FUNCTIONS OF CONFLICT

The statements from our respondents that conflict contributed to their creativity and to the quality of their final document are supported by other work done on group decision-making and creativity. Janis found that failure to allow for the development and expression of opposing views within the group could produce such defective decision making that the overall value of group effort was lost. The pejorative term "group think" has been widely used to characterize situations in which excessive group cohesiveness or a strong hierarchy, such as exists in military contexts, suppresses opposing opinion. In such cases groups tend to echo the opinions of the group leader and lose the advantage of varied perspectives.

In fact, a group's effectiveness may depend upon its ability to preserve various viewpoints. Weick presents an insightful discussion of the importance of "doubt" in the group decision-making process. He cautions groups to avoid coming too quickly to premature decisions about actions to be taken (220). Our respondents certainly reaffirm these studies by attesting to the importance of including all view-points.

Rothenberg's work on "Janusian thinking" provides an analogy for the value of diverse opinions to group creativity. Rothenberg claimed that the dissonance caused by holding opposing or inconsistent perspectives simultaneously generated innovative, hence creative, resolutions ("Creative Contradictions" 55). Though this condition exists only occasionally for individuals, it is a natural part of group work. Members of a group never have exactly the same perspective on any subject and, as our respondents told us, their perspectives are often divergent or conflicting. When the group can tolerate some disharmony and work through divergent opinion to reach a consensus, their work is enhanced. The con-

cept of unanimity placed on juries, in which any individual can block a decision that he or she cannot accept, is an example of the protection of minority opinion in order to achieve high-quality decisions. Excellent reviews of research on small-group decision-making, group problem solving, and conflict can be found in Abelson and Levy, Kelley and Thibaut, and Putnam, respectively.

#### DISTINGUISHING SHARED-DOCUMENT COLLABORATION

By collating details from our respondents' descriptions of their collaborative-writing experiences, we observed that these collaborations, all of which involved co- or group authorship, repeatedly exhibited three distinguishing features:

- production of a shared document
- substantive interaction among members
- shared decision-making power over and responsibility for the document

These features can be reflected in a wide range of group behaviors and in connection with varied tasks. The groups we studied did, indeed, differ considerably from each other in how they interacted and shared power. Yet each exhibited these three features. We believe, therefore, that this combination of features can be used to distinguish this type of collaboration, which we call "shared-document collaboration," from other types of collaboration.

#### Shared Document

As the most salient feature of this form of collaborative writing, "shared document" refers to the emergence of one document, a product of an agreed-upon insight, from the collaborative experience. Though this feature may seem obvious, its importance should not be slighted. It is because the group shares the goal of producing a single document that they have a unity of focus and engage in consensus to reach decisions. This feature distinguishes this kind of collaborative effort from collaborations found in many classrooms, where peer feedback on individually written documents is encouraged. In such classroom situations, the collaborative effort is directed toward helping an individual student achieve a personal understanding or insight which will then contribute to that

student's individually-authored document. Shared-document collaboration always involves a single document produced by more than one person.

#### Substantive Interaction

This feature means that collaborators may make contributions that affect their document at all levels, from stylistic details to global organization and content. This feature, then, distinguishes shared-document collaboration from situations in which an editor or supervisor simply assigns a project to a subordinate. The editor or supervisor may lay out the purposes and constraints of the project, which the subordinate will follow, but without interaction on these issues, these people are not shared-document collaborators.

Most interactions in shared-document collaboration typically take place at the beginning and end of the project. During their interactions the group often functions as a first-line audience, and conflict plays an important part in the group experience. The interactions do not always occur face to face but may involve written comments and technological media. The key point of this feature is that the communication is two-way and interactive, not just superior to subordinate.

#### SHARED DECISION-MAKING POWER AND RESPONSIBILITY

All members of a shared-document collaborative group have power within the group's decision-making process and share responsibility for the resulting document. This feature means that individual members are not free to make final decisions affecting the document without consulting the group but instead must go through the group process. Each member's responsibility for the document, then, results naturally from involvement in decisions that were made as the document was produced.

This feature distinguishes shared-document collaboration from situations in which someone might critique a draft of a colleague's article. Since the author is free to accept or reject the advice, such critiquing does not constitute shared-document collaboration. Also because of this feature, a research assistant or lab assistant would not be considered as a shared-document collaborator unless he or she had

sufficient status to share decision-making power concerning the final draft.

This definition of shared-document collaboration is exploratory in nature but nevertheless places some definitive boundaries upon this kind of collaborative-writing experience. The first feature is specific, the last two include a range of activities within the definition's boundaries. For example, there could be more or less interaction of a particular kind or within different activities of the writing process. Also, there could be more or less power exerted, or responsibility placed or assumed. The results of this research have only begun to point the way toward an identification and analysis of these dimensions.

#### GROUP TYPOLOGY

Each of the groups in our sample was formed because a group offered some particular advantage in accomplishing the task. We found that these group advantages fell into three categories:

- The size of the task and/or the time limits imposed upon it required the labor of more than one person.
- The scope of the task required or benefited from more than one area of expertise.
- The task included as one of its primary goals the melding of divergent perspectives.

These three kinds of group advantages, to which we have assigned the descriptive labels "labor intensive," "specialization," and "synthesis," formed the bases around which the groups in our sample were organized. Table 24.3 shows how many groups of each type we interviewed and what collaborative tasks these groups accomplished.

**Table 24.3.** Group Classifications and Tasks

Group Type	Tasks Performed
Labor-Intensive Groups ( <i>N</i> = 5)	Legal Brief Proposal Textbook Article
Specialization Groups ( <i>N</i> = 6)	Proposal Textbook
Synthesis Groups ( <i>N</i> = 3)	Goal Statement Report

None of the groups we looked at was a pure example of any one of these group types. Most of them shared the qualities of at least two types, if not all three. By looking closely at the kinds of contributions members made to a group and the kind of final document they produced, however, we were able to classify each group according to its dominant characteristics.

The general nature of the task did not automatically dictate a particular group structure and, as the table shows, proposals and textbooks were prepared by both labor-intensive and specialization groups. Instead, the particular goals of the group members interacted with the nature of the specific task and outside restrictions to determine the advantages group work would offer to a task. The following paragraphs describe each group type more clearly, with examples drawn from the sample groups.

#### *Labor Intensive*

These groups were formed primarily to enlist a number of people in performing a large task within a limited time period. These groups used the "divide and conquer" approach of separating their major projects into more manageable subtasks. Members of these groups were able to perform more than one of the possible subtasks that came out of the larger project. That is, once the task had been divided into more manageable units, any given unit could have been performed by more than one of the group members.

Jobs within these groups were chosen by members or assigned by the group leader. Group E, for example, prepared a large textbook following this organizational pattern. Although the possibility exists that one member of the group could have produced the text working alone, it would not have been produced within the same time period.

#### *Specialization*

These groups formed in order to draw on multiple areas of expertise that were required for their document or that would improve their document. For example, Group A needed the special knowledge of a medical doctor, a pharmacologist, and a business expert in preparing a major grant proposal. Group F produced a textbook that contained sections on different technical areas requiring different areas of expertise. Members of the specialization groups

planned together and challenged points on one another's drafts in all areas, but they could not exchange jobs within the group, as members of labor-intensive groups could. Each member had a specific task according to that member's specialized skill. The documents they produced reflected a broader range of expertise than the range any one could have provided alone.

#### *Synthesis*

These groups were formed to meld divergent perspectives into a solution acceptable to the whole group or to an outside group. These groups represented both a variation of perspectives and an actual conflict of opinion. For example, Group J was composed of members that had been in conflict over the goals for a community center. Their final document provided a goals statement that would help direct activities at the center and, in the process of preparing that goals statement, they resolved the differences in community viewpoints.

Both the document and the synthesis were important results of their collaboration. One corporate group, K, used their collaborative-writing task as a team-building exercise, also making synthesis a major outcome of their work.

#### QUESTIONS FOR FUTURE RESEARCH

Because this study was exploratory, the sample size was small, providing only partial answers to our questions concerning shared-document collaboration. These partial answers do, however, indicate directions future research might take to help us learn more specific information about shared-document collaboration and how it is practiced in particular settings.

Respondents in this study reported on "successful" collaborations. Although a few respondents made incidental references to collaborations with which they were not satisfied, we made no attempt to systematically investigate "failed" collaborations. A study of such "failed" instances and their causes would be especially useful to corporations and organizations that encourage collaboration.

This study indicated that a range of leadership styles exists in collaborative groups. Further study that directly examined leadership could help us learn what sort of leadership techniques are most productive in the collaborative setting and whether leadership styles correlate with writing tasks or group membership.

We found that more than one group type and writing process could be used for the same writing task. Task restrictions may, however, impose limits on collaboration that would become apparent only in the study of a large number of cases. As researchers and teachers, we need to know how the task itself affects the collaborative-writing process.

Similarly, we need to know more about how the new technologies are affecting shared-document collaboration. Some researchers are studying the effects of using word processors on individual writers and on peer-group editing. More study needs to be devoted to technology's effects on writers producing a shared document.

The sample used in this study contained a high percentage of respondents who had academic affiliations. More in-depth information is needed on shared-document collaborations in business, industry, government, and the military. When more is known about these collaborative processes, interesting comparisons might be made of the similarities and differences between collaboration that occurs within an organizational setting and the more autonomous collaborations of groups that are loosely associated with organizations or are entirely independent.

A correlated topic that needs study is the interaction between the hierarchy of the organization and the hierarchy of collaborative-group members. We have no systematic study, for example, of the effects of corporate structure on the processes or creative insight of collaborative-writing groups. We can only draw inferences from the more general research on creativity and small-group work.

Information drawn from studies on any of these topics would find immediate use in classrooms and in the business and professional worlds. We hope that the results of this exploratory research will point the way toward such future work.