Solving Problems in Technical Communication

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Introduction

Introduction: Solving Problems in Technical Communication

Edited by Johndan Johnson-Eilola and Stuart A. Selber

This book is for students who are learning about the field of technical communication. For both newcomers and people with some experience, it provides a coherent approach to understanding and solving problems and developing strategies that work across different types of communication situations. Because problems in this field are complex, multifaceted, and rooted in local settings, they do not tend to lend themselves to "one-size-fits-all" solutions. But there are *heuristic frameworks* (more on this key phrase later) that can help you address communication tasks in a systematic and thoughtful manner. This book offers original heuristics for problem contexts that are common to the field. Together, they constitute a broad-based perspective for both education and work that is sensitive to the nature of technical communication.

Although technical communication has a long and rich past—researchers have documented cases of technical communication in ancient Roman culture, for instance—the field began to mature as an organized profession in the mid-twentieth century. This ongoing process, modern historians tell us, continues to parallel in close ways the development of complex technical systems (e.g., manufacturing systems, bureaucratic procedures) and consumer markets for all things scientific and technological (e.g., small appliances, electronic devices). More than ever, the inventions and processes of contemporary society call for a great deal of explanation, instruction, and careful design, in large part because their audiences have expanded to include not only technical specialists but also lay audiences.

Computers provide an excellent case in point. Early systems were built by and for technical professionals, and were used in highly specialized settings such as scientific labs and research and development sites. Communication about and in these systems, understandably, occurred in relatively stable work cultures and involved limited groups of workers. Nowadays, of course, computers assume many different forms, and are used in a wide variety of settings and by a wide variety of people. This diversity requires more and different approaches to technical communication: Not only does computer documentation need to be written for a range of user abilities and goals, but computer programs themselves need to be adapted to support different types of activities. As computer program design has matured, technical communicators have increasingly been asked to help create systems to support very complex, specific types of tasks, taking into account not only the particular functions of the program ("Select 'Print…' from the File menu") but also very broad, social concerns ("What about users who want to save some paper? Can we let them print to PDF files instead?") and complex workplace issues ("Rather than just invite users to read the FAQ file, can we provide a way for them to suggest changes? Or even just make changes themselves?"). Technical communication is no longer simply communication *about* technology; it is also often communication *as* and *in* technology. As technologies become ubiquitous and complicated and more central to all aspects of work, the discipline of technical communication responds in increasingly complex ways.

This increased complexity carries over to the process of *learning* how to be a technical communicator. Although many technical communicators still write traditional, print user manuals, many more develop wildly divergent types of computer support materials: online help systems, self-paced tutorials, in-person training guides, automated wizards and templates, tool tips, multimedia demonstrations, and more. How does one person learn to develop not only excellent writing skills but also expertise in task analysis, document design, HTML/CSS, Flash, video and audio production, single sourcing, usability, and more?

For that matter, computer-user support materials are only a small fraction of what is involved in the ever-expanding world of technical communication. Professionals serve in nearly any area that involves technology, which is just about every field today. Technical communicators work in medical industries designing interfaces for patient health records; in aviation settings testing the usability of cockpit controls; in corporations writing annual reports that explain profits, losses, and trends to shareholders; in social service agencies preparing grant applications and proposals to support community outreach programs; in government agencies writing safety guidelines for field researchers; in publishing houses editing technical specifications for outdoor power and agricultural equipment; in mining companies creating warnings and risk bulletins for the public. This list is more suggestive than exhaustive: Technical communicators can now be found in nearly any and all work locations, handling a vast array of projects and responsibilities.

Can one become an expert in all of these areas? The short answer is no. Nobody does all of these things, and certainly not at the same time. Some technical communicators start in one field, such as computing, and work in it for several years, building up their experience first in a specific area (e.g., reference manuals) before moving on to more complicated roles (e.g., participatory design). Others move from one industry to another, applying the skills they have learned to new contexts and challenges. The career paths and future skill sets of technical communicators are anything if unpredictable: Technologies develop and change, industries go up and down, and current events, especially crises and disasters, shape cultural expectations for communication and documentation. To use a clichéd expression, the only constant in the field is *change*. You can confirm this fact by talking to people who have practiced technical communication for more than a year or two. You will undoubtedly hear stories about how their jobs evolved and grew in scope over time.

Adaptability is therefore key to what it means to be successful in the field. Technical communicators do not merely learn skills; they must also *learn how to learn new skills*, upgrading and augmenting their abilities as they go along, analyzing the matches and mismatches between what they currently know and what a situation demands. In other words, technical communicators must learn to become reflective problem solvers. This book will help you with that critical professional enterprise.

Technical Communication as a Problem-Solving Activity

We continue with three scenarios that depict important aspects of trained activity in the field: interpreting data and resources, supporting use contexts, and structuring work practices. These scenarios help to illustrate the nature of problem solving in technical communication.

Scenario #1: Interpreting Data and Resources

Kathleen is a technical communicator for a local township office, writing and editing a wide range of documents for citizens of the community. The documents in her care cover topics as diverse as emergency medical services, construction standards, recycling rules, vision statements, tax forms, and school guides. She develops print as well as online documents, and some of them appear in both formats. Kathleen does her best to prioritize health and safety issues, which are top concerns for the township. Her current project addresses a steady rise in the annual number of bike-car accidents in the community. Kathleen realizes that the actual number is likely to be even higher, for many accidents simply never get reported.

Kathleen puts aside her spreadsheet, which contains a collection of raw numbers and statistics, to examine police reports that describe the accidents: She needs to develop a rich and complete sense of why and how they happen. To start, she reads through the reports to develop a general picture of the problem. She then begins to look for trends and patterns in a variety of areas: accident times and locations, types of bikes and cars, weather conditions, road surfaces, injuries, damages, and more. Kathleen knows that determining causes is crucial to her analysis, but causes can be less than clear to even police officers, and causes are often disputed by those involved in accidents. She will therefore consider a variety of factors in her interpretation of the reports.

The interpretation Kathleen produces needs to be condensed and summarized for her superiors, but she also wants to do more than work with police reports. She thinks it might be valuable to review township information on car and bike safety, to see what drivers and cyclists are being advised and told to do. Kathleen has a surprisingly difficult time both finding the materials and knowing if she has found them all. In addition, she notices that the materials were last updated over a decade ago. Although the causes of the accidents remain vague for the moment, Kathleen suspects that the township may not be communicating clearly or effectively with these documents. And based on the amount of time that has passed since the last update, she realizes that the materials could not possibly be informed by what the township now knows about bike-car accidents. Kathleen plans to tell her superiors that this project is expanding in considerable ways.

Scenario #2: Supporting Use Contexts

William works for a company that runs an online portal for kitchen items. The website provides information on thousands and thousands of products: small appliances; cookware, tableware, and flatware; gadgets and accessories; knives and cutlery; linens, aprons, and tablecloths; cookbooks; and a great deal more. Users can access product descriptions and pictures, how-to documents, manufacturer information, retail store information, and recall notices. In addition, because the website employs features of social media, it includes user-generated reviews, ratings, and comments. All in all, the website is a reliable and comprehensive resource for all things culinary.

The company itself does not make any of the items listed on the website. Instead, it collects information about those items and presents it in an organized manner. As a technical communicator, William aims to make the website useful and usable. He creates organizational categories, writes and edits content, verifies information, answers frequently asked questions, and reviews the appropriateness of user-generated posts. He relies on several different approaches to audience analysis, and often studies server logs to learn about site use. Which pages are popular? What search terms do users employ? Are users downloading how-to documents? Are users following advertising links? Which operating systems are users relying on? Server logs enable William to answer such questions, but because the answers can change over time, he looks at the logs on a regular basis.

In his latest work session, William notices a usage pattern he has not seen before: An increasing and significant number of people are now accessing the website from mobile phones. In particular, they are seeking product ratings and reviews contributed by other users. William speculates that people must be starting to access the website while shopping, using it to help them make purchasing decisions in retail stores. Although this is an exciting development that bodes well for the company, the website was not really designed to accommodate cell phones and other mobile devices. William begins to realize that a website redesign might very well be in order. He alerts his boss to the situation and prepares a written summary of what he has learned from the server logs.

Scenario #3: Structuring Work Practices

Dozens of organizations a year hire Jane's "green business" consulting group to help them make their companies both ecologically and economically sound. Jane separates eco−marketing reality from hype for small businesses: She analyzes and translates technical documents for clients, most of whom are not experts in these areas. Jane creates flowcharts and graphics to help them understand the complicated, often contradictory technical claims made by different firms. Jane, in essence, walks her clients through a structured process modeled on her own research practices, with many of the dead ends and chaff filtered out: She shows them the complexities of the situation and potential responses, helping them to make rather than simply receive decisions. Jane's process is very complicated, relying on her ability to read the responses of her clients from moment to moment: a shifting tone of voice signaling their confusion, a detached gaze warning of attention fading. So in addition to the extensive textual material she develops—tables, charts, projections, summaries, expert opinions—Jane must interact closely with her clients to ensure that her work is fulfilling their needs.

Unfortunately, the face-to-face meetings are themselves becoming a concern. Although she is racking up impressive frequent flyer miles, Jane is a little uneasy with her own carbon footprint. Some of her clients have even begun joking about Jane's air travel offsetting the ecological good her company is doing for them.

Jane and her supervisors know they need a teleconferencing solution: The interactive, real-time, face-to-face nature of the meetings is crucial because her company works hard to put a human face to the advanced technologies they market. Will it be possible to approximate these features using screens and speakers? Will Jane—and more importantly, the people on the other end of the online conference—be able to use the technology easily? Will the benefits outweigh the costs? How will Jane and her clients share textual information such as charts, animations, and other materials that Jane would normally bring with her to display on a projection screen?

Jane understands that her current problem mirrors the problems of her clients: Each option carries complicated pros and cons. There are not any easy answers, no single obvious best choice. So Jane begins her internal project in much the same way she begins her external projects: researching, sifting, comparing, filtering. She will set up benchmarks and objectives, creating a set of materials for her supervisor that are a simplified but still complex picture of the possible solutions, then meet with her supervisor to talk through the options. She will also set up demonstration sessions of the top potential teleconferencing systems for her and her supervisor to walk through, allowing Jane to point out how each system changes (for good, bad, or otherwise) the process of communication when compared to face-to-face meetings. She knows she has a long night of research and writing ahead of her, but she is familiar enough with the process that she knows by tomorrow afternoon she will have the materials ready for the meeting.

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What can we learn from these scenarios? What do they illustrate about the nature of technical communication as a problem-solving activity? In the first scenario, Kathleen is alert to an issue in the township—bike-car accidents—but her characterization of the issue and associated data will shape how people think about the problem and solution. That is, problems and solutions are not objective realities of the technical communication environment. They are, instead, subjective phenomenon open to analysis and interpretation.

In the second scenario, William is not alert to a particular problem but discovers one during a routine check of server logs, which help him visualize audiences and contexts for the product he supports. In this case, a stable solution—the current version of the website—is destabilized by people who change their use setting (from home to retail store) and technology of choice (from computer to cell phone or other mobile device). Technical communication problems, then, are not solved once and for all, but subject to continuous redefinitions and reconfigurations.

In the third scenario, Jane knows that her own approaches to technical communication have a bearing on how she structures the work practices of others. Because of the complexities of the problem spaces she works within, Jane explicitly involves her "users" as collaborators. Rather than force an oversimplified solution onto her clients or her managers, Jane creates a structured space that suggests responses but provides the information her users need if they want to explore other viable options. Because people often prefer simple solutions, constructing these spaces is very difficult but also very important.

All in all, the scenarios emphasize a broad point: Problems, solutions, and their relationships are inevitably conditioned by technical communicators, by users and user contexts, and by the means through which people communicate. This state of affairs is a feature—not a flaw—of all human discourse.

The scenarios also suggest that technical communicators continually face both old and new problems. There are few hard and fast rules in the field because projects vary by context and circumstance, sometimes dramatically. In addition, technologies change at an extremely rapid pace, mutating as they are adopted in different ways by different groups of people. As you gain expertise, you will learn to identify tendencies, trends, and common threads from one situation to another, but you will also learn that some features of every situation are unique. So you will gain the ability to not merely *do* things but to *think about* how you are doing things, to analyze your previous experiences, attempting to come up with common approaches that seem to work from place to place—at least in some cases and to some degree. Put in different terms, you will be learning how to move back and forth from theory to practice, from practice to theory.

In reality, you probably already make this important recursive move but without knowing it. For example, you probably already understand multiple ways to communicate. In a formal memo to your co-op supervisor, you might write, “Please let me know when the final report must be submitted.” In an email to the same person, you might say, more casually, “Can you tell me when the final report’s due?” In a text message to another student in the class, you might write, “co-op report due this wk?” These shifts in register and diction signal a theoretical sensitivity to audience and purpose and to the conventions and constraints of various communication media.

Many people develop a similar set of different approaches based on intuition (itself based on experience), almost as if they were natural and obvious ways of communicating. They are not. We learn them, and often without thinking about that learning. At some point, however, you can make yourself a better, more effective technical communicator by moving consciously and explicitly from simple practice to theory. What happens if you discover that, unlike some of your professors at school, your co-op supervisor is comfortable texting. Do you text her the same type of sentence you would have written in a formal report? You can see here how you would be moving back and forth between doing and thinking—not merely thinking concretely about what you are going to do but also thinking in complex ways about your past actions, why you took them, how well they worked, how other people responded to them, and more. In such situations, you are revising your practice based on theories about practice, developing what we call *heuristics*: plans for action that you apply to types of situations based on past experiences and thinking about those experiences.

The need to continually revise practice and theory never goes away for most people in the field: Technical communicators are problems solvers, and the classes and kinds of problems keep changing. As you get better at addressing more complicated situations and develop productive ways to respond to them, you will move on to ever more complex problems requiring new solutions. As you advance as a professional, you will also develop ways of learning new things, heuristic approaches you can take to different problem situations in order to help you better understand and solve them.

Heuristics and Problem Solving: A Complex, Recursive Relationship

We develop and adapt heuristics in a complex, recursive set of procedures that involve not only actions and heuristics but a second level of analysis, including revising heuristics and thinking based on theories, which are themselves open to revision. These processes are illustrated in Figure 1, but because they can be abstract and hard to grasp, we elaborate with a simple household task: doing laundry.

When you are doing laundry, you start by sorting clothes into piles based on color: whites, dark colors, light colors, etc. That sorting pattern is your *heuristic*. What do you do, however, when you find a white t-shirt with a bright red logo on the front? Cut the logo out and put it on the red pile, then put the remaining white part of the shirt on the white pile? Your heuristic is now your problem. So you resort to "meta-activity" to reconsider your heuristic: You think about the purpose of sorting laundry. One purpose is to keep bright colors (like red) from running. But the shirt has been washed before and the red logo did not run on the white background. Therefore, you can probably assume the red is colorfast. You can now modify your heuristic with a backup rule: Bright colors on white can safely go into the white pile, assuming a previous washing. This process of modification continues on an as-needed basis.

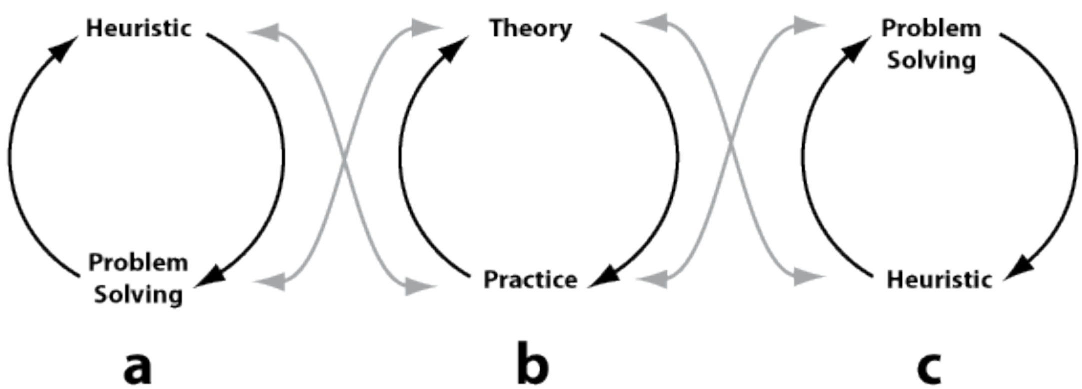

Figure 1. Recursive Procedures for Adapting Heuristics

This book offers you a range of heuristics for different problems technical communicators tend to grapple with: designing information, collaborating with others, addressing global audiences, researching and writing documents, managing projects, making ethical and legal judgments, and more (Figure 1, Part A).

In terms of our earlier laundry example, Part A of Figure 1 explores the intersection of concrete problems ("I need to wash these clothes") and heuristics ("I need to sort them into piles"). If you are a novice clothes washer, you may not have learned heuristics—you might, for example, throw a new red shirt into a pile of white laundry (a course of action that can result in a freshly laundered load of pink clothing). As you work through approaches to solving such problems, you will inevitably consider the fit between a heuristic and a concrete situation, then modify the heuristic on the fly to match the particulars of that situation. In other words, as problem situations change, your trusty heuristic may itself become a problem to be addressed: How do I adapt my heuristic to respond to the specific challenge in front of me?

As your intellectual toolbox expands in complexity and size, you will begin forming broader sets of heuristics that are interconnected to each other. In many cases, these sets can be so broad that they begin to feel rather abstract. This is not a problem because their abstract nature is what makes heuristics powerful. Heuristics do not deal so much with concrete reality. Instead, they are used to connect abstract theories to individual, concrete practices (Figure 1, Part B). As people gain expertise in situations, they typically start trying to see how and why these connections are made. You may have learned how to write a memo, for example, but you are not going to get very far writing the same type of memo for every situation, or writing a memo in situations where a phone call might be much more effective. In our laundry example, the white shirt with red logo suggests you might step back to see how your "separate reds from whites" heuristic fits between your theory and your practice: What is the theory that leads to the heuristic? How might I translate that theory differently to address this unique problem?

At some level, you will also start using abstract theories to develop and modify your heuristics to adapt to emerging problems. Again, in a complex, recursive manner, you are now thinking of heuristics themselves as problems to be solved (Figure 1, Part C). You learn, for example, how to use theory to adapt your heuristics to fit new types of problems. You take what you know about the theory of red colors in laundry bleeding into lighter colors, analyze the specifics of the situation and your own experiences, and develop a new heuristic that suggests you can wash reds and whites together in some specific situations.

Similarly, in the workplace you learn that while email messages are often avenues to obtain information quickly, you also learn (or should learn) that the ease with which email can be misread in volatile situations suggests that, in some cases, calling for a face-to-face meeting will be slightly less efficient but more likely to be productive in the long run. You learn, that is, to apply secondary-level problem-solving skills to the heuristics themselves. Over time, your problem-solving skills, your heuristics, and your understandings of theories should all continually work together to make you a more effective technical communicator.

Here is another way to think about the character of these relationships: Heuristics are relatively static procedures or frames to be applied, rules of thumb; problem solving is a messier, more contingent, and higher-order activity. Working effectively means going back and forth between heuristics and problem solving. Heuristics are never completely effective because they are more abstract than the immediate context. This abstraction is both their strength and weakness. They are also never completely effective because things change over time and across contexts. Heuristics fit well in some cases but poorly in others. So technical communicators need to resort to problem solving in order to get the heuristic to fit the local context. What you learn and apply as a heuristic in one project is going to need to be adapted into a new heuristic for another project.

This book provides important resources for engaging in this recursive process of doing and thinking by providing extensive, concrete examples that address a wide range of technical communication practices. Chapter authors describe specific experiences, analyzing the problems posed by those experiences and developing rich heuristics for solving the problems. The full range of problem-solving heuristics constitutes a broad set of approaches you can integrate into your own work. Ultimately, you will adapt and improve these heuristics as you gain your own sets of experiences and learn more about the field.

Learning About the Field: A Four-Phase Heuristic

How does one learn to become a technical communicator? How does a technical communicator continue to advance and learn on the job? In addition to numerous original heuristics for work practices essential to the field, this book provides an overarching framework for imagining a process for lifelong education, including the instructional methods of academic technical communication programs. The macro-level heuristic in Figure 2 depicts an approach you can use as a student in a technical communication program or as a professional interested in keeping up with new developments and directions in the field. Although there are other valuable approaches to technical communication education, this heuristic has something of a universal quality that can be applied, in an ongoing fashion, to a shifting, dynamic discipline.

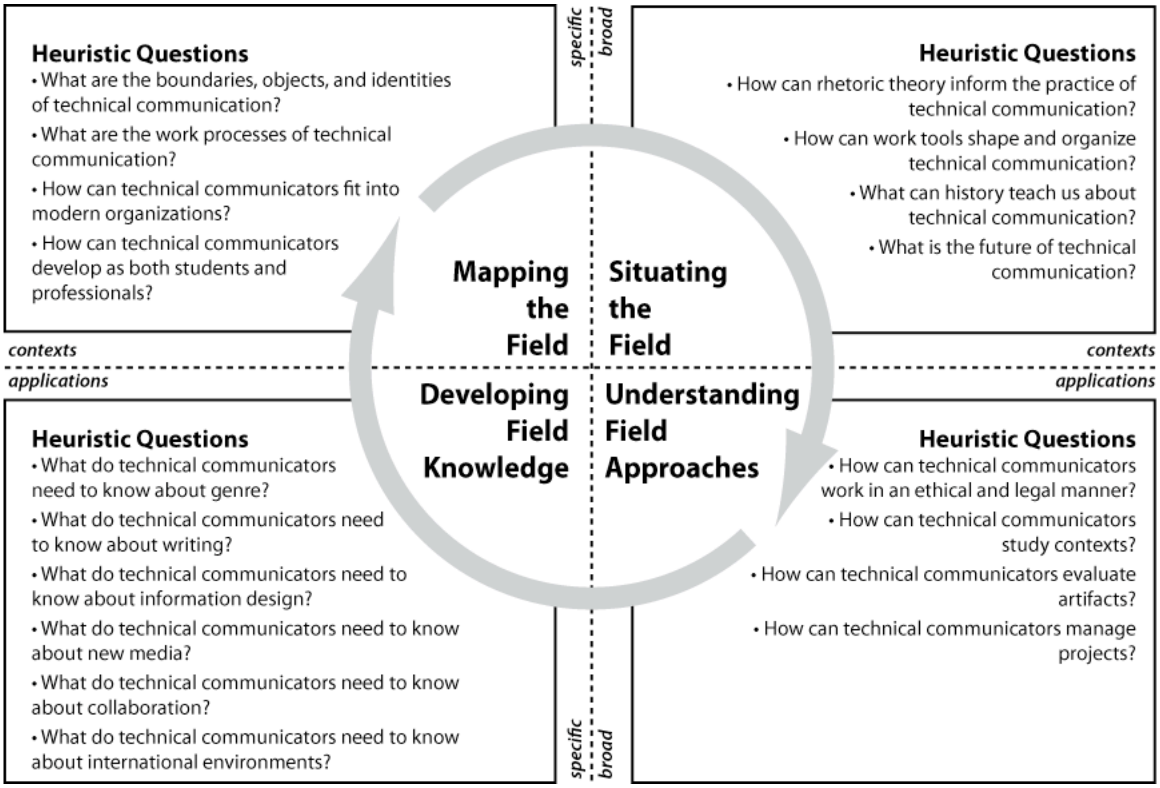

Figure 2. An Educational Heuristic for Technical Communication

On a conceptual level, the heuristic emerges from the recursive relationship between theory and practice discussed in the previous section. In slightly different terms, it asks you to work back and forth between the contexts and applications of technical communication, taking both specific and broad views of the work you are doing or will do in the future. Notice that four interconnected phases organize the heuristic: Mapping the Field, Situating the Field, Understanding Field Approaches, and Developing Field Knowledge. Each of these phases also represents a different section of the book, and the questions anchored to them are also chapter titles. We will elaborate further on this arrangement, but right now it is useful to know that the structure of the book matches the structure of the heuristic.

In Figure 2, the four interconnected phases are superimposed on a grid with quadrants that delimit their focus and scope. The quadrant for **Mapping the Field** includes fundamental questions about what technical communicators do, where they work, and how they progress as both students and professionals. These questions probe the work contexts of technical communication in very specific ways, providing concrete snapshots of the field. After working through this section, you should have a clear sense of the responsibilities, job settings, and development paths of technical communicators.

Although the quadrant for **Situating the Field** continues to address the work contexts of technical communication, it foregrounds theories and histories rather than processes and settings. Discussions associated with the previous section are certainly informed by theory and history, but the questions in this quadrant consider broader perspectives on the contexts of technical communication. After working through this section, you should see the value of theories for practices, including theories that derive from outside the field; understand how the work tools of technical communication can influence practices; recognize ways in which the past can be leveraged to improve practices (the field does not operate in a temporal vacuum); and recognize ways in which the present can be leveraged to predict future possibilities. To reiterate, both phases address technical communication contexts, but oscillate between specific and broad views of the field. Employed in either order—mapping and situating or situating and mapping—the phases enact the recursive processes of doing and thinking that are required for thoughtful and effective work in technical communication.

The next two quadrants retain the specific-broad distinction but change the focus from contexts to applications. In our heuristic, applications are equivalent to the routine practices that technical communicators engage in on the job and the routine products that technical communicators produce for users. Although the other quadrants discussed thus far mention a variety of practices and products, they do so in order to help define and explain the field, to help map and situate it against other disciplines and endeavors. In more direct terms, the two quadrants in the bottom half of the heuristic help you learn how to do the work of technical communication.

The quadrant for **Understanding Field Approaches** offers a broad examination of the applications of technical communication. It poses and responds to a series of questions that concentrate on methodological procedures that have become commonplace in technical communication settings. After working through this section, you should be familiar with approaches people in the field use to do research, evaluate and assess projects, and manage projects. You should also be sensitive to the ethical and legal dimensions connected to these tasks and others. There are many other field approaches worth learning about, but the approaches reviewed here are rather conventional and will enable you to initiate and perform key aspects of technical communication projects.

You will need more than methodological procedures, however, in order to create applications that are helpful to users. You will also need to cultivate a series of skills specific to the writing and communication tasks of technical communicators. The quadrant for **Developing Field Knowledge** distinguishes technical communicators from journalists, creative writers, and other types of writers. After working through this section, you should be familiar with how people in the field write and communicate, design artifacts, collaborate, address international audiences, develop and deploy new media, and more. What you learn here will help to explain why field knowledge in technical communication has expanded to include many skill areas beyond those traditionally associated with words and written texts.

Although you can begin with any of the four phases in the heuristic, with either broad or specific perspectives, and with either contexts or applications, we encourage students in their first course to start with the section on Mapping the Field, which covers definitions of technical communication and work processes and contexts. This basic information will serve as a useful scaffold to discussions in the other parts of the book.

The Structure of Chapters

As our scenarios illustrate, work in technical communication, even in settings with mature organizational procedures, is neither formulaic nor entirely predictable. Nor is it prescriptive or generic. Although the field has developed best practices and useful principles that can help practitioners produce usable documents (print and online), technical communication problems are—at their core—ill-structured, complex, and messy, defying easy or pat solutions.

Ill-structured problems share certain formal characteristics: They are multidisciplinary in scope, require problem solvers to express opinions and judgment, and possess multiple solutions and solution paths. These are the very characteristics of professional work in technical communication. A technical communication artifact is not the one, true, perfect solution to a communication situation. Rather, it is one of many possible responses, based inevitably on assumptions, interpretations, potentials, and constraints. Technical communication work, in other words, is rhetorical work: Professionals create as much as they report, inventing solutions to communication problems through various deliberative activities.

Given this reality, students and professionals need to be equipped with a variety of frameworks for approaching ill-structured problems. Although instructional materials in the field foreground process and often include real-world cases with an emphasis on the contingent, technical communicators need direct, repeated, and integrated contact with a series of systematic frameworks that attend to the numerous complex elements of communication situations. The frameworks in the book—at least one per chapter—show you how to approach ill-structured problems intentionally and methodically.

Each chapter in the book includes the same seven sections:

1. Summary
2. Introduction
3. Literature Review
4. Heuristic
5. Extended Example
6. Conclusion
7. Discussion Questions

The **summary** provides a descriptive abstract that lists the strategies offered by authors for negotiating the problem contexts of their questions. These lists function as sets of strategies you can review before and after projects. In terms of the **introduction**, each chapter begins with a scenario (real or invented) that helps to clarify the problem contexts for the questions. The scenarios come from the nonacademic workplace and involve practicing technical communicators and their settings. Each introduction ends with a chapter overview.

The preliminary sections of chapters also include a **literature review** (authors do not necessarily call it that). Authors elaborate on the problem contexts for their questions by discussing what the field already knows about those contexts, being sure to include the latest thinking and research in the field. Authors organize their discussions by topic or issue rather than by sources.

The heart of each chapter provides a research-based **heuristic**. Drawing on the literature review, authors offer heuristics that can help you address the problem contexts of the questions. That is, authors provide frameworks that enable you to probe, conceptualize, or engage the problem contexts in some productive fashion. The heuristics take a number of forms: for example, a series of questions to ask and answer; a model that characterizes work or activity; a taxonomy that prioritizes relationships; a flowchart that indicates processes or interactions; a grid that connects aspects of a context. In ways that make sense for the topic at hand, authors formulate suggestive structures you can apply to varying communication situations.

After the heuristics have been explained, authors demonstrate their use by applying them in an **extended example**. The objectives here are to show you how to employ the heuristics and to provide an illustration of how the heuristics can guide technical communication work. Finally, authors find meaningful ways to **conclude** their chapters, being sure to revisit any strategies revealed by the literature reviews, heuristics, and extended examples.

As an appendix to each chapter, authors provide **discussion questions** to challenge and stimulate your thinking. You can use these questions to facilitate conversations about the use of heuristics for problem solving in technical communication.

A Final Word

The heuristics in this book function as a critical bridge between thinking and doing and afford a coherent method for undertaking both basic and advanced responsibilities in technical communication. In significant and meaningful ways, they will help you learn about the field and keep up with the rapidly changing demands of the twenty-first century workplace. However, heuristic approaches, by definition, are dynamic and contingent approaches, requiring ongoing attention and evaluation. We encourage you to view the heuristics in this book with a discerning and critical eye. As you employ them and as you gain more experience as a technical communicator, you will begin to notice ways that you can modify the heuristics, adapting them to new problem contexts and to new purposes. Modifying heuristics for specific purposes is an important skill for reflective problem solvers.

Section One:

Mapping the Field

Introduction

As you learn how to function and advance as a technical communicator, you will develop a range of strategies for mapping the field, for creating representations of work and workers that bound your professional domain in clear and productive ways. Although this common “explorer” metaphor oversimplifies the process, it is still a highly useful approach: You will be looking around with an attentive eye, listening to stories from experienced professionals, making quick copies of the maps other people have drawn, training yourself to spot important and interesting features of the terrain you will be moving through, and so on. And because the terrain of this field is constantly shifting and presenting new challenges, the task of map-making will be an ongoing professional activity.

Of course, in most cases your work as a new technical communicator will not take place in the wild. You will not be the noble, strong-chinned explorer striding in to bring civilization to the natives (that decidedly Western vision always seems to lead to chaos anyway). Instead, you will be working in communities and organizations that are familiar in certain ways and unfamiliar in others. At times, people will talk to you in everyday terms you can understand; at other times, they may seem to speak in another language, referring to strange types of reports and information-gathering strategies. They will sometimes speak in jargon, combining alphanumeric acronyms and nicknames in dizzying patterns. You will suddenly find yourself, in other words, in unfamiliar territory, and in need of a map.

Facing new challenges at work can be both energizing and unsettling. The chapters in this section cannot remove all of this uncertainty (Figure 1). They will, however, give you heuristics you can use to generate maps to help you find your way around and imagine work activity.

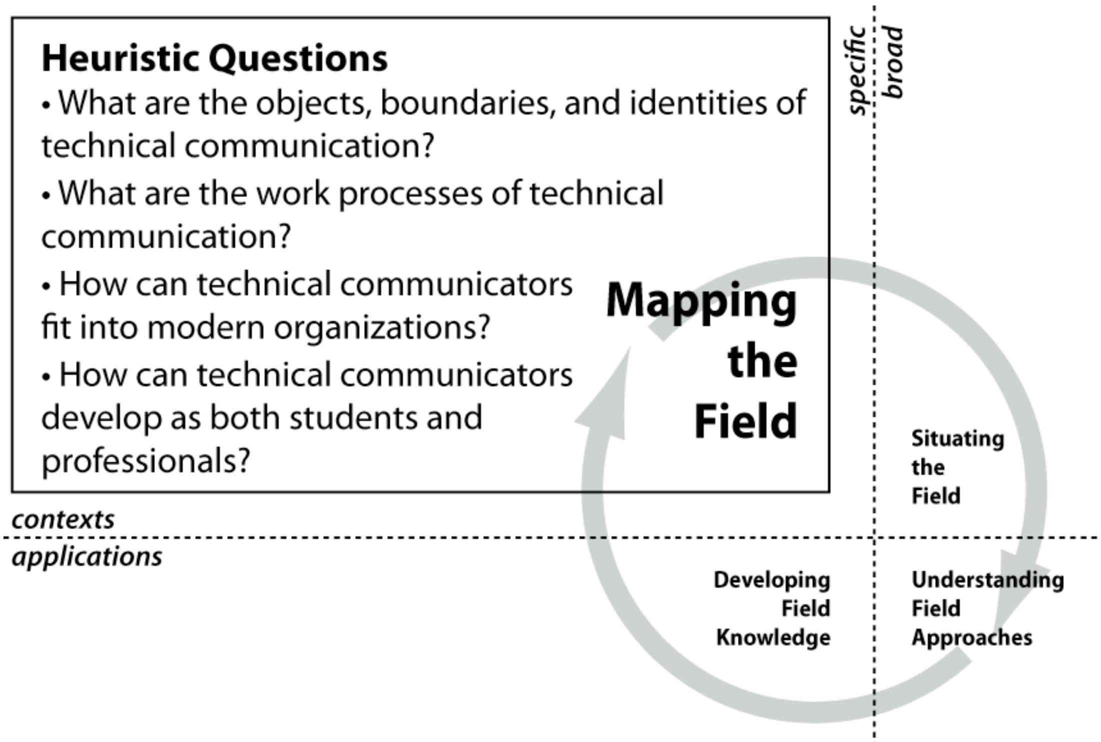

Figure 1. Heuristic Questions for Mapping the Field

In the introductory chapter, Richard J Selfe and Cynthia L. Selfe offer approaches for answering one of the first sets of questions you will face: "What are the Boundaries, Objects, and Identities of Technical Communication?" Selfe and Selfe review methods that are commonly used to help students understand what technical communicators do in the workplace. These methods include examining histories of the field and compiling lists of skills that employers say they want their workers to possess. Although these methods are valuable, Selfe and Selfe advocate for looking at what technical communicators say to each other about their work, filtering that large and ongoing body of discourse through the information visualization technique of "word clouds" to provide high-level maps of the field. The examples developed by Selfe and Selfe use research articles from key journals for practitioners to create instructive snapshots of professional practice. You can also use this technique on texts from your own work contexts to create additional and different maps.

In "What Are the Work Processes of Technical Communication?" William Hart-Davidson also draws on research by and about practicing technical communicators to define three primary forms of work in the field: designing information across numerous media and genres, advocating for the needs of users, and stewarding the role of information development in organizations. As Hart-Davidson demonstrates, mapping the functions and value of these activities brings technical communication in from the periphery to occupy a central role in the mission of many modern organizations. You can use the heuristics offered by Hart-Davidson to develop work processes that produce and support substantive roles and responsibilities.

This active remapping is demonstrated in detailed ways by Jim Henry's "How Can Technical Communicators Fit into Modern Organizations?" This chapter discusses strategies you can use as you find your way within a new company, community, or organization in your role as a technical communicator. Relying heavily on the experiences of a student team writing an annual report for a local community health agency, Henry sketches out heuristics you can draw on as you begin your first technical communication job and as you move from one organization to another. The heuristics incorporate a variety of research methods that enable you to map the dynamics of workplace settings.

This first section concludes with the reminder that mapping the field is a process that never stops: Technical communicators on the job are also always students, learning new ways of working as situations, goals, and technologies change. Kelli Cargile Cook, Emily Cook, Ben Minson, and Stephanie Wilson address the question, "How Can Technical Communicators Develop as Both Students and Professionals?" Emily Cook, Minson, and Wilson all look back from their current workplace roles to their time as students in Cargile Cook's technical communication class. As all three demonstrate, effective classroom learning can be very useful when you enter the workplace, but you will need to think about the skills and strategies you are transferring, reflecting on how they fit (or fail to fit) with the demands of your current work, adapting and building on them as your own professional abilities evolve and expand.

Chapter 1: What are the Boundaries, Objects of Study, and Identities of Technical Communication?

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Summary

Understanding your field and being able to map the territory of its practices, objects of concern, and identities is one mark of an informed professional, and an important indication of expertise in the workplace. Quite a bit of controversy, however, surrounds attempts to define the landscape of technical communication, a field that involves practitioners, researchers, and theorists in a broad range of activities. Some attempts to identify the boundaries of the field rely on historical accounts of how it was born and grew into a recognized area of research and practice. Other efforts attempt to describe the research base of technical communication, identifying the topics and issues that provide a focus for investigations and studies. And still other efforts identify *the general kinds of skills and understandings* needed by technical communicators in the workplace.

All of these approaches, however, can seem abstract and distant to students of technical communication who hope, one day, to become professionals. So what are the boundaries, objects/topics, and identities of technical communication as a field?

This chapter looks at three common approaches to mapping the territory of technical communication—histories of the field, identification of research foci, and descriptions of the workplace skills that working technical communicator need. Each of these approaches has its strengths and limitations, and each produces a very different map of the field. To help create a

more comprehensive understanding of technical communication as a field—its boundaries, objects of concern, and identity—we suggest using *text clouds* as a mapping heuristic.

Introduction: Mapping Technical Communication as a Field

In 2006, Amanda Metz Bemer, a student of technical communication at the University of Washington Seattle, came face to face with an interesting fact about her chosen field, nobody knew what technical communication was. When she talked to her fellow students and friends outside her major, nobody knew what it was that technical communicators really did, nobody knew what research was done in the field, nobody could imagine what issues interested technical communicators.

Amanda tried to give her friends and family an understanding of the field by listing the classes she had taken, "technical writing, instruction manual writing, communication theory, usability testing, document design, rhetorical theory." But, as Amanda noted, she generally got a "blank look and an 'oh'" for her trouble. So Amanda asked herself if there were a better way to talk about her field than giving a "laundry list of classes."

After doing her own research on technical communication—the boundaries of the field, its objects of study, and its identity—Amanda learned that the matter was more complex than she had thought. Indeed, no single source she read had been able to identify a definition of the field that was both comprehensive and specific enough to do justice to the field and help others comprehend what went on within its boundaries

As Amanda herself noted in "Technically, It's All Communication: Defining the Field of Technical Communication," a 2006 article she wrote for *Orange: A Student Journal of Technical Communication*, there had been no shortage of *attempts* to define the boundaries, objects/topics, and identities of technical communication. However, the success of each of these attempts, she realized, had been limited, perhaps because a good map had to serve so many audiences (students of technical communication, scholars and practitioners in the field, non-specialists and members of the public interested in what technical communication is and isn't) and perhaps because the field itself covered so much ground. No one map of the territory that the profession occupies had emerged as fully capable of representing so much ground in a concise and understandable way to so many audiences.

The same problem that Amanda identified also has a larger impact on practicing technical communicators at the national level. Dan Jones (2009), for instance, argues that the benefits of having an authoritative map of the field are significant. As things currently stand, he points out, the field suffers from an "identity problem,"

> The identity problem is most obvious every time an outsider asks what technical communicators do. Like it or not, technical communicators interact daily with people who have only a faint idea of what they do….Many technical communicators…are not sure what technical communication is. Many technical communicators cannot adequately articulate what this profession is about…Many cannot even argue convincingly that technical communication is a profession. Technical communicators' anxieties about salaries, morale, prestige, and professionalism in their companies or on their campuses are major symptoms of their confusion. (567)

This chapter examines previous attempts to map the field of technical communication—by tracing its history, by defining its objects of research, and identifying the skills and understandings that are needed by practitioners—and discusses the limitations of each of these mapping attempts. The chapter then offers a new heuristic for mapping the field—text clouds—that takes advantage of both words and visual information.

Literature Review: Mapping the Field of Technical Communication with Words

A number of researchers have attempted to map the identity of technical communication, as a field, in *words*, publishing their efforts in the form of books and journal articles. Although these authors have approached their task in a variety of ways, their attempts to map the field often fall into three categories:

- maps that focus on *the history* of technical communication,
- maps that describe *the research base* of technical communication,
- maps that identify *the skills and understandings* needed by technical communicators in the workplace.

Each of these approaches has significant limitations and each produces a tracing of the field that privileges a different point of view and perspective. In the following sections, we'll look at the three primary approaches to mapping the field with words, and then suggest a fourth approach—using text clouds—that may offer a more comprehensive and informative representation.

Historical Maps of Technical Communication

One way of answering the question, "What are the boundaries, objects/topics, and identities, of technical communication as a field?" involves tracing the roots of technical communication, creating a map—often in the form of an edited collection of works—that focuses on the historical precursors of scientific and technical writing and the eventual emergence of the field as we now know it.

In *Three Keys to the Past: The History of Technical Communication*, for example, Teresa Kynell and Michael Moran trace the roots of the profession to the work of natural philosophers, scientists, and educators. In this important historical collection, Charles Bazerman writes about the contributions of Joseph Priestley in describing electricity during the 17th century; James Zappen explores the science writing and rhetoric of Francis Bacon in the 18th century; John Brockman chronicles Oliver Evans' descriptions of mills and steam engines in the pre- and post Civil War period of the 18th and early 19th centuries; and Theresa Kynell tells the story of Sada Harbarger's work on promoting technical communication within the Society for the Promotion of Technical Communication in the 1920s. Other sections of this book include historical accounts of technical communication movements in Europe (e.g., Elizabeth Tebeaux's chapter about the emergence of women technical writers during the English Renaissance, and Merrill Whitburn et al's discussion of emergence of plain style in scientific discourse during the 17th century) and in the United States (e.g., Robert Connors' description of the increased popularity of technical writing from 1900 to 1970, Jo Allen's description of the growing influence of social consciousness on technical communication).

The effort to map technical communication historically, as Nancy Allen has pointed out can appear "haphazard":

> Should the work focus on the rise of technical communication as a career; as an academic field of inquiry; or as a centuries old endeavor…? Should the work examine the subjects, the concept, or the writers of technical communication?

> And which writers should it examine—those who practiced technical communication or those who have studied it? (227)

When historical accounts focus on key figures, for example, they can encourage what John Brockman calls a "generals-and-kings" understanding that "history consists of the work of the famous and influential" (1983 155). When they focus on *key moments* of technological innovation (e.g., the invention of the Astrolabe or electricity, the operation of modern mills and steam engines, the publication of the first books on midwifery written by women), such selective historical accounts can encourage a disjointed, episodic understanding of technical communication that may, as Jo Allen (1999, 227-8) points out, fail to provide a fully situated understanding of how movements develop and are tied to one another.

Those accounts that *do* provide a picture of the long sweep of history are often limited in detail. Frederick O'Hara's "A Brief History of Technical Communication," published in 2001, for instance, covers technical communication from the 12th century to 2005 in four pages. Although shorter pieces like this one provide valuable thumbnails of broad historical movements, they can include neither the depth of detail nor accurate representations of the many social, cultural, and economic factors that help make the field come alive for students. If we were to consider this brief piece a representative historical map of technical communication, for example, we would only see the largest of landmarks and these only from a distance: the emergence of mathematical writing among the Aztecs, Egyptians, Chinese, and Babylonians; the development of astronomy in the Middle East; the explosion of scientific, medical, and mechanical arts in the Renaissance; the invention of movable type and the growth of scientific publishing in the 15th century; the emergence of scientific journals and patents in the 18th

century; the introduction of federal research contracts in the 19th century; and innovations in military technologies and the computer industry during the 20th century.

Such a map is so general in the landmarks and boundaries it identifies within the field of technical communication that it provides little information about the pragmatic concerns demanding the attention of practicing technical communicators, individuals who must deal with multiple and immediate demands on their time and skills, and may find that historical treatments of their profession to provide insufficient help or guidance.

Finally, historical accounts are ill-suited to communicating with coherent visual impact, the boundaries, objects of study, and identity of a growing and dynamic field, especially to public and non-specialist audiences.

Research Maps of Technical Communication

A second common approach to mapping the boundaries and topography of technical communication as a field focuses on landmarks identified within scholarly and research studies. These maps focus on investigations of the texts (documentation, online exchanges, reports), textual practices (editing, writing, revising), textual environments (digital spaces, organizations, workplaces), and intellectual approaches (theoretical frames, disciplinary perspectives, research methods) associated with the work of technical communication.

Central Works in Technical Communication, edited by Stuart Selber and Johndan Johnson-Eilola, for example, represents an important recent collection that offers a scholarly and research map of technical communication. As Selber and Johnson Eilola acknowledge, their own bounded take on the field is “informed by contemporary social theories” and offers a map focused on the “research and theoretical portions” (xvi) of the technical communication landscape from their position as scholars and faculty members responsible for creating curricula and teaching courses in technical communication that are aimed at pre-professional students. Thus, Selber and Johnson Eilola note, they exclude “how to” research projects from this collection in favor of research that is “conceptual in nature” (xvi) and that provides a “way into the scholarly conversation[s]” that constitute the field from an academic perspective. As a result of the boundaries that Selber and Johnson-Eilola set for their project, each of the thirty-two pieces that comprise the collection is authored by faculty scholars teaching in technical communication programs at colleges and universities around the United States.

The main sections of this germinal and influential collection provides an indication of the topics of concern to the academic research scholars who have contributed chapters:

- rhetorical perspectives on technical communication
- philosophies and theories of technical communication
- issues of ethics and power
- examinations of research methods
- studies of workplace contexts for technical communication
- studies of online environments for technical communication
- pedagogical directions for technical communication programs.

Although these topics do provide “one map among several” of the field of technical communication, it is a map purposefully influenced by humanistic disciplines (rhetoric, philosophy, ethics) and the social theories that now inform academic studies within composition, history, and English programs. The list of topics leaves the pragmatic “how to” research conducted by workplace professionals uncharted. In addition, this collection focuses exclusively on programs of technical communication based within the boundaries of the United States.

A similar map of technical communication as a field can be found in Tim Peeples' *Professional Writing and Rhetoric: Readings from the Field*, a collection aimed at undergraduate students of technical communication preparing themselves as professional communicators. Peeples' collection, which "aims to be as representative as possible of the issues that define the field" (3) provides a map bounded by three "binaries" that have historically helped structure technical communication: practice versus theory, production versus practice, and school versus work. In describing his collection, the editor notes that these binaries represent misunderstandings of the field and argues for redefinitions of each area that complicate such understandings.

Among the chapter topics represented in this collection are

- the relationship between rhetorical theory and the practice of technical communication,
- the ways in which writing is situated within in the social contexts of organizations,
- the ethical dimensions of professional writing,
- the role of technological contexts in shaping contemporary technical writing,
- the importance of user-centered documents,
- the role of professional writers in shaping the social contexts associated with technical communication, and
- strategies for students who plan to move into the professional ranks of technical communicators.

Because this map of the profession is committed to complicating the three binaries identified above, this list of topics (and the specific articles within each chapter), suggest several key landmarks of technical communication as Peeples perceives the field. First the collection reveals the belief that workplace practices (writing within organizations and document production) must be placed in conversation with theoretical perspectives that have typically informed academic discussions of technical communication (the social theories that inform participatory design and user-centered communication, rhetorical and ethical theories of communication, and postmodernism) and argues that "theory and practice cannot be separated from one another: good practice requires theoretical knowledge, and good theorizing is not only a practice but also requires a responsiveness to practice" (3). Second, the collection argues, in Peeples' words, that a "focus on the products of writing not only hides the social interaction that is integral to writing, but also distracts from an understanding that writing is a form of "social interaction" or the "means by which we mediate social interaction" (p. 4). Finally, the chapters in this collection are committed to a belief that "rhetorical reasoning" is characteristic of both workplace practitioners and academic scholars of technical communication.

Despite the attempt to establish direct links between academic-based and practitioner-based perspectives on technical communication, however, this collection, too, contains works authored exclusively by academic faculty, rather than workplace practitioners and only one work by authors outside the U.S (a chapter by Canadian scholars).

Although both of these extensive collections offer a valuable set of contributions to the field of technical communication, one that is especially useful for students of technical communication, as maps of the profession they suffer from being both too large and too small.

They are too large, for instance, to provide a map of the profession that can be communicated concisely—in either words or images—to members of the public or non-specialists. Individuals who hope to make some sense of these maps must read the chapters contained within them, a task that argues against their value as concise maps for non-specialists and members of the public.

And the collections are too small, in that they focus only on works authored by academic scholars and, thus, necessarily reduce the breadth of technical communication to a certain kind of theory-and-practice research while avoiding *how to* research. Even the most extensive collections can contain only a relatively limited number of publications: in the case of *Central Works,* thirty-two pieces were chosen to represent the entire field, in the case of *Professional Writing and Rhetoric*, twenty-five pieces were included. Thus, as maps, such collections may neglect those works that might be less central, but nonetheless figure as key shaping influences on the broader field of technical communication.

Mapping the Skills and Understandings Needed by Technical Communicators

A third approach to mapping the field of technical communication attempts to describe the skills and understandings needed by practicing technical communicators in the workplace. In 2000, for instance, George Hayhoe, as the editor of *Technical Communication*, a journal devoted primarily to practicing technical communicators, sketched a relatively standard set of job requirements, maintaining that all communicators, regardless of their specific jobs, needed foundational skills in "writing, editing, visual communication, multimedia, document design, audience and task analysis, usability testing of products and documents, and interpersonal communication" (151); a mastery of "one or more subject domains in the sciences, medicine, engineering, or another technical field; and knowledge of "how to use the software tools required for a specific task" (152).

Other experts, however, argued that the transition from a manufacturing society to an information culture in the later 20th century has necessitated a change in the description of technical communicators' jobs. As Johndan Johnson-Eilola noted in 1996, technical communicators are no longer engaged in simply translating technical information for non-specialist audiences or supporting the product development and manufacturing sectors of corporations; rather, he continues, they are doing what Robert Reich calls "symbolic-analytic work" engaging in the "manipulation and abstraction of information" (Johnson-Eilola, 253). In such environments, Johnson-Eilola continues, technical communicators need the "ability to identify, circulate, abstract, and broker information" (255). In a similar vein, Corey Wick (2000) describes the work of technical communicators as "knowledge management," noting that practitioners have to "grasp the immeasurable complexities of knowledge, language, and communication" (524) and "facilitate cross-functional collaboration" (525), as well as serving as "expert communicators" (526).

Such works, while instructive on a general level, offer relatively abstract maps of technical communication as a field of practice; they do little, for instance, to identify the specific locations of technical communication work within a range of profit and not-for-profit workplaces; or to describe the specific documents, texts, objects, or discourses that occupy the attention of technical communicators. Such maps are also *future focused* in that they try to anticipate the skill sets and understandings emerging within a range of workplace contexts given larger social, cultural, and economic trends. Because of this perspective, they may be most valuable to academic teachers of technical communication who need to anticipate such trends, so they can shape curricula that will help students prepare themselves to meet needs of emerging work environments. These maps, however, may be of less pragmatic help to practicing technical communicators who *already* inhabit positions within the field, whose work is shaped by immediate demands of a specific industry, or whose efforts are shaped by the uneven nature of change in the large, varied, and far-reaching field of technical communication.

In addition, such maps of the field—which are predicated on a basic responsiveness to contemporary social, cultural, technological, and economic trends—become quickly outdated as these trends, themselves, change. Thus, they may be less useful in providing a stable description of the boundaries, objects of study, or identities of technical communication as a field.

Finally, *word maps* of technical communication as a field that focus on the skills and understandings that practitioners need suffer from the same shortcoming as the other word maps we have described—they do not take advantage of visual cues to represent the boundaries, objects of study, and identity of this growing and dynamic field

A Heuristic: Mapping Technical Communication with Text Clouds

The different *word* maps of technical communication that we have identified—those focused on the historical emergence of technical communication, on the objects of interest to technical communication researchers, and on the skills and understandings needed by technical communicators—all have significant limitations in terms of representing the entire field. So what other types of maps can technical communicators employ to provide a sense of the large, diverse, and dynamic arena of technical communication?

In recent years, one heuristic that technical communicators have come to rely on when they want to make sense of large amounts of information—especially when dealing with complex ideas and numerous documents and data that changes over time—is the use of *tag clouds* and the related variant of *text clouds*.

Tag clouds are most often used by web site designers or users to represent and navigate complex web sites and their contents (Nielson, 2007; Rivadeneira et al, 2007). Tag clouds are visual representations of words, typically a set of "tags" that describe different pieces of information contained in extensive web sites, databases, or blogs. The visual attributes of these words—size, weight, color, for example—are used to “represent features, such as the frequency of the associated terms” (Rivadeneira et al, 2007, p. 995).

Text clouds, which are related to tag clouds, are used not for navigating web sites or online databases, but, rather, as analytical, “text visualization” tools (Lamantia, 2007, “Text Clouds”; Rockwell, 2003). Text clouds can also be employed heuristically for tasks of comprehending or getting a sense of large or complicated sets of information. Text clouds are composed not of navigable tags, but, rather of words from a larger set of information or documents. These words are compiled, and represented graphically—in different sizes according to frequency of occurrence or differing font weights and colors to indicate frequency—in order to provide an overall sense of a text. In describing the value of text clouds, information designer Joe Lamantia (2007) notes,

> In the information saturated future (or the information saturated present), text clouds are the common executive summary on steroids and acid simultaneously; assembled with muscular syntactical and semantic processing, and fed to reading-fatigued post-literates as swirling blobs of giant words in wild colors, it consists of signifiers for reified concepts that tweak the eye-brain-language conduit directly.

Lamantia continues “Text clouds are meant to facilitate rapid understanding and comprehension of a body of words, links, phrases, etc. Any block of information composed of text is open to analysis as a text cloud” (Joe Lamantia, Joe Lamantia.com blog, comment posted 15 March 2007).

Text clouds, and their cousins tag clouds, can be understood as heuristics for reflecting on large data sets (Nielson, 2007, 4; Bateman et al, 2007). Daniel Steinbock, the inventor of TagCrowd (a free text cloud generating program) contends, “When we look at a text cloud, we see not only an informative, beautiful image that communicates much in a single glance, we see a whole new perspective on text.” Among other functions of text clouds, Steinbock notes that they provide “topic summaries” of a text, a means of “data mining” a corpus, and a tool for reflection (TagCrowd). Other researchers (Gomez-Perez, 2004; Bateman et al, 2007) have described how both simple and complexly rendered tag clouds and text clouds can be used for the purposes of reflecting on and representing textual data at various levels of granularity.

In the section that follows, we demonstrate how to use a text cloud as a heuristic to map the field of technical communication. Text clouds can help both entry-level technical communicators and technical communication students answer Amanda Metz Bemer’s question—“What is technical communication, anyway?”

Creating Text Clouds

A text cloud that serves as a useful map of technical communication as a field needs to meet three important criteria that we have identified in the preceding sections

- it needs to be flexible, adaptable, and rhetorically sensitive to different audiences—students of technical communication, experienced scholars and practitioners, the public and non-specialists—all of whom have different needs and purposes.
- it needs to be broad enough to identify both central and non-central areas and topics of interest; all of these topics make up the field.

- it needs to be concise enough to make immediate sense—on both visual and alphabetic dimensions.

The following steps will help you create such a text cloud:

1. Identify a focusing question or questions for the text-cloud (e.g., What are the boundaries/objects/identity of technical communication as a field?). Also articulate the rhetorical purpose, audience, and content for the cloud (e.g., What is the purpose of constructing this text cloud? Who is the audience? What documents will provide the content for the cloud?).
2. Identify and refine a document/data set appropriate to the rhetorical context.
3. Identify the consistent set of rules for structuring terms within the text cloud (e.g., using compound tags, the ordering of multi-word tags, the use of plurals).
4. Examine text clouds from different perspectives and adjust levels of detail.

An Extended Example

In the following sections, we provide an extended example of how to construct a text cloud that maps the *boundaries*, *objects/topics*, and *identities* of technical communication as a field. We also discuss the kind of social, analytical, and rhetorical work that text clouds can accomplish.

Step 1: Identify a focusing question or questions for the text-cloud and articulate the rhetorical context for the cloud.

The focusing question we will use for the extended example in this chapter is "What are the boundaries, objects, and identity of technical communication?"

It is important to acknowledge at the outset, however, that it is impossible to represent, in any summarized form, the *entire* field of technical communication—to represent all of the technical communicators who are practitioners, all the different kinds of businesses and organizations that employ technical communicators, all of the genres associated with the academic study technical communication, all the different ways of researching technical communication and its effectiveness. Nor is it possible to examine every practice involved in technical communication, every piece of technical communication produced in this country and others, the history of the field, or all of the research investigations that help comprise technical communication. Finally, any map of the field will necessarily be limited to the field as it exists at a specific time and place—it will provide a snapshot of technical communication, rather than a movie.

The next step of our process involves focusing more narrowly on the rhetorical context of the task. For our sample text-cloud exercise, we have identified the following context:

Purpose: To create a map of technical communication that provides an informed overview of the field's work and a general understanding of its contours, one that is both reasonably thorough and easily comprehended in terms of visual display and content.

Audiences: Scholars of technical communication (e.g., students and faculty in technical communication programs) and practicing technical communicators (e.g., workplace practitioners and researchers.

Step 2: Identify and refine a document/data set appropriate to the rhetorical context.

Creating a text cloud requires sampling key terms from a particular document set. For the purposes of our extended example, we have chosen to focus our sample text cloud on the research conducted in technical communication as published in two specific journals that report on research in the field: *IEEE Transactions on Professional Communication* and *Technical Communication Quarterly*. The general process we will use to construct a cloud is represented in Figure 1:

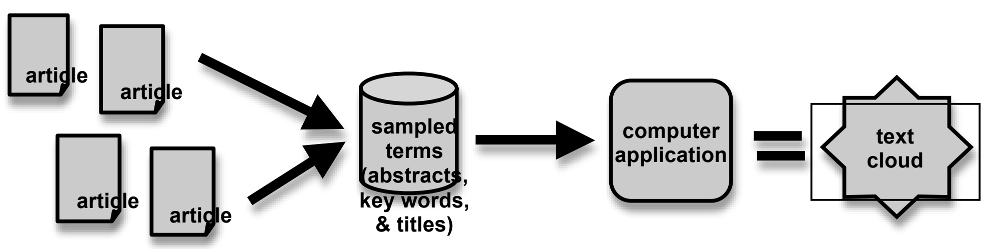

Figure 1. Process of creating a text cloud.

IEEE Transactions on Professional Communication focuses on research projects undertaken primarily by workplace practitioners and in workplace contexts. *Technical Communication Quarterly*, in contrast, while it, too, focuses on research about technical communication practices in the workplace, also features research undertaken by both academic scholars of technical communication and workplace practitioners.

Issues of both journals are accessible online from 1996 to 2006, which provides a ten-year window on research within the profession and on the practice of technical communication. In addition, both journals provide a short list of controlled indexing terms and subject terms for each article as well as an abstract. These last elements provide a ready source of text-cloud terms that can be adjusted for an appropriate level of granularity.

Because we want to focus on technical communication *practices* rather than *curricular and classroom issues*, we can refine this text-cloud exercise by eliminating articles in both journals which have a curricular or teaching focus. Once we eliminate such articles from our data set, we have a final of 168 articles for *IEEE Transactions on Professional Communication* (Volume 39, Issue 1 through Volume 49, Issue 4) and 116 articles for *Technical Communication Quarterly* (Volume 5, Issue 1 through Volume 15, Issue 4)—within a ten-year period.

Step 3: Identify a consistent set of rules for structuring terms within the text cloud.

The next step in the process of constructing a text cloud that can be used to map the *boundaries*, *objects*, and *identity* of technical communication involves identifying the consistent set of rules for structuring terms within the cloud.

Although the basic process is relatively simple, however, creating a *rhetorically useful* text cloud may well involve additional steps that involve some manual manipulation of data. Understanding text clouds as wholly generated by computers can mask a number of the issues involved in such a task, and much of the work that must be done to make text clouds useful to a particular audience.

Among the rules we have selected for our sample text cloud are the following:

- focus primarily on nouns and noun phrases (e.g., text, tagging, analysis). Eliminate most other parts of speech. TagCrowd (the open-access program we will use to generate the clouds in this chapter) can bet set to automatically exclude common words such as “a,” “the” “of.”
- exclude proper names of people.

- include words that directly modify nouns (e.g., *factor* analysis, *computer* tagging).
- manipulate word order (identifying subordinate and super ordinate, or parent, terms) and use hyphens to preserve semantic relationships. (e.g., text-computer-tagging-of, analysis-corpus, analysis-factor, analysis-textual.

Step 4: Examine text clouds from different perspectives and adjust levels of detail.

After the input data is structured, pragmatic rhetorical decisions will help an author determine the best perspectives and the optimal level of granularity for creating a text-cloud aimed at particular audiences. In the case of the current exercise, for example, the alphabetically arranged text cloud created from index terms, subject terms, and key words from article titles and abstracts from the 168 articles in *IEEE Transactions on Professional Communication* and the 116 articles for *Technical Communication Quarterly*—all published between 2006 and 1996—would include approximately 2240 hyphenated terms, depending, of course, on the designer/tagger and their rhetorical understanding of the task.

This enormous text cloud would be almost impossible to make sense of—readers would find it exceedingly difficult to use in getting an efficient cognitive overview of the field of technical communication, in reflecting on the field, or in constructing a collective social sense of the *boundaries*, *objects*, and *identity* of technical communication.

In trying to hone in on these rhetorical tasks, we can identify several additional strategies: examining text clouds at several levels of granularity; grouping related terms within brackets; designing smaller, more focused text clouds. Often these strategies will need to be applied in combination to create text clouds that are appropriate for a particular rhetorical purpose like the one we have identified in this chapter.

Controlling for the level of detail and granularity in a text cloud can help communicators determiner their size, and thus, their practical usability. To help in this task, most text-cloud generation applications allow communicators to determine a minimum and/or the maximum threshold for the number of terms within a cloud. In our current exercise—mapping the boundaries, objects of study, and identities of technical communication as a field—limiting the original text cloud to display only those words occurring at least 10 times (in lists of index terms, key word lists, titles, and abstracts) yields a smaller and more manageable text cloud of 134 words and variants as shown in Figure 2. This cloud, however, also has its limitations.

analysis(es)/analytical (44) author(ship) (11) automation (14) business (19) century (12) cognition(ve) (12) [cognition (10)] collaborate(ing)(tion)(ive) (19) communication (339) [communication (14) communication-business (22) communication-of-technical-information (36) communication-professional (92) communication-science (13) communication-technical (29)] communicator(s)-technical (26)] computer(s) (ing) (27) corporate(tion) (13) cultural(ism)/cross-cultural (48) data (45) database (18) design(ers) (58) discourse(s)/discursive (27) document(s) (32) documentation (43) [documentation (10) documentation-system (10)] (e-) electronic (26) [e-mail (email) (33) electronic-mail (18)] edit(ing) (ial) (ors) (19) employee(s) (er) (ment) (18) engineers(ing) (26) English (13) environment(s) (13) error (11) ethic(s)(al) (28) gender (14) genre (13) [global(ized)(ization) (11) group(s) (35) [groupware (18)] health (12) help (10) history(ical) (24) [history (12)] hiv/AIDS (12) human (43) human-factors (37) industry (10) information(83) [information-technology (13)] innovation (13) interaction(s)(ive) (15) interface(s) (23) [interfaces-user (19)] international(-) (19) internet (42) [internet (39)] knowledge (28) language (42) learner(s) (ing) (14) linguistics/lingual (11) management (25) manual(s) (20) [manuals-user (13)] media(um) (21) medicine(al) (23) message(s) (10) metaphor(ic) (10) method(s)(ology) (15) model(ing) (20) multimedia (10) online (16) organization (47) policy(ies) (10) presentation (46) [presentation-technical (41)] problem- (13) process(es) (ing)/procedure- (12) product (14) professional-

(19) [professional-aspects (10)] psychology(ical) (16) [psychology (10)] publishing (21) query- (11) read(er) (ing) (17) report (19) research (69) resource(s) (13) [resources-information (10)] rhetoric(s) (al) (ician) (69) [rhetoric (20)] science(ists)/scientific (49) [science (12)] socio(al) (ology) (52) software (32) study(ies) (19) system(s)- (62) [system-documentation (13)] task (10) team(s) (33) technology (24) tele- (work) (communication) (conferencing) (presence) (15) text (25) theory(etical) (ies) (40) translation (14) United-States (16) [United-States (14)] usability (20) user(s) (66) [user-interfaces (18) user-manuals (12)] values (12) virtual- (22) visual-(22) web- (42) web-sites (10) [women (female) (feminized) (20)] work(ing) (ers) (-place) (36) writer(s) (ing)(81) [writers-technical (10) writing-technical (18)]

Figure 2. Words and variants occurring 10 times or more in data set of index terms, key word lists, titles, and abstracts.

The resulting cloud, while arranged alphabetically remains relatively large, taking three pages to display. In addition, many of the important terms identified in the original cloud have been dropped altogether because they do not appear frequently enough or because they are not associated with a common **parent term** (a super ordinate term that serves to collect several items under one umbrella). For example, there are no entries for infrequently used terms like *cancer*, *Alzheimer's disease*, or *diabetes* because each one of these items appears only once in the original data set. Further, because two of these terms (e.g., *cancer*, *diabetes*) were used in the data set without being next to the word "disease," they were not linked to the parent word *disease* that could be used to collect several more specific terms under the umbrella of a generic term.

Our example text cloud remains difficult to read—hard to make sense of—not only because of its size (which is still rather large), but because it is structured almost exclusively by alphabetic order except for the terms within small black brackets that show frequent variations of terms. Although the alphabet provides a reliable way to locate individual words, it gives readers little help in identifying related words (e.g., *woman* and *female*) unless they occur next to each other in alphabetic order or they happen to share a similar root (e.g., *user* and *usability*).

To address these problems, we suggest experimenting with grouping related terms within brackets. A primary difficulty with text clouds—and most tag clouds, in addition—has to do with the challenge of grouping related terms that are not automatically placed in proximity by alphabetic ordering because they have a similar root word (Hassan-Montero & Herrero-Solana, 2006). Consider, for example, the terms in Figure 3: *curb-cuts*, *accessibility*, *Americans-with-Disabilities-Act* and *disabilities*. In an alphabetized and ungrouped text cloud, the terms would be separated, and, as a result, might be overlooked by readers as forming a semantically related cluster of terms. Grouping related terms using brackets allows readers to identify them with the parent term of *disability*.

Figure 3. Grouping related words within a text cloud using brackets.

Design smaller, more focused text clouds

In some situations, it may seem impossible to create a text cloud *small enough* to make sense to readers seeking an overview of the entire field of technical communication and, at the same time, *detailed enough* in terms of granularity to represent all of the important information. In such cases, communicators might consider designing several more focused text clouds that address particular kinds of information about the field (and are easier to read) rather than one large text cloud that represents all of the information (and are harder to read).

In Figure 4, for example, we have created a relatively small text cloud that focuses on **the boundaries of technical communication**, interpreting *boundaries*, in this particular case, in terms of geography and geographical borders. This approach results in text cloud offering both focus and detail, identifying all of the geographical locations—and the terms associated with geography—mentioned in the abstracts, titles, and indexed terms of *IEEE Transactions* on *Professional Communication and Technical Communication Quarterly* from 1996 to 2006.

Figure 4. Text cloud focusing on the geography of technical communication.

This text cloud also uses several kinds of brackets as indicated by the sample text in Figure 5. The larger black brackets are used to group terms that are topically related: in this case, terms associated with *globalization* and terms associated with *localization* are grouped together to indicate that they both relate to discussions of changing markets and trade, transportation systems, and communication patterns on a global scale. The smaller black brackets are then used to group terms that provide some detail and focus within this same discussion. For example, the term *global*, its variants, and associated hyphenated terms—used a total of eleven times in the data set—are contained within a set of smaller brackets. Smaller brackets are also used to group the term *local* and its variants, used a total of six times.

Figure 5. Sample bracketed clusters at several levels for a more focused text cloud.

It is important to point out that the focus, grain size, and bracketing of the text cloud represented in Figures 5 involves rhetorical decision-making about how to represent the field of technical communication. For example, we chose to group the terms *globalization*, *localization,* and *cross-cultural* to reference the profession's interest in changing markets and trade, transportation systems, and communication patterns on a global scale. We also chose to include terms associated with *language* and *language translation* as a way of acknowledging the field's attention to matters of language within the context of discussions about both globalization and localization.

A *focused* text cloud is not necessarily a *small* text cloud, however. Figure 6, for instance, represents a text cloud that has been focused on the objects and topics associated with technical communication—at least as indicated by the research contained within the pages of these two U.S. journals during the decade in question. This text cloud eliminates any parent terms that appear less than ten times. Further, although it includes some details in blue brackets, terms that appear less frequently are left out to keep the cloud to a manageable size.

[American (6) United-States (16) Europe(an) (6) Finland (4)] [century (12) 19th-century (4) 20th-century (3) history(ical) (24)] author(ship) (11) automation (14) [business (19) corporate(tion) (13) industry (10)] collaborate(ing)(tion)(ive) (19) [communication (339) [communication-business (22) communication-corporate (4)] communication-computer-mediated (8) communication-intercultural (6) communication-(of) technical-information (45) communication-organizational (7) communication-professional (92) communication-science (13) communication-technical (29) communicator(s)-technical (26)]] [[computer(s)/computing (27) computer-science-education (4)] digital (8) information-technology (13) [interface(s) (23) interfaces-user (19)] intranet (12) online (16) [system(s)- (62) system-documentation (13)] software (32) virtual-(22) [virtual-enterprises (4) virtual-team (5)] [internet (42) web- (42) web-sites (10) world-wide-web (8)]] [culture(al) (ism)/cross-cultural (48) international (19) intercultural (8) global(ization) (11) local(ized)-(6) translation (14) [translation-language (5)]] [data (45) [data-privacy (9) data-processing-business (6) data-processing (7)] database (18)] [design(ers)(58) graphic(s) (7) hyper(text) (media) (9) image (7) illustration (6) [media(um) (21) media-choice (4)] multimedia (10) photo(s)(graphy) (8) video (8) visual(22)]] [document(s) (32) documentation (43) [documentation (10) documentation-system (10)]] [(e-) electronic (26) [electronic-publishing (4)] e-mail (email) (33)] [edit(ing) (ial) (ors) (19) publishing (21)] query- (11) [employee(s) (er) (ment) (18) management (25) [management (5) management-human-resource (4) management-of-change (4)]] engineers(ing) (26) environment(s)(al) (13) error (11) ethic(s)(al) (28) [gender (14) women (female) (feminized) (20)] genre (13) [global(ized)(ization) (11) local(ized) (6)] [group(s) (35) groupware (18) team(s) (33) [team-working (7)]] [help (10) [help-systems (4) help-online (4)]] [human (43) human-factors (37)] [information(83)] innovation (13) [interaction(s) (ive) (15) interaction-human-computer (9)] [knowledge (28) [knowledge-management (6)]] [language (42) [languages-natural (4)] linguistics/lingual (11) discourse(s)/discursive (27) English (13) translation (14)] [learner(s) (ing) (14) education (7)] [manual(s)(20) [manuals-user (13)]] [medicine(al) (23) health (12) hiv/AIDS (12)] message(s) (10) metaphor(ic) (10) model(ing) (20)

[organization (47) [organization (7) organizational-aspects (8) organizational-structure (4)]] policy(ies) (10) [presentation (46) presentation-technical (41)] [problem (13) [problem-solving (4)]] [process(es) (ing)/procedure- (12)] product (14) [professional (19) [professional-aspects (10)]] [psychology(ical) (16) [psychology (10)] cognition(ve)(12)] [read(er)(ing) (17) [readers (4)]] [report (19) [report (6)] [research (69) method(s)(ology) (15) study(ies) (19)] [resource(s) (13) [resources-information (10)]] rhetoric(s)(al)(ician)(69) [rhetoric (20)] science (ists)/scientific (49) [socio(al)(ology)(52) [social-aspects (9) socio-economic-effects (5)]] task (10) [technology (24) tele-(work) (communication) (conferenceing) (presence) (15) [teleconferencing (5)]] text (25) [theory(etical) (ies) (40) [theory-media-richness (5)]] [usability (20) [usability (8) usability-testing (7)] user(s) (66) [user-interfaces (18) user-manuals (12)]] values (12) work(ing) (ers) (place) (36) [writer(s) (ing) (81) [writers-technical (10) writing-technical (18)]]

Figure 6. Text cloud showing the topics and objects that characterize the field of technical communication.

Readers will also note that the text cloud in Figure 6 adheres only loosely to an alphabetized order, giving priority, instead, to groupings of related terms. For instance, the detail of that larger text cloud, as indicated in Figure 7, shows that *business*, *corporate(tion)*, and *industry* are clustered together and bracketed because they all refer to the for-profit sector and workplaces—even though two of these terms [*corporate(tion)* and *industry*] would be separated by alphabetical order.

Figure 7. Bracketing related terms, resisting alphabetical ordering.

Structured in this way, the text cloud offers some recognizable focus on **the topics and objects of interest to technical communication scholars and practitioners**. On a very simple level, the cloud

- acknowledges the different terms—*professional communication*, *technical communication*, *business communication*—that seem to provide descriptive anchors for the field;
- identifies the range of activities undertaken by professionals within the field of technical communication, drawing readers' attention to clusters of activity around *computing*, *computer systems*, and the *internet*; *cross-cultural communication*; *data and databases*; *design work* in various *digital media*; *documentation*; *human factors*; *organizations*; *science*; *users and usability*; and *workplaces;*

- recognizes the major academic fields that inform the work of technical communication: *communication*, *information science* and *information technology*, *business* and *management*, *language* and *linguistics*, *engineering*, *medicine, psychology* and *sociology;*
- acknowledges technical communication's focus on social/cultural issues by pointing to the prevalence of terms like *ethics*, *gender*, *language and discourse*, *health*, *psychology* and *psychological*, *rhetoric*, *sociology*, among others;
- recognizes ways of working within the field of technical communication, emphasizing *collaboration, groups, and teamwork*; *email communication*, *editing and publishing*, *groups* and *teamwork*, *tele-work*, *tele-communication*, *tele-conferencing*, *tele-presence*; *research methods* and *studies*, *writing* and *technical writing,* among others.

We can undertake a similar exercise by creating a text cloud focused on the **identity technical communication as a field by focusing on terms used to name or refer to the field**. This cloud (Figure 8) uses two levels of brackets to group terms. To make the cloud smaller and more focused, the smaller black brackets contain terms used four or more times in association with the parent terms. Less-frequently-used terms are left out of the brackets to keep the cloud focused.

[communication (339) communication–technical (29) communication–technical–information (45) communicator(s)–technical (26)| communication–organizational (7) communication–professional (92) communication–business (22)]

[design(ers) (58) (7) [visual (22) image (7) illustration (6) graphic(s)] [media(–) (um) (21) media–choice (4)] multimedia (10) photo(s) (graphy) (8) video (8) hyper(text) (media) (9)] information (83) presentation–technical (41) [knowledge (28) [knowledge–management (6)]] publishing (21) read(er) (ing) (17) [professional (19) [professional (4) professional–aspects (10)]] rhetoric(s)(al) (ician)(69) technology [(24) tele–(work) (communication) (conferenceing) (presence) (15) [teleconferencing (5)]] work(ing) (ers) (36) [writer(s) (ing)(81) [writers–technical (10) writing–technical (18)] edit(ing) (ial) (ors) (19)[editing–technical (4)]

Figure 8. Text cloud focusing on identity terms for technical communication as a field.

Focused in this way, the text cloud offers some perspective on the identity terms used by practitioner/researchers:

- acknowledging that the conventional terms used to refer to the field focus around the key terms of **communication** (technical communication and communication of technical information, professional communication, organizational communication, business communication) and **writing** (technical writing, editing, technical editing);
- recognizing the crucial role that the production, analysis, and exchange of **information** and **knowledge** play; technical communicators are information workers and knowledge workers;
- identifying a strong emerging focus around communication in different **media** and using different modalities of expression, as demonstrated by the cluster of terms around design, visual, illustration, graphics, media, media choice, multimedia, photography, video, and hypertext;

- acknowledging a focus on technical communication/technical writing as a **profession** whose **work** often takes place in digital environments (tele-work, telecommunication, tele-conferencing) and engage in specialized labor (technical communication, technical writing, design);
- recognizing the strong influence exerted by the academic field of **rhetoric** and the cultural/social/economic focus on **technology** (technical communication, technical presentation, technical writing) on the identity of the field.

By Way of Concluding, But Not Finishing

Technical communication scholars and practitioners, as contemporary "knowledge workers," Susan Havre et al (2002) points out, "must make sense of huge amounts of unstructured textual data." One valuable heuristic for making sense of these large data sets involves, "exploring multiple visual presentations, or visualizations of the data," each version of which may well "lead to important insights and/or a better global understanding of the collection" (p. 1077).

The goal of this chapter has been to examine the usefulness of text clouds as mapping heuristics that will help technical communicators represent their professional field—its boundaries, objects of study, and identity—to themselves and to others. Such clouds, as Mogens Nielson notes, allow users to "quickly and intuitively get an overview of the most used tags in a tag space." This kind of representation functions "like a satellite image of an area" (Nielson, 2007, 7) to provide a particular perspectives on the field and offer what Keng Siau and Tan Xin call a visual "frame of reference" (Siau & Tan, 2005, 275).

Text clouds, as we have also tried to demonstrate, can be understood as *analytic tools*, as well. They are generated, as Geoffrey Rockwell (2003) notes, by the "processes of taking information apart and putting it back together into new configurations for the purposes of reflection and discovery" (213).

The visual dimensions that text clouds offer (e.g., color, size, font, bracketing and grouping), may allow technical communicators to convey information efficiently and effectively to readers, in ways that differ from the conventional uses of text in summaries, reviews, reports, and similar documents—thus, extending the landscape for rhetorical effectiveness.

Discussion Questions

1. What ways could you use text clouds to make sense of the large sets of textual data you produce?
2. How might color be used in text clouds to provide an additional dimension for analysis and representation?
3. Are text clouds, themselves, rhetorical arguments for a particular interpretation of a data set? Please explain your answer.
4. What procedural step of creating a text cloud, as described in this article, was the most difficult for you to follow? Please explain why.
5. What percentage of the meaning of a text cloud is carried by visual cues (size, weight, color, number of occurrences)? What percentage by the words themselves? Please explain your estimation.
6. What is your own best learning style? Do you learn best through images? Printed words? Aural sources? Please explain your answer.

7. What is rhetorical effectiveness?

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Chapter 2: What Are the Work Processes of Technical Communication?

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Summary

The goal of this chapter is to provide an overview of the work practices of contemporary technical communicators for those planning a career in this area. Three major work patterns are highlighted that are characteristic of technical communication today: information design, user advocacy, content & community management. The chapter draws from the research literature in the field to reveal trends that contribute to the growing responsibility of technical communicators in knowledge-intensive organizations. These trends are made concrete in a story about one particular technical communicator, Elena, and are rendered as learning goals in a series of recommendations about how one might build knowledge, skills, and attitudes necessary for leadership in the field of technical communication.

Introduction

Elena[1] is a technical writer, or at least that's how she thinks of herself. But in truth she doesn't do much of what she, or anyone else for that matter, would call 'writing' these days. She has had several actual job titles in the last few years: Information Developer, a title meant to equate her role on product development teams in the technology company she worked for with software developers, Digital Content Analyst, and lately Senior Information Designer. That last

[1] Elena is not a real person. She is a composite character whose job titles and work processes are borrowed from several real people.

one is also her current title with the documentation contracting services firm she works for most often: Great Lakes Information Solutions (GLIS). GLIS finds Elena contract work with clients who need help with a variety of writing, editing, information design, content management, and electronic publishing problems. In exchange, they take a cut of the client fee.

This week Elena needs to bill hours on four projects for three different clients. Three of those projects are clients of GLIS; the fourth is a project for her former employer, an information services company for which she used to work as an in-house employee, but after a layoff now works with on a contract basis doing projects a lot like the ones she used to do when she was a Digital Content Analyst there. She gets paid more than she used to for this work, but she also has to pay for her own health insurance and fund her own retirement account. GLIS makes this a bit easier than it might be, though, by providing its stable of contract workers access to group policies and financial planning services.

[Advance Organizer] Changing Patterns of Work in Technical Communication

During the rise of technical communication as a career category in the U.S. industrial economy, the work of technical communicators had been difficult to evaluate in explicit terms because it had been seen as ancillary to the production of manufactured goods and, as Faber (2002) and others note, disconnected from the service-oriented economy of the professions. But the work of technical communicators today is more readily visible and vital to the core mission and the bottom line of organizations of all types.

Three overall patterns of work emerge from research in technical and organizational communication that speak to the activities, responsibilities and skills of technical communicators at the beginning of the 21st century. This chapter presents three corresponding sections that summarize research on the core issues of each work pattern and alert you to questions and tensions, highlight key processes & skills, and finally present strategies that you can implement drawn from the implications of the available research. The three patterns, in brief, are:

> *Pattern 1: How Do Technical Communicators Work as Information Designers?*
>
> This section examines what it means to do the work of creating information that no longer stays neatly within the boundaries of a single genre or even a single medium, but must be published in multiple formats for multiple audiences.
>
> *Pattern 2: How Do Technical Communicators Work as User Advocates?*
>
> This section traces the work of usability and user-centered design, demonstrating how the contributions technical communicators make to product development can positively influence all aspects of the user experience
>
> *Pattern 3: How Do Technical Communicators as Stewards of Writing Activity in Organizations?*
>
> This section follows the changing role of technical communicators in organizations where most workers and, often, customers and users are writing and creating content. Technical communicators' expertise helps to ensure that organizations support content development as a vital component to the organization's success, much like scientists ensure that pharmaceutical companies do good science.

As we might expect, there is considerable overlap among these three patterns of work when they are considered in light of the careers, projects, and even the day-to-day routines of technical communicators. So from the outset, it might be best to think of these areas as regions in a Venn diagram.

[literature review] Pattern I: Technical Communicators Work as Information Designers

Technical *writing* – even when we limit what we mean by writing to the things that go into making traditional print texts - is not what it used to be. And, of course, we can no longer limit technical writing in this way. This is why we use the term technical *communication*: technical communicators make videos, diagrams, websites, and many other types of resources. And they must often create the material for all of these formats at once so that they can be delivered, on demand and simultaneously, ideally derived from a single source.

What the research says: technical communicators work to coordinate & transform information

A 2007 special issue of the *Technical Communication Quarterly* was dedicated to research on the ways technical communicators are dealing with the circumstances of something the editor of that issue called “distributed work.” At the organizational level, the term “distributed work” refers to the way individuals and teams often work at different times, from different locations, and across a variety of technological platforms and systems. But Spinuzzi (2007), in the introduction to the special issue, suggests a definition of the term that applies in a more precise way for technical communicators. He notes that distributed work describes both the means and ends of technical communication in that the work is “coordinative” in nature so that it may enable the required “transformations of information and texts” required (266). If this sounds like technical communicators don't merely make texts from scratch, but instead manipulate many existing texts, images, and fragments of information in order to make new ones…then you are starting to get the picture.

Johnson-Eilola was among the first to sketch such a picture of the writing work that technical communicators do in scenes of distributed work. Writing around the same time that most people were becoming acquainted with the World Wide Web for the first time, Johnson-Eilola (1996) borrowed a category from Reich (1991) to characterize the nature of technical communication as "symbolic-analytic work." Symbolic-analysts, to put it simply, solve problems with information, texts, and images. They find, arrange, synthesize, and transform existing texts to meet the needs of diverse users and to address new challenges. As Spinuzzi suggests, the primary act is one of *coordination*, though Johnson-Eilola warns that this should not be understood to be devoid of significant inventional (i.e. knowledge-making) responsibility. Why? Because coordination is merely the means by which technical communicators work. *Transformation* is the end goal. Making something new and adding value are the hallmarks of distributed work in technical communication.

Before we take up the question of what the coordinative, transformational work of technical communicators look like up close, I want to point to one more key trend that is implied by the concept of "distributed work." Technical communicators' work is almost entirely conducted in and dependent upon digital environments: content repositories, text and image authoring suites, social and professional networking sites, mobile devices. If there was ever an image of a technical communicator at work in an office cubicle, at a desk in front of a monitor, an updated version of that image still likely has the monitor – but likely more than one display, no doubt with a content-management system repository in an active window – and just as likely shows the worker at home or in a coffee shop. Technical communicators' scenes of work may reflect economic shifts in the way they are employed – more often, these days, as contractors as in-house employees – but they also reflect the fluidity and mobility required to do coordinative work. A key skill, as we will see, is understanding how information can *move* and how it should transform when it moves from one system to another, from one user group to another, and even from one culture to another.

What the research says: Processes of coordination and transformation

Among the more vivid and detailed portrayals of the moment-to-moment and day-to-day work of technical communicators today is offered by Slattery (2007) who studied writers working for a technical documentation services company that contracts with client organizations in a variety of industry segments such as software/IT and pharmaceuticals. Slattery used screen capture software to record five Senior Technical Writers' work and then conducted a series of follow-up interviews in which the writers watched replays of segments of work. Much like athletes asked to comment on replays of key segments of a sporting event, Slattery had writers go back and analyze the moves they were making. He concludes, among other things, that the documentation they were asked to produce "was not so much written as assembled—a pastiche of contributions from multiple individuals (and sometimes the technologies themselves) over the duration of a project" (315). Close up, this work can seem as intimidating as it seems strange when the image one has of "writing" consists of a single writer working with a single, coherent text.

To generate these kinds of close-up images, Slattery analyzed the screen capture playback in very small segments of time (seconds, rather than minutes), counting the numbers of texts in play and in focus during a particular writing or editing task. The patterns that emerge from this type of detailed analysis are striking. The writers were using multiple texts as sources, creating multiple texts at one time, and actively managing the links among many, many documents as a routine way of achieving what, at first glance, appeared to be relatively straightforward writing goals. Slattery explains

> In his one-hour session of drafting a new technical document, Doug used 11 different documents across six software programs and one printout. Dirk used 20 documents across 15 programs in an hour and a half while revising a draft. And as Parker updated help files based on e-mail prompts, she used 37 documents across six programs in just under an hour (318).

Slattery gives the skill required to do this kind of work a name: textual coordination. And in an earlier article (2005), he argues that the need for technical communicators to develop this skill goes beyond the practical hurdles associated with the disparate and ever-changing set of software tools and systems that writers must adapt to. Textual coordination, for Slattery, also involves the expertise required to identify, select, stage, and then re-combine bits of existing texts in order to form new ones (2007, p. 318).

An equally rich and fascinating portrait of the transformational aim of, in this case a designer of digital media, emerges in a case study by Graham & Whalen (2008). Graham, the researcher, shadowed and interviewed Whalen, the website designer, as he worked on a number of different client projects. One highlighted project is for a manufacturer of bar code scanners for whom Whalen creates an E-greeting card using Flash that recipients can play like a game. Whalen's design of that project, according to the published account, is a series of one transformation after another as he takes familiar elements from the two dominant communication genres (greeting cards and online games) and from the company's corporate identity and marketing materials (bar codes, scanner images) and combines these into an interactive experience for users intended to carry a positive corporate message, boost the company's reputation, and thank customers. Whalen had multiple audiences, purposes, and contexts to consider, and he also had to deal with multiple modalities (visual/textual), media (Flash animation, static web sites), and genres (greeting cards, e-cards, games).

The conventions and constraints of the latter set of variables help to define what **can** be done, while the needs and desires of users and clients as represented in the first set of variables define what should be done. Graham & Whalen suggest that it is the job of the professional communicator to make these two ends meet, and to solve all the small problems that arise along the way (p.86). They tell one especially interesting story to illustrate how the choice to go with a shooting gallery motif for the game, with users scanning UPC-coded items rather than firing at them, leaves Whalen little room to visually incorporate holiday-themed content in the main interaction of the game. But Whalen solves this problem by introducing humorous characters that represent "false targets" for the player. They, like UPC bar codes, are black and white striped and appear as characters with subtle holiday visual cues: sports referees in Santa hats, white tigers with reindeer antlers, etc. One of these characters – a Zebra – was not included in the final design because a partner company of the client had a Zebra as part of its corporate branding and so they did not want to portray a Zebra as a bad guy in the game.

Graham & Whalen's illustration of the ways audiences, contexts, and purposes interact with modes, media, and genres helps to show just how complex the coordinative work of new media design can be given its transformational aims. And what seems to be true for both Whalen and for the Senior Technical Writers that Slattery studied is that, despite the complexity of distributed work, there can be order amidst the apparent chaos. In the next section, we will consider some strategies you can use as you learn to make texts that transform.

Pattern II: Technical Communicators Work as User Advocates

"Know your audience." It is perhaps the oldest rule in the book when it comes to being a good writer in just about any genre. In technical communication, it is a mantra. When you are creating information meant to guide someone else through a task, for instance, there is just no substitute for being in the shoes of the user. Or, at least, as close to that as one can manage with careful inquiry, observation, and interaction with real users.

But sometimes for technical communicators, the rule might more accurately be phrased this way: "No, your audience." That is, not only must the technical communicator lead the research effort to learn about users, they must also represent the knowledge gained about users – their goals, their needs, their preferences – in the design process as well. The results of audience analysis become, in these moments, the evidence required to make good decisions in a user-centered design (UCD) process. But if UCD is something nearly all development teams subscribe to in principle, in practice this way of working requires the users interests to come first, ahead of those of developers, at least equal to those of clients paying the bill, etc. Hence: "No, your audience" is a phrase that represents what technical communicators must do to keep user interests at the forefront of decision-making.

What the research says: Usable + Useful + Compelling

One of the more interesting things that has happened to change the way technical communicators work has to do with the way the same technologies that had been used almost exclusively by experts in work settings – computers, hand-held devices, etc. – are now used by just about everybody in all kinds of contexts. Such a shift dramatically changes the conditions under which a user might find a piece of software and the information meant to guide action "usable." Mirel (2004) suggests that due to this kind of shift, even in work settings where problems are complex, "usable" is just not good enough. Systems must be use*ful*. Usable is a minimal requirement: necessary, but insufficient. Useful is a higher bar, and the one that users who have choices will demand.

But if Mirel's research on users whose work involved complex problem solving was instrumental in emphasizing the goal of designing useful systems, then the vast number of users engaged in activity that is equally complex and not necessarily related to work promises to make useful, itself, a minimal requirement in favor of a yet higher bar: *compelling*.

Sun (2004) produced a detailed account of users whose interactions with technology help to illustrate what lies beyond the goal of designing usable products with her comparative study of Chinese and American mobile phone text-messaging users. In the first phase of her study, Sun asked groups of young, urban students and early-career professionals to complete questionnaires and detailed use diaries, including a log of all the SMS messages sent and received over the course of a given period. She then analyzed both the content and the patterns of messaging to determine what these users were texting about and where and when they were texting. The results were eye opening.

Among the more surprising findings, Sun's study revealed that both the Chinese and American users were willing to put up with what, in both cultures, amounted to a cumbersome interface for text entry in order to take advantage of what she calls the "social affordances" of SMS message: unobtrusive, even covert, messaging, the ability to maintain social contact with friends and family despite a hectic schedule, etc. In short, usefulness trumped usability (p.473-4). Sun calls this phenomenon the “triumph of users;” users are shown in her detailed profiles of use to make adaptations to the design of the system, as a whole, that ultimately make it work to meet their needs. But they do this in ways that are extremely, even radically “local,” according to Sun (p.476). Each instance of use has “a local purpose and a social motive” (473). When the two are aligned, the user interaction tended to go smoothly. But users’ social motives were stronger than their immediate purpose. Or, to put that another way, users were not especially tied to the ways they communicated at the level of their phone handsets, their calling plans, or their carriers. They would and frequently did change any or all of those things to achieve their desired ends, even if this meant enduring what in many cases seemed like usability problems.

So what do Sun’s results mean for designers of systems? And for technical communicators? Again, the implications are radical. One is that design teams should not try to solve all the usability problems with a given system before it ships. Sun’s work shows that this is not only impossible to do, but also that it is not always necessary for a product to succeed. A second implication, though, brings technical communicators into the discussion of how design for users should proceed: users will work to localize your product post-adoption, and will help you improve it if you can find ways to listen carefully to them. Open a channel and you can involve users directly in the long-term success of a design (p. 478).

What the research says: User Advocacy Begins with Processes of Paying Attention

As researchers in technical communication began to explore the ways documents got used in workplace settings – their goal being, initially, to help students better understand how to write in these settings – the recommendations that followed from these studies took an interesting turn. They came back saying that writers, themselves, should consider similar investigations as part of their work. They should be researchers in addition to being writers. And where workers were already “writing” as part of their work, technical communicators might be researchers *instead of* being writers. Beverly

One of the most interesting places to see the ways that a technical communicator working primarily as a researcher might make a significant impact is in the area known as risk communication. Risk communication, generally, deals with the ways information in a variety of forms is deployed to mitigate negative consequences ranging from immediate physical danger to financial risk. Researchers in risk communication tend to examine moments when existing communication methods fail, hoping to discover ways to correct for similar problems in the future. Beverly Sauer’s (1998) research on risk communication in the mining industry is one example within technical communication of work that, in the end, prescribes new roles for technical communicators. Sauer writes about the gap that emerges between safety regulations meant to govern the behavior of miners and the actions of miners that, in post-accident reports and depositions, seem to conflict. One conclusion is that miners get hurt or killed because they fail to follow the rules as written.

But Sauer’s research shows that from the miners’ point of view, the written rules are inadequate and literally inaccessible during the moments when workers need to make a critical decision. There is literally no way, in some of the most high-stakes situations, for a text to adequately convey what miners need to know to avert disaster. So how does it happen that tragedies are, in fact, avoided? Sauer used documentary evidence that included in-depth post-incident interviews and depositions with miners to reveal that some of them use sensory information – what the miners' call "pit sense" – to avoid injury or death during catastrophic events such as collapses. But official reports that Sauer examined of accidents rarely acknowledge pit sense and, in fact, contradictory to findings from interviews, concluded that mine collapses were entirely unpredictable (p. 157). How could this be?

Sauer's point is a subtle, but important one for technical communicators to understand. Sauer argues that the official reports assume a false model of how safety information should circulate among mining company administrators, regulators, and mine workers. That model suggests that the information miners need to be safe can be determined ahead of a disaster and communicated effectively in writing. And if that model is the only one, then it truly does seem that certain kinds of catastrophic events are completely unpredictable and, therefore, avoidable.

Sauer's investigation suggests otherwise, however. She suggests that the model of how safety information originates and circulates that the official reports assume is wrong. Some safety information - perhaps the most critical kind of information needed in the dynamic environment of a pending collapse, for instance – cannot be known in full ahead of time. That information originates with miners in the pit. Safety instructions follow after that – sometimes in time to save lives in an emerging disaster, and others only for "next time" (p. 159).

So what are the implications for the role of the technical communicator in this type of situation? If we assume that the technical communicator is the person whose job is to write safety regulations – a fairly traditional role – then the implications are profound indeed. What is missing, according to Sauer's revised model, is the ability to listen in a timely way and facilitate the spread of knowledge that originates, quite literally, in the body of an individual miner so that others can use it. A whole new mandate with a familiar ring to it: know your audience.

Pattern III: Technical Communicators Work as Stewards of Writing Activity in Organizations

Single source publishing, distributed production and even user-generated content: these trends accompany a broader shift in North America toward an information economy. As I noted in the opening paragraph of this chapter, this shift is potentially positive for technical communicators because, to adopt the language of economics, it moves technical communicators' work higher up the value chain. But what, exactly, does this mean? Simply put, it means that the most valuable thing that organizations produce, today, is information. And to the degree that the value of information is directly influenced by how it can be understood and used by others, then the core expertise of technical communicators is potentially very much involved in creating and maintaining that value.

This shift to information as a valuable commodity is easiest to see and understand in companies that sell information, or access to information, as their primary product. Google is one obvious example of this sort of company; they make money primarily by providing a variety of services to web users and charging other companies to place ads in the views that users access to use those services. Clearly, the value proposition for users of Google's search service lies in how it helps them find information.

But the shift that moves technical communicators up the value chain is not limited to companies that sell information directly. Even in the manufacture of traditional goods, it is often the information produced about and along with a product that is the most valuable commodity. It was not always so. A manufacturer of washing machines, for example, used to make most of their money from selling the machine. The information that went along with it – the operators manual, the repair manual, the design specifications – those were necessary, but largely non-revenue generating by-products. Today, manufactures operate in a very different kind of environment that is global in scale and densely networked. And we must think, here, of both transportation and information networks.

What this means is that for, say, the maker of medical devices, there is no longer as much value in manufacturing the plastic housing or even the silicon chipset that go into the devices, at least not in North America. These operations are lower in the value chain than the design of the devices, a process that not only involves engineering but also clinical testing to ensure that they do what they are intended to do. The company that can produce the information needed by others to market the device as effective and to manufacture the components offshore in labor markets where it is still profitable to do so is likely to sit highest in the value chain. They likely also own the brand that will go on the finish product.

What this all means is that companies move up the value chain and stay near the top to the degree that they can produce useful, reliable, high-quality information that can be understood and used by others. It also means that it is no longer possible for technical communicators to be the only ones doing the 'writing' – and here we would need to consider a broad definition of the term that can encompass the types of information and genres that an organization might produce. No, everybody in the information economy writes or contributes to an organization that must write, and write well, to stay competitive and/or fulfill its goals.

What the research says: Writing specialists, including technical communicators, move into facilitative roles in the information economy

While initially, there was a considerable amount of concern if not outright fear in the technical communication community about the shifts mentioned above and what they were doing to endanger the prospects for writing specialists, today there is less worry. Michael Albers wrote an article published in Technical Communication Quarterly in 2000 that many regarded with trepidation because it foretold significant changes in the responsibilities of technical editors. To be fair, Albers' own view was not a pessimistic one. In retrospect, we can say that he saw the importance of an editor's expertise growing as the possibilities for distributing content creation to more people grew. Writing specialists – those trained in making texts coherent and usable by their intended audiences – would move, we might say, a little higher up the value chain as more subject matter experts (SMEs) contributed content to repositories from which finished texts could be dynamically assembled. But Albers knew that this message would be unsettling to many who still held a fairly traditional view of editing that involved technical communicators maintaining ownership over a single, coherent document. That, he predicted, would all but go away (p.203).

Ten years later, we can say that Albers was right. Today it is increasingly unusual for any enterprise – even small ones – to create and maintain at least some of the information they produce outside of some type of content management system (CMS). For many organizations, a CMS is the way they manage their web site. And for companies that publish information in print or online that they sell or provide as a service, a CMS is likely a critical part of production and quality control. Two key reasons organizations choose to adopt a CMS are to involve more people in producing content and to reuse more of that content whenever possible (Hart-Davidson, 2010). Both of these trends, moreover, tend to cause corresponding shifts in the role that technical communicators play in organizations.

The more expertise they have about how to organize writing processes, and about concepts such as how genres work, the less likely they are to spend their time actually writing.

The more experienced and senior they become, the more likely they are to adopt roles as managers; managers of content, yes, but also managers of people. In a more recent article published in Technical Communication, Albers (2003) updated his vision of the career track of the technical communicator in light of developments in the world of CMS and single sourcing. There, he noted that the image of the technical writer controlling all the details of a document from start to finish – from initial outlining to drafting to revising and editing – belonged to a "craftsman" model of document production that was difficult and, in any case, unproductive to sustain in single-sourcing environments (337). As a result, tasks we once associated with technical communicators exclusively such as "writing" and "designing and manipulating graphic displays of information" belong now only to junior-level technical communicators. Senior level technical communicators are decision makers, who spend their time defining high-level requirements for a range of information products and training others to produce the content for those products.

It is not that writing has gone away. Nor is it the case that technical communicators are not involved with writing. It is, rather, that the whole organization must write, and write well. And the charge of the senior technical communicator is to look after the quality of writing at an organizational level and to see that it is constantly improving.

What the research says: Writing specialists must be stewards of writing activity in organizations

We are only just beginning to see research on the ways technical communicators can help whole organizations to transform their writing and communication practices for the better (see, e.g., Hart-Davidson, et. al. 2008). But we do have a rich body of work from researchers who examine communication practices at an organizational level with an eye towards improving the way these organizations function by improving the way they write, together[2]. Two well-known researchers in this area are JoAnne Yates & Wanda Orlikowski. They publish independently as well as together, but when they collaborate, they produce studies that are particularly valuable for the way they reveal how organizations work, or fail to work well, as a function of how well they communicate.

In one such study, for example, Kellog, Orlikowski, & Yates (2006) examined a category of activity they called "boundary crossing" a key factor in the success of businesses that must regularly coordinate their own activity (and interests) with those of other business in order to succeed. They learned that successful boundary crossing involves coordination at two levels. The first level is strategic and involves sharing knowledge and establishing common ground. The second level is more directly communicative and involves the use of specific methods for "boundary spanning" such as shared "routines, languages, stories, repositories, and models" (p. 24). By carefully observing the project work of a corporate web development firm known as "Adweb" in their study, Kellog et. al. discovered an interesting and useful pattern. In order to keep members of their own firm and representatives of client firms up to date and engaged amidst a constantly changing environment, Adweb had developed three strategies (in original italics, below) that the researchers call our attention to:

> Adweb members *displayed* work across boundaries (i.e., they made their work visible and accessible to other communities), they *represented* work across

[2] I can't review all of that valuable work here, but I recommend that readers see especially the full-length works by Cross, Smart, Winsor, Spinuzzi, Grabill, and Simmons to name just a few. Also see the outstanding collection edited by Zachry & Thralls.

> boundaries (i.e., they expressed their work in a form that was legible to other communities), and they *assembled* their separate contributions across boundaries into an emerging collage of diverse elements (i.e., they reused, revised, and aligned their work over time so as to keep it dynamically connected across multiple communities) (p. 28).

Displaying, representing, and assembling are, for Kellog & her colleagues, categories of communication practices. Over time, members of the organization learn to do them in conjunction with one another, as a matter of routine, creating an overall structure for coordinating (and boundary crossing) that the researchers call a "trading zone." Borrowing the concept from another researcher, Kellog et. al. find the concept of a trading zone to be useful because it emphasizes two key aspects of boundary crossing: 1) exchange and 2) transformation. Exchanges happen when information passes from one person to another, from one group to another, or from one document to another. Transformation is a frequent result and sometimes a necessary pre-condition for exchange. In order for someone (or some thing) on one side of the exchange to understand what is being passed, the information must itself be transformed (p. 39).

By now, you should be hearing something familiar. That the essential moves or basic particles of the information economy – the atoms that make up organizational work, if you will – are acts of coordination and transformation. You might recall from the discussion of the first Work Pattern, earlier in this chapter, that these are also the fundamental moves that make up the work of technical communicators, according to some researchers. Technical communicators are, it seems, traders in the trading zone. Or, as Albers might point out, junior technical communicators are. Senior technical communicators are those involved in creating the conditions for the trading zone to function and, over time, to improve those conditions so that it functions optimally.

Practice Information Design, User Advocacy, Content & Community Management

In this final section of the chapter, I will try to put all three patterns together in a way that helps those preparing for a career what it might be like to work as a technical communicator. We'll return to our fictional character Elena first, to see how she shifts among the three work patterns discussed above, and also shifts roles, tasks, projects and teams in the course of her everyday routine. After Elena's story, there are some things you can work on to perfect your practice in all three of the work patterns.

Elena's Story: Life as a Technical Communicator Today

> Elena is spending the morning doing the kind of work she finds it nearly impossible to explain to her friends and family when they ask her about projects she is working on. Her computer screen is full of windows, and there are many more minimized in her task bar. It looks chaotic, but she has a system. She is flagging terms in a large repository of text and image files that make up the source for a number of technical manuals. Two of the manuals can be viewed in a format that non-specialists would recognize as a manual, though neither is printed. A third and much larger "manual" is really, at this point, just a collection of marked up text files – nearly 10,000 of them in all – that have no information model or style information that brings them together into a coherent whole. The other two manuals consist of a subset of these same files, but

because there are style sheets already created, she can use a browsing tool to render them rather than reading them in her integrated development environment (IDE). The ability to do that makes it a little easier to find terms that need to be added to the controlled vocabulary for the repository – a kind of glossary, she would tell you if you looked puzzled – because she can see more of the context in which a reader might encounter the term. To flag terms that either need a new definition or may need a revision, Elena moves back and forth between reading the rendered version of one of the manuals, creating links in the corresponding text files in the IDE, and adding the terms to a work list she has created as a separate file. Later she will send break that file into separate lists of terms to send to her Subject Matter Experts who will write and/or revise the definitions.

All three manuals contain technical information for medical devices. The client designs and markets these devices in the U.S. and the E.U., but uses a network of manufacturers in Asia who produce hardware, components, and firmware for the devices. The technical manuals that Elena is working on are used by these manufacturers, and, occasionally, by other companies who create add-on devices, replacement parts, or other consumable supplies that users of the devices need. The manuals are published in three languages: English, German, and Korea. In the next release, a fourth will be added: Mandarin. Roughly two thirds of the source text is originally produced in German, as the client is headquartered there, the rest is produced in English. Elena works with English text only – much of it translated from the original German – but she also does some work to prepare the English versions for translation to Korean and Mandarin, mostly smoothing out syntax in English into a straightforward Subject-Verb-Object pattern so that the translators have short, clear phrases to begin with. This service is a value-added option that this particular client is trying out for the first time, so her "agent" at GLIS has asked her to give it special emphasis. They hope to sell this service to the same client for other projects they are bidding.

Elena is mentally rehearsing what she will say in the design team meeting that starts in a few minutes. She will take the meeting on the phone. The rest of her team is on the other side of the continent, three time zones away. She and one other person on the team, the user-interface designer, have been texting back and forth all morning in preparation for what they both anticipate will be a contentious discussion, if not a honest-to-goodness fight.

At issue in the design meeting will be her recommendation for changing the design of a software product used by medical technicians to prevent a common transcription error that occurs due to the way the modal interface design causes users to switch between screens. To find the information they need, users need to be in search mode, but to enter a new value, they have to switch away from search results to enter data in diagnostic mode. Elena and the UI designer, Chad, will be arguing for a dashboard view that eliminates the modes and allows users to find and enter information without changing views. This, they will say, will avoid a lot of errors. Elena will point out that it will also save them the cost of developing help and training information meant to guide users around this problem and to fix errors in patient records that result from it.

This is not a new idea, or a new problem. But if the past is any indication, the product manager will resist the suggested change because it involves significant changes to the existing codebase and, therefore, significant cost. The software developers will likely agree – at least one of the people who will be on the call is the same person who, the last time the issue came up, insisted that this problem was with "stupid users" rather than with the design of the product. Chad pointed out at that time that modal interfaces, wherever they show up, cause problems like this because they make people adapt to what were, at the time, the processing constraints of the machine. These constraints no longer exist as practical matters of processing or memory now, of course, but they remain in the codebase of legacy products like this one.

Elena takes a deep breath, a final sip of coffee, and puts her phone on speaker. She's ready for battle.

Elena puts her phone on mute. Waiting a beat to be sure that the red indicator light is glowing, she says, out loud, "since forever!" This is in response to Dan's snide question aimed at her "…since when are you an interaction designer anyway?" She smiles. Dan's comment is an acknowledgement, however begrudgingly, that she has persuaded the team lead to go with the UI changes she and Chad have been pushing for.

Later, she will calmly explain that attending to user interaction (UX) is precisely what she had been brought in to do. That, in fact, they had paid her to go and watch users working with their product, talk to those users, and to bring that information back to inform the next release of the product. UX Designer may not be her title on this particular job, but UX research is certainly one of her responsibilities.

She can now turn her attention to her next goal of persuading the project manager – the person who controls the purse strings for this particular product – that what she has learned from observing users for a limited time in just two specific work sites is so important that they should be doing this much more often. She heard many, many good ideas for improving the product in the few hours she spent with users. And she has only been able to suggest the most basic of these to the development team so far. What really needs to happen, she thinks, is that those users – those Nurse Practitioners who, after all, know their work contexts the best – need to be on the next conference call.

Elena is working on the project for her former employer, the company that sells streams of filtered content to libraries and other companies. The company doesn't create the content it sells access to, nor does it do much to re-package it in the form of traditional publication formats. The value added service they sell to their clients is most visible, in fact, in what is left out of the streams of data rather than what is contained in them. In a world awash with information, they filter out what is unwanted, leaving only the most valuable, trustworthy, and useful information remaining. Elena is going through a series of client comments – some of them solicited during a recent round of phone interviews and others that have come in unsolicited via e-mail – and trying to synthesize from these a list of priorities for improving their data filtering service offerings for a particular industry sector: pharmaceutical and medical device manufacturing.

The recommendations that Elena will make will ultimately find their way into code: XML formats that determine which clients see what types of information from the thousands of content providers the client company has relationships with. But Elena will not deliver the recommendations in code. She will write a report and, if necessary, create some diagrams that illustrate how the new filters should work to fine-tune the way the content must flow. She would tell you that it's a lot like plumbing, or maybe more like heating and air-conditioning and ventilation. Air flows rather than liquid flows seem a more apt metaphor for the material she is trying to direct. Elena knows that the more customized a flow is for a given customer, the happier they are likely to be. But, at the same time, the more a given flow (and here we are talking about a filter or combination of filters) can be reused, the more profitable it is to the client. And so she is working to find patterns in customers' comments, requests, and complaints that will allow for the optimum balance between customized and generalizable. Those patterns will be the basis of her recommendations in the report.

It is Sunday afternoon, and Elena is working in a local coffee shop, a pile of print documents spread out on the table. From a few feet away, anyone who knows Elena might guess it is just another work project. But this one is a bit different. The papers are a mix of genres: scientific journal articles, EPA standards, and water quality test reports. Elena is sorting them, highlighting the occasional passage, and looking for evidence.

This project concerns the neighborhood where she grew up and where her mother and stepfather still live. There have been concerns about contamination in the aquifer from which the part of the city in which the neighborhood sits draws from for years now. But recently, a citizens action group has formed in an attempt to pressure local and federal government agencies to perform additional testing. Elena learned about the group when a member brought a flyer to her mother's door. The flyer announced a meeting, and also included a call for volunteers with specific kinds of skills. They wanted folks with science degrees and laboratory experience, lawyers, and health care professionals. And last on the list: technical writers. She went to the meeting.

Once there, she saw that there was indeed a way for her to help, but it wasn't exactly what the organizers had imagined a technical writer might do. They wanted her to write a brochure to explain to community residents – mostly non-scientists and many without a college degree – what the potential negative effects of unregulated contamination of their community's drinking water might be. She listened and nodded. But as the meeting went on, she heard something that made her think of a different way she might be helpful.

Partially in response to the pressure brought by the group, the regulatory commission had agreed to hold a series of public meetings to discuss the results of previous water quality tests of the aquifer and whether further tests were warranted. Public comment was solicited for these meetings, and individuals could respond in writing as well as raise questions and concerns during the meeting itself. The group had already decided that it would be most effective if a report could be written explaining the groups' position on the need for further testing. But group reports were not allowed at this stage, as they fell outside the strict guidelines established for "public comment" Individuals could submit, but groups could not.

Elena formed a plan right away. She could establish a web site where community members writing reports could coordinate what they were doing, share the evidence they were finding, and report on the focus of their individual arguments. Because community members represented different perspectives of the issue – legal, health, economics, and environmental – there would be a range of individual reports. But Elena knew they would be more effective if they were all driving toward the same overall conclusion. At the heart of the web site would be two features. One would be a discussion board on which to post questions, share ideas and links to reference material, and to coordinate further meetings, reviews, etc. The other feature would be a shared repository of scientific source material that provided the best evidence, previous reports by the regulatory agency that gave members a framework for presenting their claims, and templates for the reports themselves to create some common structures and ensure similar overall impact of the members' reports.

She pitched that idea as the meeting came to an end, and the group sat silently for a moment. Then a chorus of laughs broke out. And in another second they were tossing out ideas right and left about what kinds of resources each had to share with the group, digging into briefcases and producing folders stuffed with the documents that now filled the small table at the coffee shop. That was last Saturday. A week or so later, Elena is creating index of the resources she had collected so far. This index would sit in the "scientific resources" folder of the shared repository and provide the members with a title, author, date, and abstract of each article and report contained there. This metadata format would then be used to create a new entry in the index whenever a new resource file was added.

After she finishes the index, her plan is to start working on the brochure. She looks forward to being able to write again.

Learning from the Research

If Elena's work seems exciting to you for its variety and the types of challenges it poses, you are probably eager to develop the kinds of knowledge and skills to help you succeed in the types of situations Elena faces. What follows here is my attempt to demonstrate one way to do this: learn from the research cited earlier. I have taken the central ideas discussed in the literature review sections for each work pattern, turning them into strategies that you can learn, practice, and/or modify as you encounter opportunities like those in Elena's story.

What You Can Do: Learn to make texts that transform

As I have written elsewhere, technical communicators today must shape texts that can be more readily transformed, and in the case of interactive genres, can themselves transform to meet the needs of their users (Hart-Davidson, 2004). The process can be complex, but a process can, in fact, develop and become a routine and even a shared set of actions for technical communicators. A simplified version of that routine is represented below:

Coordinative Work

1. Select source texts from (or that will be combined to create) the source repository of information required by the audiences you are creating resources for. You will make this project easier if you choose a text genre that already has a semantic structure you are familiar with. (may switch order of #1 & #2 if needed)
2. Get to know your audiences. Pay special attention to what they do, what specific tasks they need your information to perform. Also pay attention to who they are and how this might influence what information they need and how they prefer to have that information delivered. (may switch order of #1 & #2 if needed)
3. Analyze source texts and inventory the contents, preferably using some kind of standard labeling system (e.g. semantic markup in XML). As you go use techniques such as

Rockely et. al.'s (2003) re-use map that will help you define shared vs. audience-specific objects in the source. Also note where information is missing and will need to be created.

Transformative Work

4. Model the information, creating a structure capable of supporting reuse and transformation by defining the boundaries of information "objects" – chunks with semantic names rather than structural ones - in ways that are as free of style and presentation details as possible. As needed, create new abstract "container objects" in the information structure that permit certain objects to be grouped together or, alternatively, pulled apart and used separately.
5. Begin creating the primary transformations: design new "views" of the information you have assembled and designated as appropriate for each audience. A view is a slightly different way to think about designing documents – in any form – that allows you to define what information users will see/hear across a variety of media, modes, and genres. Here you are creating and applying structure and style information to the content outline you created in step 4
6. Design the secondary transformations: define how each of the primary views will transform to meet the needs of users as they interact with it; create additional style rules, scripts, & query language that makes these transformations happen.
7. Go back to your audiences, as often as you can, to test out the decisions you are making. Whenever you can, have them attempt to do the tasks for which you are creating information resources. Watch them carefully. Can they do what they need to do? Seek

their feedback. Do they feel confident that they are achieving their goals? Does your information help them?

8. Repeat steps 1-6, as needed and in response to feedback from step 6.

What You Can Do: Don't guess what your users need and want, get to know them or, better yet, get them involved

I had occasion to offer some advice to technical communicators a few years ago about a phenomenon called "Web 2.0" in the pages of a trade publication of the Society for Technical Communicators (Hart-Davidson, 2007). In that article, I asked technical communicators to think of Web 2.0 not so much as a change in the way the web works, but rather as a change in the way users behave. Users produce rather than merely consume information in a Web 2.0 model, and they also sort, categorize, label, rank, and rate it. When they do those things, they add value to existing information. And they do it all whether we ask them to or not. So what is a technical communicator to do? Aren't all those things the very same things we used to do? Are we out of work in a Web 2.0 world?

Not by a long shot. It just means, as we saw with Sun & Sauer, that our relationship to users needs to change. They say things, we listen. They write, we help them do that.

Here, then, are four things technical communicators can do to become more effective user advocates:

1. Listen to users (and watch what they do)
2. Actively participate in the development of new tools and services that respond to emerging user needs

3. Curate (i.e. gather, organize, label, etc.) the ever-growing content collections produced by users

4. Document and work to standardize emergent content formats so that they can scale and travel

5. Create the means for users to pursue social goals in ways that make technical demands seamless

(Hart-Davidson, 2007, p. 12)

What You Can Do: Move up the value chain by improving your organizations' ability to write together

Building on Kellog, Yates & Orlikowski, you might consider the three categories of boundary crossing practices as areas to examine and improve in the organizations where you work. To the degree that you can do this, you will likely become more valuable to the organization. Start by observing, just as Kellog & her colleagues did. What activities could you add to the categories below?

Display Practices
Function to make work visible and accessible to other communities

• Create work process diagrams	• Send e-mail to project team
• Create project plans	• Post on project wiki
• Update project logs	• Flag finished milestones on calendar

Representation Practices
Function to express work in a form legible to other communities

- Convert textual process descriptions into diagrams
- Write and circulate notes from a meeting
- Send regular progress update email to clients
- Participate in "scrum" meetings with development team members

Assembly practices

Function to enable work to be reused, revised, and aligned over time and dynamically connected across multiple communities
• Reuse project plan milestones in a progress report presentation • Use a common format for "pitch" presentations to allow different team members to contribute sections independently • Create templates for common genres and store them in a shared repository • Share contact information with team members to allow for distributed review

Conclusion

There are two ideas in this chapter that may come as something of a surprise to those who are new to technical communication, or to those who have not kept up with recent changes in the field. The first is the idea that opens the story of Elena in the Introduction: technical communicators do much more than just write; so much more, in fact, that it sometimes seems like the writing they do is a minor part of their job responsibilities. The second idea is that technical communicators' contributions have moved closer to the bottom line: they routinely contribute directly to the most valuable aspects of a company's business or an organization's mission. Both of these trends are supported by research such as that reported in the U.S. Government Bureau of Labor Statistics Occupational Outlook Handbook & on ONet, the BLS resource site that lists details about work activities, qualifications, etc. for various jobs in the U.S. Economy. In fact, the BLS projects better than average opportunity for job growth in technical communication through 2018 in a diverse range of industry sectors including Software, IT Consulting, Health Care, and others. In short, technical communication is trending well as the U.S. transforms to a more knowledge-centered- economy.

Discussion Questions & Topics

1. As noted in the introduction, the three work patterns of technical communicators highlighted here frequently intersect. This is most visible when you consider the details

of specific project. Select a project you have worked on or that you have read about and trace the ways the work involved exhibits one or more of the patterns. It may help to sketch a Venn diagram with three overlapping circles and place key events from the account of the project into each region.

2. A key coordinative skill that experienced writers in Slattery's study had developed was the ability to pre-stage their work environment for a productive session of work. What do you do before you write to make sure that you have what you need to be successful? Does this differ when you are revising? Composing a multimodal text or website? What tools (electronic and physical) do you keep handy? What templates or "jigs" have you developed for tasks that get repeated? What rituals or routines do you rely upon to keep yourself on track?
3. The notion that social motives dominate task-oriented goals can be quite a disruptive one when it comes to measuring usability. The reason is that social motives are tied to complex activities that are much harder to break down into discrete moments that indicate success. Consider, for example, that users of camera phones are not merely trying to successfully take pictures, but may be engaged in that activity because they are trying to share experiences with people distant from them. Their motive is not a perfect picture, but a stronger relationship with the people they are sharing pictures with. Now imagine you work for a mobile handset company. How might you evaluate the usability/usefulness of your camera phone? How would you measure just how compelling this feature is to your users? What would you ask them? What would you have them do? How would you measure success?

4. How confident are you in your ability to improve the writing that others do? That an entire group does? Consider what kinds of experiences have helped you to become the writer you are today. Make a list of moments that you attribute to your own development as a writer. How might you create the conditions for helping others to improve? Would you take them down the same path you have followed? Do you see a better way?
5. Which of the types of work Elena does is most appealing to you and why? Which do you feel most prepared for? Least prepared for? Looking at your planned program of study for your major or concentration, where will you develop the skills and knowledge to hone your strengths and build your experience?

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Chapter 3: How Can Technical Communicators Fit into Modern Organizations?

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Summary

Every modern organization possesses an *organizational culture* that distinguishes it from others, and technical communicators who seek to "fit" into any organization must develop skills as cultural analysts. This chapter discusses a number of studies of technical communication that have drawn on such cultural analysis, then presents a framework for conducting it: conducting participant-observation, compiling fieldnotes, interviewing culture members, analyzing cultural artifacts, and writing. Many of these methods can dovetail directly with one's work as a technical communicator on any given project, and the chapter presents an extended example as illustration: A team of technical writers charged with composing an annual report for a nonprofit organization interviewed organizational members, collected artifacts, and compiled extensive fieldnotes to help them fulfill the assignment. In the course of their cultural analysis, they perceived a need in the local culture that they knew they could fill—and they did so. Thus the chapter provides a method not only for "fitting" into the modern organization but also for exercising greater agency as a part of it.

Introduction: Pondering a Workplace Culture

Kate and her two peers, "Jin" and "Cassie," have just met their point of contact for the nonprofit organization with which they'll be working during the next eight weeks to help compose that organization's annual report. They have connected with "Sylvia," the Director of Development of "Women's Family Planning Centers,"[1] through our Service Learning Center on campus to fulfill the major collaborative writing assignment for our technical writing course. Sylvia has arranged this first meeting at a local off-campus café popular among students to explain a bit more about the organization and its mission. All three technical writers already know of the organization (though none has visited it), yet none has ever written an annual report. They are eager to learn more and get started on the writing project. At this meeting Sylvia is welcoming, warm, and full of energy, projecting a persona that the three women suspect might reflect the broader *ethos* of WFPC. Figure 1, below, shows an excerpt from Kate's notes at that meeting, typeset here from the original handwritten notes for legibility:

	First Meeting: 2/25/07 *Sylvia is wearing her WFPC shirt* *-enthusiastic* *-teacher persona* *-very direct about political views* *-answers questions directly and does not stray off topic too much (less than many professors I know)*

Figure 1. A typeset version of Kate's fieldnotes from first meeting with Sylvia.

Afterwards, Kate, Jin, and Cassie are excited to have scheduled their on-site arrival later that week, yet they are also full of questions: What if Sylvia's persona *doesn't* reflect the *ethos* of WFPC? What if the organization is rigidly formal, antiseptic, and cold? What if WFPC expects the three technical writers already to know the ins and outs of annual reports? Or alternatively, what if others at the organization don't reflect Sylvia's professionalism and instead are lax, disorganized, or indifferent to the organization's mission? What if they expect the technical writing team to do all the work with no support, or with inadequate information to compose the report? What if there are feuds, in-fighting, and territorial tendencies? What if the three of them arrive at work later that week to find a workplace that feels alien—and alien*ating*? How can they fit in?

In a way, this last question condenses all those preceding it, and it's the kind of question we have all asked ourselves when pondering a new job (or the first job!) as a technical communicator. Although we often relegate such concerns to the (seemingly secondary) category of "social skills," the fact of the matter is that in any given workplace, we are constantly figuring out how to "fit" in order to accomplish the organization's goals. We daily process hundreds of little clues as to *how things are done here*, often at the nearly subliminal level, to accomplish successful writing projects. This chapter will help you develop expertise in attending to these little clues—and many others—by teaching you how to become an *analyst of your workplace culture.* The chapter is organized as follows: the recent trend among certain scholars intent on bringing cultural studies to bear on technical communication is characterized as "top-down" or "bottom-up" through a brief literature review, the better to situate this chapter's approach to cultural analysis as among the latter. The literature review next presents a definition of "organizational culture" provided in the literature of organizational psychology then concludes by surveying pertinent scholarship that elaborates on fieldwork approaches and the disciplines that deploy them, to conclude with scholarship in technical communication focused on the analysis of workplace cultures.

This background sets the stage for a heuristic you can follow to analyze a new (or even familiar) workplace culture, the better to discern "how things are done here" in close detail and to document this work. Such documentation can help you both to "fit in" and to re-shape the organization, however modestly, by providing you with insights on cultural practices that feed directly into your technical communication practices. An extended example from Kate's team writing project at WFPC illustrates this cultural analysis at work. The chapter concludes with an illustration of how such analysis enables both a better "fit" *and* taking proactive steps to shape that culture.

How Researchers Have Analyzed Workplace Cultures and Technical Communication in Them

If the choice of the verb "fit" in my title might suggest a one-way process through which a technical communicator becomes socialized into a (static and pre-existing) workplace culture, the reality is anything but. Workplace cultures in the twenty-first century are dynamic and in flux. Their rules, norms, and values vary in strength and direction, and technical communicators who best "fit" into a modern organization are those who become adept at analyzing its culture—the better to shape that culture even as one is shaped by it. Of course, our work as technical communicators is always shaped by cultural forces *beyond* the organization, and recent works in technical communication have tapped the field of "cultural studies" to signal this important inter-relatedness (Scott, Longo, and Wills 2006; Zachry and Thralls 2007). Cultural studies approaches often use specific pre-chosen theories to illuminate communicative practices, and such "top-down" theorizing can shed new light on everyday worklife issues such as "authority" and "agency" (Herndl and Licona 2007).

The invaluable counterpart to such top-down theorizing about organizational cultures is the bottom-up analyzing offered in this chapter, in which you, the technical communicator, become a cultural analyst. The basis for your analysis will be the everyday practices that you can observe, document, compare, and ponder in order to understand the many aspects of this local culture as they shape writing. Such analysis is common in the fields of sociology, anthropology, folklore and other disciplines where inquiry is grounded in fieldwork. The methodologies for conducting such analysis often rely heavily on ethnography and autoethnography to produce research. For example, when Stephen Doheny-Farina published "Writing in an Emerging Organization"(1986), he drew on on-site observations, fieldnotes, interviews, and analysis of cultural artifacts to analyze ways in which writing practices and corporate policies in the organization co-evolved. With this orientation to cultural analysis in mind, a few key works on the topics of organizational culture, fieldwork, and technical writing in workplace cultures are discussed below.

Organizational culture. In 1990, the organizational psychologist and management studies expert Edgar Schein published "Organizational Culture" in the journal *Human Organization,* introducing valuable approaches and definitions to help us think about "culture" as it takes form in modern organizations. Among the approaches he lists in this article is ethnography, and among the definitions is this one, of "culture":

> *Culture* can now be defined as (a) a pattern of basic assumptions, (b) invented, discovered, or developed by a given group, (c) as it learns to cope with its problems of external adaptation and internal integration, (d) that has worked well enough to be considered valid and, therefore (e) is to be taught to new members as the (f) correct way to perceive, think and feel in relation to those problems. (Schein 1990, 111)

His definition of "culture" is by no means the only one available (Kroeber and Kluckholn [1963] published an entire *book* on definitions of this contested term), yet it proves valuable for technical communicators stepping into the role of cultural analyst because of the way he has broken it down into parts: What basic assumptions seem to drive this organizational culture?

How were these assumptions developed, and how are they sustained? What problems of external adaptation does this organization face (i.e., what is its market niche, and who are its competitors?), and what mechanisms work internally to maintain cultural cohesion? How are these assumptions taught to new members? As you collect data related to such questions, you are on your way to cultural analysis that will enable you to "fit" into your organization.

With the spread of the concept of "organizational culture" across many disciplines in the past two decades, the numbers of publications relying on this concept now total in the hundreds, and a comprehensive review of the literature would be impossible here. Yet as a sign of the potential of the approach offered in this chapter, consider the 2007 publication by Boyle and Parry in *Culture and Organization*, entitled "Telling the Whole Story: The Case for Organizational Autoethnography." They say, "First, this approach has the ability to connect the everyday mundane aspects of organizational life with the broader political and strategic organizational agendas and practices"(Boyle and Parry, 2007, 185). By understanding these broader political and strategic organizational agendas and practices as they interrelate with your day-to-day work, you will not only "fit" more successfully into your workplace culture, you will also shape your professional identity as an active influence in that culture—and in those that will probably follow.

Ethnography, Autoethnography, and Fieldwork. As mentioned above, fieldwork is vital to cultural analysis in ethnography, defined as "the art and science of describing a group or culture" (Fetterman, 1998, p. 1). Anthropologists and folklorists have provided valuable sources on fieldwork skills that you can apply in your analysis, including the vital practice of capturing good fieldnotes (Emerson, Fretz, and Shaw 1995; Hammersley and Atkinson 1995, 175-186). Beyond fieldnotes, anthropologists have addressed the whole process of ethnographic analysis from start to finish, to address of participant observation, interviewing, artifact analysis, and the ethics that should guide the whole undertaking (Hammersley and Atkinson 1995; Fetterman 1998). In most scholarly fieldwork studies, the researcher is not part of the culture under study, yet the sub-genre discussed above by Boyle and Parry, "autoethnography," refers to this kind of cultural analysis. The prefix of "auto" indicates that the analyst is part of the same culture that he or she is analyzing, and if you are studying an organization where you have worked for some time, you fall into this category. To learn about the roots of this sub-genre, you can read David Hayano's 1979 article of the same name from *Human Organization*, in which he observes the promise of autoethnography for "its potential advisory capabilities in programs of change or development"(Hayano 1979, 103). Early critiques of "autoethnography" claimed that the autoethnographer could never be "objective," yet recent thinking on qualitative research—the kind you will be conducting—points out that no one can ever be entirely "objective" when it comes to interpreting lived realities. We all filter our interpretations based on ways in which our "subjective" viewpoints have been shaped by factors such as gender, age, ethnicity, and many other influences. At the same time, though, we can also temper our subjectivity by "triangulating" with other sources (more on this below). The goal is to achieve something like "positioned subjectivity" that takes into consideration our own subjective positioning as part of the analysis.

Technical communication in workplace cultures. Doheny-Farina's article cited above appeared soon after the publication of *Writing in Nonacademic Settings* (Odell and Goswami 1985), in which researchers used ethnographic techniques to report on writing projects in specific workplace settings. In the years following, ethnographic techniques for studying workplace writing became a mainstay that produced knowledge on such topics as teaching and learning in workplace discourse communities (Matalene 1989) and the connections between workplace literacies and the teaching of English, (Garay and Bernhardt 1998). Single-authored books using ethnographic methods have probed issues such as the ways in which collaborative authoring takes place in workplace cultures (Cross 2001) or in which workplace culture members improvise (Spinuzzi 2003). Recent articles using ethnographic methods have addressed such topics as the ways that language practices informed by local cultural knowledge shape cultural memberships (Racine 1999) and the ways that writing practices shape change within an organizational culture (Anderson 2004). Autoethnographic accounts of technical writing have been much rarer, given that most practitioners' publications are professional rather than scholarly, yet the dynamics of workplace ghostwriting have been traced through autoethnographic analysis (Henry and "George" 1995); three other publications represent similar autoethnographic collaboration among a university researcher and seventeen technical communicators, conducted over seven years (Henry 2000; Henry 2001; Henry 2006).

Becoming a Cultural Analyst

With the research outlined above in mind, let's equip you to become a cultural analyst by following a careful heuristic as illustrated in figure 2 below.

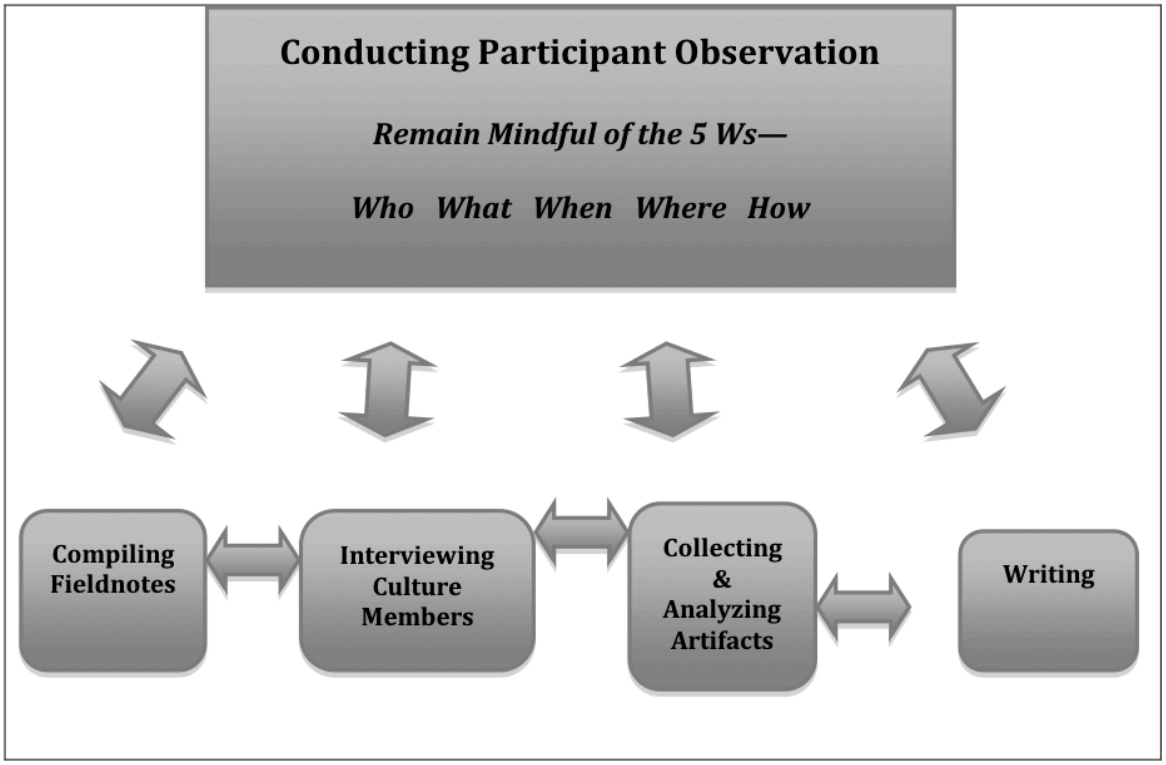

Figure 2. A heuristic for fitting into an organizational culture.

As can be seen in figure 2, your procedure will grounded in a common technique for fieldwork known as "participant observation." As its name suggests, this technique requires observing the activities of culture members while participating in them yourself, the better to understand them thoroughly because you have not only watched but also learned experientially. Ideally, you will be able to participate in a range of activities required of technical writers while observing this culture, all the while making notes on the "five W's" of the culture—who does what, when and where, and how do they do it? Because this part of your heuristic really grounds all of the other parts of it, we have represented it as the initial and governing phase of the flow chart in figure 2, inter-connected with the other parts of your fieldwork. The bi-directional arrows to each of the other elements of the heuristic indicate this inter-connectedness. The notes that you will take are known as "fieldnotes," and the pages that follow show you how to compile these fieldnotes carefully and systematically to help you capture all that you observe in writing. These fieldnotes give you a basis for interviewing cultural members, and you will read some helpful techniques and hints for doing so. Finally, you will learn to collect samples of as many different kinds of writing as you can find, and then set about interpreting this writing based on your growing knowledge base grounded in your fieldwork. As figure 2 indicates by the arrows among boxes on the flow chart, these four processes of compiling fieldnotes, interviewing culture members, collecting and analyzing artifacts, and writing are often conducted in close succession or even simultaneously, as one process makes you realize that one of the other processes could add to your learning base.

This written end product can take forms as formal as a research report for your class, an article you might submit to a professional journal, or a report you prepare for the CEO (most likely in collaboration with your colleagues). Alternatively, your end product might be as informal as notes to yourself that attempt some synthesis of what you have learned or memos to file that document an issue in its complexity and that can help you articulate your own positions on that issue to your colleagues. One technical communicator I once worked with likened his own fact-finding using these methods to becoming a kind of "sleuth," and he was quite proud when this sleuthing uncovered a serious flaw in his company's forthcoming style manual: the plans for the manual had been based primarily on input from upper management rather than the front-line technical communicators who would use it, and when he consulted these technical communicators on the proposed outline, they were able to offer suggestions to improve it dramatically. (See Henry 1995.)

Whether you are brand new to a workplace and thus similar to the ethnographer arriving among indigenous peoples in classic Western ethnographies, or you are already ensconced in a workplace culture yet interested in analyzing it in the tradition of autoethnograpy, you'll be following some standard procedures. Let's consider each of them in some detail:

Conducting Participant-Observation. Dating at least as far back as early (Western) anthropologists' trips to non-Western cultures to document their customs in the ethnographic tradition, participant observation entails joining culture members in their daily life and attempting to interpret cultural practices based on such participation. The fieldworker eats, sleeps, works, plays—even runs from the police, if necessary (see Geertz 1973)—alongside culture members. In your case, you won't have to eat and sleep with the culture members—and hopefully you will not have to evade law enforcement—but you will seek to experience the culture exactly as the others do. Unlike them, you'll be monitoring these activities and writing about them, attempting to capture as closely as possible the details of document production and review as this culture does it in its own special way. To keep yourself "observing" even as you are "participating," keep in mind the familiar "five W's":

- Who? Who are the people in this culture and what are their job titles and duties? Who reports to whom?
- What? What is the organization's primary mission and what are its secondary missions? What is it market niche and what kinds of writing (often called a "deliverable") enable it to survive?
- When? When do processes ebb and flow? How are deadlines established and enforced?

- Where? Where are people located physically in the organization (office locations and configurations can tell you a *lot* about cultural values) and where are their collaborators, intramural and extramural?
- How? How do technical writers compose here? In teams? Individually? How do review processes take place? How does writing expertise take form in this culture?

As you answer such questions, pay particular attention to language use. Inevitably, you will notice specific uses and applications of terms and phrases that might seem familiar to you yet which take on new dimension and significance when understood in their specific organizational culture. To help you capture all of these details as precisely and astutely as possible, let's look at the primary tool you'll be using: compiling fieldnotes.

Compiling Fieldnotes. Fieldnotes are entries made in systematic and regular fashion in a log or journal. Historically, ethnographers would fill up journal after journal (often in the form of spiral notebooks), in longhand, on their observations about cultural practices, striving to capture as many details as possible. Very often, traditional ethnographies would include an "arrival scene" that depicted the local culture, and it's a good idea to do the same in yours: you never get a second chance to encounter a new culture for the first time, and documenting first impressions can provide you with a valuable file that reminds you of the very first day in your "fitting" process. Very often, moreover, that arrival scene will include a tour of the workplace, an event that corresponds remarkably to a field technique that ethnographer David Fetterman calls the "grand tour"(Fetterman 1998, 41).

As you make your fieldnotes, be sure to date each page and leave a wide margin on the left hand side. Try to capture as many details as possible, to be able to recreate the "smell and feel" of this local culture. At times, your notes on the right-hand side might be little more than hastily scribbled jottings as you try to capture details, and you can come back later and fill in the details. Figure 3 shows such a formatted page.

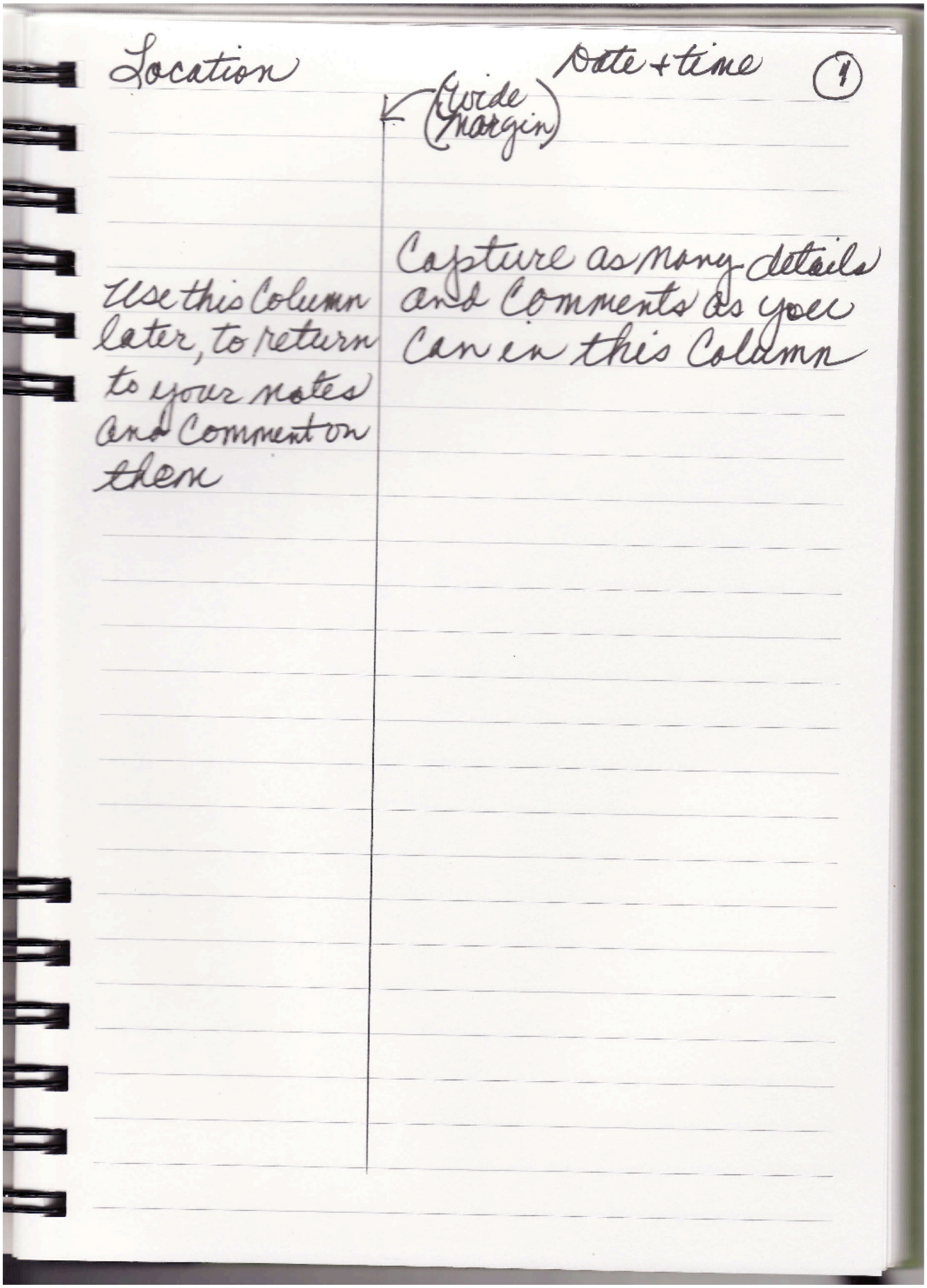

Figure 3. A sample formatted page for fieldnotes.

As time passes, you will want to revisit all the notes you have taken and systematically comment on them in the left-hand margin. Adding these comments can help you remember to take certain steps, as in the case of procedural notes, and they can also enable you to start "connecting the dots" among observed events, comments by colleagues, and written artifacts. Eventually, you will cross-reference your notes to other pages of fieldnotes or to other sources of information, to begin identifying recurrent topics or patterns or to leverage these fieldnotes for greater understanding of your position of technical communicator in this workplace culture, as you will see in the extended example below.

You may want to compile your fieldnotes directly in a word-processing program, particularly since the vast majority of your work as a technical communicator will be completed on a computer. In that case, use your spiral notebook only for those moments when you are walking about or on site somewhere and don't have access to a computer, then transcribe these notes as soon as possible to put them with your other notes. (This procedure is the one Kate followed for her fieldnotes cited in the opening scenario and in the extended example below.) Or, if you feel more comfortable compiling notes in a PDA or "speaking" your notes into a Smartphone, use that technique. Regardless of your technology during the collection of notes, though, be sure to transcribe them as soon as possible after you have captured them. Follow the same procedure of sequentially dating the entries and do some creative formatting (by formatting the page in two columns for example) that will allow you to comment on these notes later on. You can of course take advantage of your word-processor's insert comment function to enhance this meta-commentary on your notes, and as your commenting reveals patterns, trends, or interesting connections you may find yourself color-coding them. If your research evolves into very elaborate analysis, you may also take advantage of commercial and open source software along with other technological resources to enhance this analysis.

Interviewing Culture Members. Interviews are another key ingredient in analyzing a workplace culture, and also an activity that dovetails easily with your work assignments. After all, technical communicators regularly ask questions of their supervisors and other coworkers to garner information necessary to complete a task. Think of those ad-hoc questions as *spot interviews*, to be captured in your fieldnotes. In fact, you might not even refer to them as interviews with culture members but choose rather to refer to them simply as meetings during which you will take notes or audio-record to help you be as precise as possible in your learning. As your analysis progresses, you might want to schedule some more formal interviews with specific organizational players. You will want to wait until your fieldnotes have yielded some specific patterns or trends, or otherwise prompted specific questions about the local culture, and you will then want to schedule these interviews in advance. If you are pursuing a full-blown formal analysis—possibly for a class report or for a scholarly journal—then you may want to ask your interviewee's permission to record the interview digitally or with a simple analog tape recorder. After the interview, you will index the recording during playback by topic, noting the time on the counter as each topic shifts, and you will probably choose to transcribe certain passages verbatim.

Why conduct these extra interviews? Well, fieldworkers often speak of *triangulation* as a valuable research principle. As the term suggests, triangulation consists of comparing (at least) three sources on a given topic to see convergences and divergences. The objective is *not* to determine some definitive "truth" (and therefore who is or who is not "telling it") but rather to acknowledge a basic tenet in qualitative research: all social facts are complex, and varying points of view on them enable you to identify certain beliefs or viewpoints held by culture members and see where these accounts point to a trend or to a significant commonly-held assumption or value. When you are able to identify these kinds of things, you are in the process of learning the basic elements of culture as defined by Schein earlier. In the process, you have been able to get to know other culture members better, all the while showing them your serious, professional, engaged workplace identity.

If you have never conducted a formal interview, be sure to do some preparatory work. Consult some sources on interviewing techniques and common pitfalls, such as Edward Ives' *The Tape-Recorded Interview* or David Fetterman's *Ethnography: Step by Step*, particularly pages 37-52. Guides such as these go into depth on the key issues below:

- **Be absolutely ethical**. Never record anyone without his or her permission, and never divulge information given in an interview that the interviewee deems sensitive. If you wish to cite an interview, request permission and, ideally, let your interviewee see the citation in your writing to confirm it. Sometimes a comment in one context requires qualifying when presented in another context.
- **Do your homework**. Find out as much as you can about your interviewee by studying his or her organizational position and cultural role(s). Don't waste your interviewee's time by asking questions that you could have found the answers to otherwise.
- **Prepare questions**. Prepare the interview meticulously by writing down specific questions beforehand. Do *not* think that you can go into the interview and simply "wing it." Frame your questions as "open-ended," that is, as questions that cannot be answered with a simple "yes" or "no," or if they can, be ready with a follow-up question that cannot.

- **Use probes and elicitors**. Described by Edward Ives as "a device for eliciting more and better information in an interview, or to put it another way, of helping the interviewee tell a story more completely" (Ives, 1995, 53), a *probe* can be a pointed question often introduced by "How …" or a follow-up to a *general* response that prompts the interviewee to ground that response in the specifics of everyday work. An *elicitor* can be any artifact from the workplace culture (see below) that will elicit extended commentary by your interviewee. Previous work such as reports or technical documentation projects (which you would have with you, in hard copy or online) are great elicitors. If you have a very specific question about composing processes, you might even ask your coworker to speak aloud his or her thoughts while in the throes of composing, while you both watch the screen.
- **Strive for mutuality.** Some fieldworkers characterize the interviewer's role as that of a “collaborative listener”(Sunstein and Chiseri-Strater, 1997, 345-415), a concept that might help you elaborate your role as you interview writers. The more the process feels collaborative, the more your interviewer is likely to speak candidly.
- **Conclude professionally**. Thank your interviewee for his or her time (or for *their* time if you have chosen to interview more than one colleague at a time, to tap the synergy that can emerge in such situations), and promise to get back to them if your notes will lead you to share their views with others. Then keep your promise.

Though these steps may seem time-consuming, by following them you have achieved two key goals: (1) you have garnered information in systematic fashion to the ends of understanding your workplace culture in greater depth and breadth, and (2) you have demonstrated a professional and smart workplace identity to other colleagues, thus establishing yourself as someone with whom they will want to collaborate readily in the future.

Collecting and Analyzing Artifacts. You may think of the term *artifact* as it indicates some object taken from an exotic culture or some priceless piece in a museum, and if so, your understanding reflects the etymology of this word: something that has been made (*factum*) by drawing on skill, craft, and knowledge *(ars*). You can see how this etymology opens the doors for considering all kinds of cultural objects as artifacts. Edgar Schein offers a very broad interpretation:

> When one enters an organization one observes and feels its *artifacts.* This category includes everything from the physical layout, the dress code, the manner in which people address each other, the smell and feel of the place, its emotional intensity, and other phenomena, to the more permanent archival manifestations such as company records, products, statements of philosophy, and annual reports. (Schein 1990, 111)

Now, you can't "collect" a "dress code" (though certainly you will want to take notes about it in your fieldnotes!), but you can collect lots of the other formal documents that Schein lists above. Treat every document you encounter as "data," and make copies (in paper or digital form) that you can study later as part of your cultural analysis. In addition to such formal writing, collect informal writing, too: Post-it notes, organizational charts, white-board diagrams (use your cell phone to photograph them!), *anything.* All artifacts can help you interpret cultural practices and technical writing within them.

One key element in interpreting artifacts is to ask yourself not only what an artifact *says*, as in the case of so many written documents, for example, but also how it *functions,* within and beyond the workplace culture. Think of the difference, for example, between what a report *says* and how it might get used by different members of an organizational culture for different purposes and according to a variety of "agendas." As soon as you start digging below the "face value" of cultural artifacts you are uncovering more cultural values and assumptions (and the ways in which other cultural members are interpreting, deploying, and subtly reshaping them), the better to determine your own "fit."

Writing. Writing is at once a central tool in conducting your fieldwork and in many cases the culmination of it. Your extensive notes, even if they go no further than your fieldwork journals, will serve as important documentation for you to refer to when you want to validate a hunch about cultural values or refresh your memory on specific practices. You may use these notes to compose *memos to file*, formal memos stored on your hard drive (backed up in paper form and in each case stored in a safe and secure location) and which elaborate your understandings of such values and practices. If you are not required by your organization or your supervisor to keep a log of your work activities, or even if you are, these memos can constitute a valuable corpus that goes beyond the mere recording of activities completed to probe many implications of these activities and even ideas for action grounded in such probing. Doctors, lawyers, and CEOs regularly document their work through memos to file, so why shouldn't you? Such memos can remain with you during your entire professional life, constituting a variation on journal entries you may have been asked to complete in writing classes and serving as an invaluable source for elaborating upon your résumé orally throughout your career. Think of these memos as a *working paper* to which you can add as you go and that will serve as an invaluable documentation of your own "enculturation" at your place of work.

Your research on your workplace culture will likely take other forms, too. You may be asked by a coworker or supervisor to contribute to a report going up the hierarchy on work practices in your unit, or you may be charged with writing a letter of transmittal for a longer document, your goal being to succinctly represent this document's background to the addressee(s). Or you may be tasked with a documentation project that actually *requires* a number of the fieldwork practices above, even if those requirements are not explicitly stated. Finally, you may author or co-author a research report submitted to a scholarly journal that establishes you as a researcher for a wider audience. Whatever the case, the methodology described above will serve you well, as the extended example below illustrates.

Finding a Fit at Women's Family Planning Centers

As you could tell from the opening scenario, Kate and her team members had stepped into the role of cultural analyst even before they had entered the culture of WFPC—by capturing fieldnotes during their first meeting with Sylvia. When they arrived at WFPC the following week to begin their work, they were given a tour of the offices. Such a tour is common when being inducted into a new job as a technical communicator and in many ways resembles the "grand tour" sometimes used by ethnographers as described above. Following our guidelines for capturing fieldnotes during this grand tour, Kate scribbled as the team walked. Later, she transcribed these notes into her word-processing program and followed the practice of commenting on the notes in the left hand column, to produce the set shown in figure 4 below:

	Second Meeting: 3/5/07
	Narrow carpeted hallway in hodgepodge office building, matching blue painted doorframes
	Other businesses in building include real estate agencies, doctors, insurance companies, and a travel agency
How important is surveillance?	*Building built in 1962*
Co-workers seem to reflect Sylvia in dress	*Surveillance cameras, security doors with keypads (can change without having to change locks or get keys back)*
Use of space reflects focus on services rather than status	*Employees in business casual*
Not sure of room #s, may need to get these later	*4 rooms on the third floor* *309* ***Business*** *office –waiting area, reception, copy room, 3 office* *Very small waiting area with just 2 chairs and one coffee table* *307* ***Finance*** *office, central area and offices, 3 main people*
Follow up on check-in procedures	*30?* ***Lunchroom****, 2 more offices, material storage--lots of pamphlets, videos, binders stored on floor-to-ceiling shelves* *30?* ***Clinic*** *– reception, waiting room, exam rooms, surgery, recovery* *condoms, lube, etc. displayed just as you enter reception (behind door)* *small, simple and clean exam rooms* *comfortable recovery area*
They have thought about client privacy	*waiting room has a very small window to reception desk area, this makes me think that check-in is all that happens in the public sector of the waiting room, and high levels of privacy are maintained as all conversations and details are discussed behind*

	closed doors
How will the org being "flat" factor into our work? Do other people here think of themselves as "jack of all trades?"	matching rattan chairs with matching dark blue cushions freshly painted two-toned walls done in purple to match WFPC logo colors Large windows bring a good deal of light into the area More than half of the waiting room is only visible after you turn around a corner after coming in through the door; this means that the door opened to the hallway does not expose those in the waiting room to anyone walking by in the hallway Quotes: Sylvia's comments: "We are a very flat organization" "Board of directions is in charge of overall direction and financial health of organizations, they are responsible for paying back any money due and this new strictness has resulting in more careful oversight than in the past" Financial person's comment: "Jack of all trades"

Figure 4. A typeset version of Kate's fieldnotes from first visit to WFPC.

As you can see in this example, Kate was capturing copious notes on the physical environment, attempting to capture the "smell and feel" of the office workspace as it might shape the environment where co-workers collaborate. At the same time, she was conducting those "spot interviews" mentioned above and capturing snippets of verbatim comments. The reflective comments in the left-hand column already anticipate not only a "fit" between her (and her team) and WFPC, they already carry implications for the annual report on which they will be collaborating: How does an issue of client privacy get handled in such a report? Can they use the pamphlets, videos, and binders in the lunchroom to get a better sense of the *ethos* that WFPC will want to project in this report? In a "flat organization," who else is likely to have input on this report? Some of these questions were answered when Kate's team was able to secure another key artifact from the WFPC culture: the organizational chart, shown in figure 5, below.

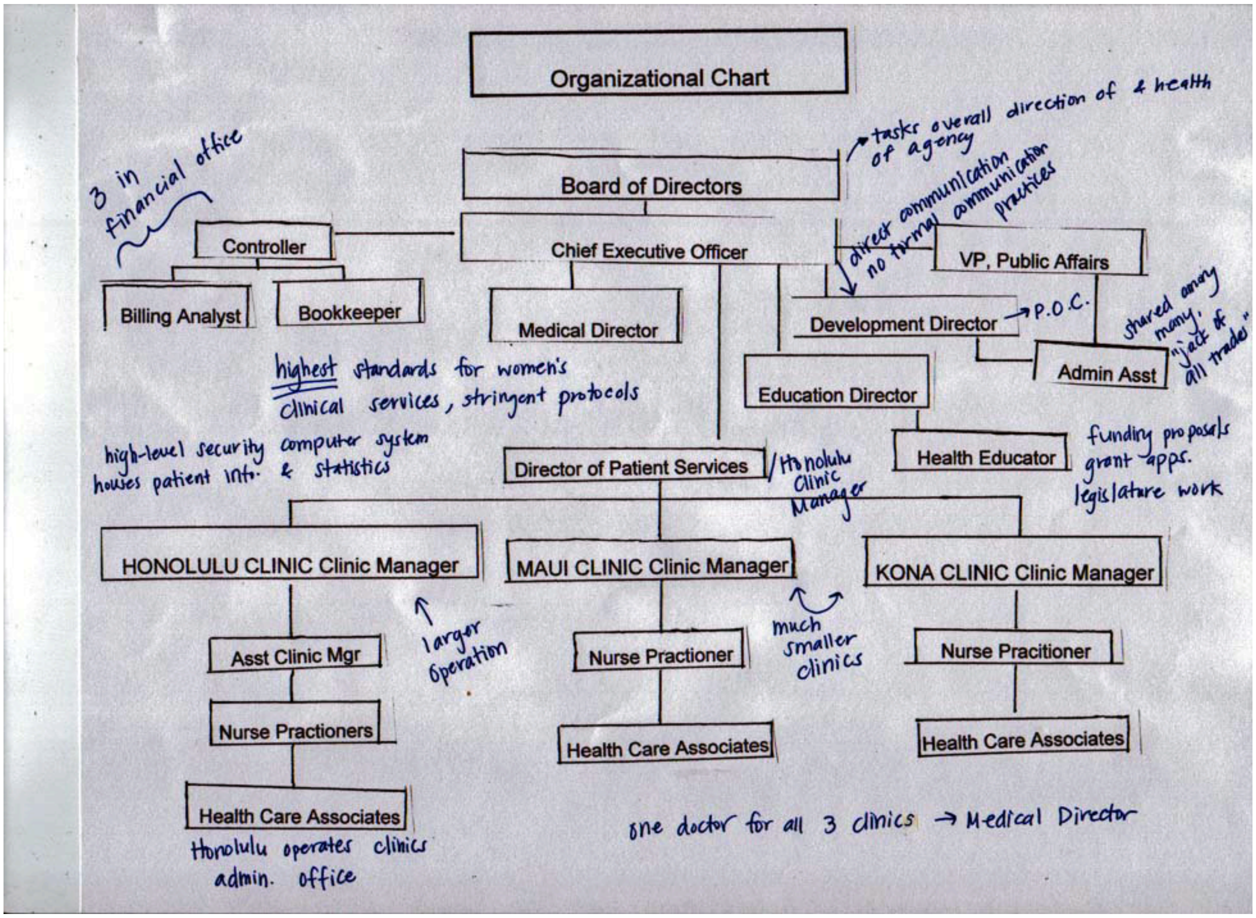

Figure 5. WFPC organizational chart.

As you can see, the org chart in its document design wouldn't *necessarily* indicate a "flat organization" as WFPC was described by Sylvia in their second meeting, yet Kate's scribbled note between the Chief Executive Officer and the Development Director helps confirm such a cultural practice: "direct communication; no formal communication practices." Scribbling such notes on an org chart is indispensable for exactly this capacity to begin "decoding" a written artifact for the practices it fails to convey. In the case of their team's work, this artifact also suggested quick turnaround times between drafts and responses to them. Kate's notes also include some valuable information on the workplace values and assumptions: "highest standards for women's clinical services, stringent protocols." Such values and assumptions gave the team a good written touchstone to return to when drafting parts of the annual report, and the note following it ("high level security computer system handles patient info and statistics") indicates that this local culture strove to make good on its *image* as a safe and secure place for women by using technology in a way that protected women's private information.

As this team progressed in their work on the annual report, they were able to render their initial observations more nuanced. For example, in her *working paper*, composed to capture their learning about this culture, Kate returned to the observation about the "flat organization":

> While WFPC enjoys emphasizing the 'flatness of the Organization,' there also exists a hierarchy and consequential procedures . . . utilized in certain situations. For instance, any published materials coming out of the organization have to be approved by Bob, the CEO, before being sent to the printers.

As a very important document, the annual report would certainly require Bob's approval, and the technical writing team of Kate, Jin, and Cassie now incorporated him into their mental picture of implied readers for this report.

They also drew upon an invaluable artifact from WFPC's files: the 2004-2005 annual report. The cover of the report included a horizontal band of images including a mother and child, two senior women in front of a U.S. flag, an image of a nurse, an image from a pro-choice demonstration, and a baby; these images were bordered on the top by a running marquee STRENGTH IN DIVERSITY and on the bottom by UNITED BY PURPOSE. The team's analysis of this document design alone told them that the contents of the report would most likely have multiple appeals and multiple audiences, and that any draft wording that they would supply would inevitably be revised. They had done a lot of research outside of the culture—specifically on annual reports as a genre, compiling a folder of reports available online from other nonprofits—and together with their ongoing work *inside* the culture, they were able to draft a page-by-page outline, then fill it in with suggested copy for each section. Ultimately, their drafts did get revised quite a bit, but as Kate put it in an e-mail reflection on March 7, 2008,

> although the final product had many changes from our draft (generally for financial reasons or because of repetition in other mailed materials), it reinforced for them that we were able to 'get' them and thus, as we were [outsiders] in a way, this must mean they have a pretty streamlined and consistent message. That was clearly something that they gleaned from the whole process. It was a sort of two-way reinforcement.

When I sought Sylvia's affirmation of Kate's claim, her e-mail of March 10, 2008 concurred:

> One of the most satisfying aspects of the project was communicating our corporate culture to the writing team and then the way in which the writing team did indeed 'get it.' It is important to us that the overall message of our organization is clear and communicated effectively across the different layers of our organization.

In Sylvia's affirmation, we see a subtle and valuable elaboration on the concept of "organizational culture": the metaphor of "layers" underscores just how fluid and changing cultural practices can be—yet another reason for technical communicators to document observations in some kind of working paper.

As newcomers to this organizational culture, Kate and her teammates thus provided invaluable review that gave the long-term culture members something akin to a usability test. Meanwhile, though, as they grew to know the culture more and more, the technical writing team realized that even if they lacked all the cultural knowledge to be able to represent WFPC as completely as they would have liked in this vital publication for an *external* audience, they did possess knowledge as researchers that would enable them to produce a technical document for *internal* consumption. Their cultural analysis had revealed a strong emphasis on women's health issues above and beyond family planning, revealing the cultural assumption that family planning and women's health are inextricable issues. The technical writing team also knew that the clinical services counseled women on many topics. One such topic was cervical cancer, yet WFPC lacked documentation on the most recent research on this topic, a fact that Kate and her team had entered into the Working Paper. When they proposed to Sylvia that they put their skills in composing annotated bibliographies to work for WFPC, Sylvia immediately approved the project. By the semester's end, when the technical writing team had concluded its work with WFPC, they had produced a ten-page report on cervical cancer research and treatment that lives on to this day in WFPC's culture.

In sum, Kate's technical communication team used several methods to conduct their cultural analysis: engaging in participant-observation, capturing fieldnotes, conducting interviews, analyzing artifacts (from the physical décor of the offices to the org chart to previous publications), and composing a working paper. In just seven short weeks, they had moved from total cultural outsiders to quasi-insiders who now understood the organization's *ethos* in much detail. They were able to supply WFPC with a good draft of an annual report, and just as importantly, they were able to help WFPC gauge its own image as represented in that report. As cultural analysts, Kate and her team were also able to perceive a need in the culture that they could supply—the annotated bibliographic report on cervical cancer.

Conclusion: Survival of the Fittest

When Darwin coined his oft-cited expression, his use of the term "fittest" was *not* meant as synonymous with "strongest" (as is often implied in popular usage) but rather with "having the best *environmental* fit." And so it is with technical communicators in modern organizations: those who can analyze their environment effectively and insightfully are most likely the ones who will become the "fittest" to and for that culture. At the same time, most modern organizations witness high turnover in their workforce, which means that technical communicators will be faced ceaselessly with new organizational cultures—whether they remain a good "fit" in their current culture or move on to another. One technical communicator with whom I have previously collaborated found the turnover at her workplace so daunting she likened colleagues to "Tasmanian devils" who rushed in and out of the culture (Henry 2005, 199), and in the current globalized economy, workers at all layers of the culture are likely to inhabit somewhat precarious positions. Under such conditions, it may seem daunting even to entertain goals beyond "survival" as an employee, let alone aspire to exercising significant agency in the workplace culture.

Yet Kate's team illustrates how technical communicators can do just that when they incorporate cultural analysis into their everyday work. When I queried Sylvia as to the status of the annotated bibliography produced by Kate and her collaborators, she replied by e-mail on March 11, 2008 with this observation:

> I've referred to it and used some of the research in a grant proposal submitted to the Chamber of Commerce Public Health Fund. I was seeking a second round of funding to support our cervical cancer screening and treatment program, which has helped us secure funding for these services that are not always covered otherwise by the Federal Title X family planning funding or even all insurances. I plan to get back to it again in the near future as it is time to start writing grants again; the government has just released a report that one in four teenage women has some form of STD, and some of these STDs can prompt cervical cancer. WCFS is strongly committed to educating and counseling such young women. So, yes, it does live in on in our culture, in very significant ways.

Were Kate and her team members active agents? It would appear so, and women who visit WFPC in the future will benefit from their efforts. Did cultural analysis help them contribute? Their working paper's observation about the culture's lack of a bibliography on cervical cancer and their proposal to write one answers this question resoundingly. Can your own cultural analysis, achieved by following the heuristic of this chapter, help you shape an organization's culture even as you strive to "fit?" Let Sylvia's response serve as inspiration.

Discussion Questions

1. Read Horace Miner's "Body ritual among the Nacirema." (You can find a "reprinted with permission" version online at: https://www.msu.edu/~jdowell/miner.html.) Notice the paragraph numbers in the margin. Beginning with paragraph 3, jot down the main practices you notice. How do these practices compare with those in contemporary U.S. culture?

2. Using Schein's definition of organizational culture on p. X, divide the class into six teams and assign one part of the definition to each team. Then task each team with analyzing how you as students have been socialized into your campus culture with respect to your part of the definition. When teams report to the whole group, see if you can add to or challenge the claims of other groups.
3. During one of your instructor's lectures, take notes following the format on p. X. After the lecture, comment to yourself on selected notes in the left-hand margin the way that Kate has commented on hers on p. X. If possible, use a special bullet or symbol in the margins to link one of your instructor's comments with others, indicating the relationship (e.g., "see p. 3 where she gives another example"; "does this comment relate to the work we did on readability?"). At your next class meeting, share your notes with a classmate and note similarities and differences.
4. Interview a classmate to learn as much as you can about her or his composing processes. Begin by elaborating a list of questions that cannot be answered with a simple "yes" or "no," then add some possible "probe" prompts to them. Take notes furiously as he or she responds, or better yet, use an audio recorder and then index the recording as explained on p. X. From this set of notes, produce a one-page summary of your classmates' composing processes. As part of the summary, note those processes that you suspect are widely shared in your classroom culture and those you suspect are not. Discuss your summaries as a class.
5. As preparation for your onsite ethnographic research within an organizational culture, visit a department or locale on your campus and take fieldnotes. Share them in class.

6. As a class, read the first few pages of Geertz's "Deep Play: Notes on the Balinese Cockfight." (Several Internet sites offer copies of this chapter from *The Interpretation of Cultures* online.) Why did Geertz and his wife flee the police? What do you make of *his* use of language to describe the Balinese culture? Use this analysis to be self-conscious about your own metaphors as you write.
7. Study the organizational chart on p. X. What kinds of day-to-day activities would you expect to take place for the employees in each box? How would you expect them to share information across the organizational culture? Considering Kate's comments on the org chart and her designation of her team's p.o.c., which employees were likely to have contributed what kinds of information to support the annual report? If you are a practicing technical writer, bring a copy of your organization's org chart to class and see how close your classmates can come to answering similar questions about your organization.
8. If you are a practicing technical writer currently, find some document in your organization that you can talk about not only for what it *says*, but also for what it *does*: what kind of cultural work does this document accomplish, how does it accomplish it, and why?
9. If, like most students, you have composed an annotated bibliography for some course, bring a copy to class. Imagine revising it for an organization to use while seeking grants to help the organization fulfill its mission. What kind of an organization would it be, and how would you have to adjust your bibliography for such a purpose?

Notes

[1] Following protocol to assure the anonymity of participants in research involving human subjects, I have assigned a pseudonym to this organization and to the point of contact, who has granted permission to publish this chapter and who has reviewed it to assure faithful representation of the organization and the work of these three technical writers. The only real name is that of Kate Millen, who has graciously agreed to revisit her technical writing project at WFPC and provide excerpts from her working documents to illustrate the approach presented in this chapter. This research was reviewed and approved by an officer of the university IRB.

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Chapter 4: How Can Technical Communicators Develop as Both Students and Professionals?

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Summary

You are likely reading this book because you are considering a career as a technical communicator. In a sense, every chapter you read in this book, every topic you discuss in this course, and every project you complete are the first steps you'll take to develop yourself professionally. Professional development is generally defined as actions an individual takes to establish, strengthen, or maintain knowledge and skills that are necessary to perform a job well or to advance one's position or status in an organization. But what are these actions, specifically, and when should they be taken? When does this work end? This chapter is designed to answer these questions. To do so, it maps the status of technical communication as a profession and considers how technical communicators' own professional growth is connected to the discipline's development as a profession. It provides you with snapshots of the careers of three technical communicators. Using them as examples, it suggests a heuristic that will assist you as you develop professionally, both now as a technical communication student and later as a novice technical communicator.

Portraits of Three Professionals

To illustrate how successful technical communicators have worked to develop themselves as professionals, this section introduces you to three graduates of the technical writing program at Utah State University. All three of these students earned their bachelor's degrees in this program, and one of them has also earned her master's degree in Utah State's online technical writing program. These professionals all started their work as technical communicators just as you are starting yours, by enrolling in an introductory technical communication course and progressing from there. This section, however, showcases their current positions, describing their roles and explaining their work. Later, in this chapter, you'll learn the steps they have taken to arrive at these positions. In both sections, these three professionals will tell you their stories in their own words.

Meet Stephanie Wilson. Of the three of us, I am the most recent graduate of Utah State's technical writing undergraduate program. I graduated in May 2008. Before graduation, I applied for a position at Utah State University (USU) with the Programming and Design (PAD) team, a unit within the office of the Vice President for Information Technology (IT). After a few months of waiting, interviewing, and negotiating, I accepted a position on the PAD team as technical support coordinator. My job responsibilities include writing end-user documentation, training users, and managing workflow and resources within the team. I work daily with intelligent and talented IT professionals, as well as many subject matter experts in most of the departments and research centers at USU.

My job as technical support coordinator requires me to train and support users of the USU content management system, ezPlug. To do this work, I write documentation for ezPlug, provide hands-on training as needed, and answer questions over the telephone about how ezPlug works. End-user documentation is not the only type of writing I do; my supervisor sometimes asks me to plan, author, edit, and publish other texts independently. For example, I write tooltips, error messages, or other text prompts. I sometimes help with technical public relations writing for IT, especially on our team website and other IT websites. One writing project I especially enjoy is creating posts for the blog our team publishes, which is geared towards web content managers at USU. I also manage projects and workflow for a team of programmers, designers, and student employees. I supervise interns from the technical writing program, who support my work by writing documentation drafts and helping me acquire visuals for our documentation projects. All of these duties require me write, edit, collaborate, and manage people almost every weekday.

Meet Ben Minson. I graduated from Utah State University's technical writing program in May 2005. I currently work as a technical writer for the LDS Church on some of the many software applications built internally to support our large organization. I began as an intern shortly after graduation and later became a full-time employee. A one-man team, I create online help systems, quick reference guides, user guides, tutorials, and release notes.

Part of developing content for these projects is interviewing interaction designers, business analysts, developers, and testers. I document tasks, functionality, workflows, and downstream effects of user actions in these applications. I manage most of my projects completely from writing drafts and creating graphics to delivering the finished documents. When needed, I collaborate with product managers in providing live training. I also work as a reviewer of official department communications to help the department maintain a professional image. In any given day, I take on several different roles, and writing is a small piece of the pie.

Meet Emily Cook. I have worked a technical communicator for over ten years now, and I've earned two degrees in technical communication, both from Utah State University. I earned my undergraduate degree in May 2001 and my master's degree in December 2005. My current work is very fast-paced! I am a proposal manager within the Marketing Communications arm of GC Services' Marketing Department. I oversee the department's workload as well as complete my own projects, including proposals, presentations, brochures, tradeshow materials, and our internal company newsletter. I follow up and ensure that my counterparts complete their work and have the resources in order to do so. I also coordinate and manage tasks related to personnel issues, including hiring, interviewing, and training new candidates or recruits to our department.

Arriving at this position took some time. Leading up to it, I worked as a technical writer for training curriculum, a proposal analyst, a proposal coordinator, and a senior proposal coordinator. You might also find it interesting to know that I've held many of these jobs from a distance; that is, I telecommute to work. Of course, this was not always the case. I had to prove myself in the office first, but now I work over 2000 miles from my company's home office in Houston. I sometimes travel to meet with other members of our staff, but mostly I work independently and communicate with my colleagues electronically.

Technical Communication's Professional Development

Although their job duties and workplaces are different, these graduates share common educational experiences and have taken similar paths to reach their current professional goals. In many ways, the road to professional success seems easy to understand and navigate. Almost everyone has, at least, a basic understanding of how to find a job and keep it. Defining the terms "profession," "professionalism," and "professional development," given this basic understanding, seems relatively simple. Simple definitions, however, can be troublesome. For example, when these terms are conflated—that is, blended into a common overarching definition: to become good at what you do—the resulting definition tends to ignore the historical and cultural meanings of "profession." Considered in light of these more complicated meanings, the terms "profession," "professionalism" and "professional development" are concepts less easily defined or enacted.

For this reason, technical communication scholars have hotly debated whether our discipline is a profession at all. When you first read this statement, you may react negatively to it. You would not be the first person to do so. But before you reject this idea completely, read this section. Its purpose is to help you understand what a profession is; explain why scholars have debated technical communication's status as a profession; provide you with a historical perspective about technical communication's development as a discipline, if not a profession; and suggest that, while technical communication may not currently qualify as a profession, it is a maturing discipline on its way to becoming one.

What is technical communication? This question is not easy to answer, primarily because technical communication is so difficult to define. Defining our discipline, however, is a crucial step to becoming a profession. As Faber notes, before we can claim to be a profession, "we need to carefully define what is professional about professional communication and how professional communication is distinguished from other forms of workplace writing" (2002, 307). Similarly, in his introduction to *Power and Legitimacy in Technical Communication*, a two-volume collection that grapples with the history, identity, and future of technical communication, Gerald J. Savage argues that it will be impossible to call technical communication a profession until we are able to define exactly what technical communication is:

"Unless we are able to define our field, we are unlikely to be recognized as a profession—we cannot be recognized by others if we can't even recognize ourselves" (2004, 1). The definition problem is compounded by the fact that individuals who call themselves technical communicators work across diverse fields, disciplines, and organizations, making it particularly challenging to find a definition capable of encompassing such difference. In fact, some scholars, such as Allen (1990), have argued that we should not attempt to define technical communication because its definition is specific to organizations and locales, not across them. One anthology, *Defining Technical Communication* (Jones 1996), nevertheless, collects twenty-three essays that work toward a disciplinary definition. In the introduction, Jones notes that while the anthology "brings together many of the best efforts" at defining the field, these efforts do little more than provide us with a list of qualities and skills: "Qualities and skills," he acknowledges, "do not, of course, provide us with a satisfactory definition" (1996, v).

Interestingly, in 2005, a year after *Power and Legitimacy* was published, two scholars, Kathy Pringle and Sean Williams, claimed to have arrived at a definition by studying a group of diverse technical communicators to discover how they defined themselves and the work they do. The definition Pringle and Williams derive from their study was not unlike many of the definitions collected in *Defining Technical Communication* (Jones 1996):

> Technical communicators work at the intersection of technology and people, migrating back and forth between technology and communication as they design products for specific audiences….We approach technology from a human perspective and believe that technology should adapt to people, not the other way around. We design communication products accordingly, using whatever media,

> software, technology, or tool is most appropriate to achieve this end. People are the ultimate end, we would argue, not the technology (2005, 369).

This work and the values we place on it, they contend, describe not only what technical communicators have done in the past, but also what we are doing now and will be doing in the future (2005, 368). If we accept Pringle and Williams' definition, then we have, as Savage suggests, taken the first step toward becoming a profession.

Are other steps necessary to become a profession? Developing and agreeing upon a common identity or definition is the first step toward professionalizing technical communication, but what steps follow? Most scholars agree that a standardized code of professional responsibilities or behavior (more commonly called a code of ethics) is an early step toward professionalization as is agreeing upon a common set or coherent body of knowledge (Rainey 2005; Faber 2002; Hayhoe 2005; Campbell 2008). Next, the field must identify core competencies or skills, standardize processes, and develop criteria for evaluating products (Rainey, Turner, and Dayton 2005; Hayhoe 2005). Such steps, Rainey argues, result in a "mechanism for identifying and validating the work that [technical communication professionals] do" (2005, 679).

Historically, professions are promoted through organized efforts of those who seek to belong, and professional organizations are generally where this work begins: "Professions will commonly form professional organizations, unions, or guilds which work to unify the practice, represent the field to the public, lobby government officials, advise government and organizations, monitor and promote education of members, promote communication and socialization among practitioners, and maintain codes and standards [Savage 1999, 358]. In the last decade, the Society for Technical Communication (STC), our discipline's largest professional organization, has taken the lead in this work, setting concrete goals and endeavoring to achieve them. According to STC's website, its 14,000 members include "technical writers, editors, graphic designers, multimedia artists, web and intranet page information designers, translators and others whose work involves making technical information understandable and available to those who need it" (Society for Technical Communication, For the Press). As the largest professional organization for technical communicators, STC is poised to move the discipline toward professionalization. The organization's 2008 Strategic Plan outlines four specific tasks necessary to achieve these goals:

- "Establish a body of knowledge for the profession.
- Define and promote ethical standards for the profession.
- Identify the skills and aptitudes that are associated with successful technical communicators.
- Adopt, enhance, or create international standards that positively impact the profession" (Society for Technical Communication 2008).

In response to these tasks, STC already has an established code of ethics, Ethical Principles for Technical Communicators (Society for Technical Communication 1998), and the organization is investing significant resources toward the development of the Technical Communication Body of Knowledge (TCBOK), a draft of which its members are now able to access.

The TCBOK draws heavily upon the scholarship of Kenneth T. Rainey, who dedicated the latter part of his career to studying technical communication competencies and skills and working with the STC as well as other national and international technical communication organizations to promote consensus about these competencies. Researching alone or with collaborators, Rainey spent years identifying what he called "core competencies" and then testing his findings through actual workplace research. Rainey and his collaborators Turner and Dayton encapsulate this research in their award-winning article, “Do Curricula Correspond with Managerial Expectations? Core Competencies for Technical Communicators” (2005), in which they identify three sets of competencies that technical communicators should possess:

- **Primary competencies**: the abilities to collaborate, write clearly, assess and learn technology, take initiative, and evaluate their own and others’ work
- **Secondary competencies**: the abilities to use technology to accomplish work in various media and to “write, edit, and test various technical communication documents”
- **Tertiary competencies**: the abilities to conduct research and usability tests, single-source, design instructional materials, budget, present, and respond to cultural differences (Rainey, Turner, and Dayton 2005, 323)

This research, derived from academic curricula as well as managerial surveys and interviews, also led to identification of four key skills that technical communicators should possess: excellent communication skills, collaborative skills, interviewing skills, and an affinity for technologies.

Other researchers have conducted workplace research with similar results. For example, Whiteside examined programmatic curricula and also interviewed technical communication undergraduates and managers to identify key job-entry skills. While she identified many of the same competencies as Rainey, Turner, and Dayton, her research participants included business and organizational knowledge in their lists of competencies, and they recommended that soon-to-be graduates also learn project management, computer languages, and software tools (2003, 311). Managers valued collaborative skills, as well as time management, in their new employees; they also recommended that students take advantage of internship opportunities and learn to work with subject matter experts (2003, 311). Both graduates and managers in Whiteside's study recommended that students gain knowledge of a technical area to adapt more easily to a workplace setting. Kim and Tolley's study resulted in comparable findings; the five graduates surveyed in their study recommended that students gain competency in problem-solving, analytical , and rhetorical skills (2004, 381). They also recommended that students engage in multiple internships and "familiarize [themselves] with industry needs" (2004, 385). Included in these needs is industry-specific knowledge: "Domain knowledge or experience may be especially important when a student wants to specialize in a particular area, such as healthcare, scientific research, business, or technology" (2004, 382). These skills and competencies, Kim and Tolley's participants said, would not only serve the technical communicator well when on the job but also when looking for one.

In all of these studies, technology skills and abilities were mentioned, but the need for specific tool or software instruction was inconclusive. While some graduates recommended that students learn specific software tools, managers were less emphatic. One manager in Rainey, Dayton, and Turner's study noted: "Basically, if I can find a superb writer who understands technology and works well with others, I am willing to provide training for all the other skills I need the person to have" (2005, 333). Like this manager, Kim and Tolley's research led to a similar conclusion: "Although the presence or lack of computer skills was not the only factor in our graduates' job search processes, these days students need to master some level of technology as an expected standard literacy. However, the specific tools they need to know may vary depending on the particular job or area of technical communications" (2004, 382). These findings suggest that knowing specific technologies is less important than knowing how to learn technology.

The benefit of these studies is that they not only inform STC members creating the TCBOK, but they also can assist current students in technical communication programs identify what skills and competencies they need to be successful in their workplaces. In other words, they work in two directions: both supporting the discipline's development as a profession and identifying key competencies and skills that newcomers to the discipline should possess. It is important to note, however, that the TCBOK is still in an early stage, and the STC has yet to achieve buy-in from national and international technical communication organizations, such as the Association of Teachers of Technical Writing, the IEEE Professional Communication Society, or the Council for Programs in Technical and Scientific Communication, as well as others. While representative members of these organizations have been active in TCBOK development, interorganizational buy-in has stagnated, possibly because many academics who belong to these organizations have yet to be persuaded that professionalization and the standardization of programs and practices are beneficial to them and their students. Like Allen, they argue that their programs are specialized by local needs and competencies; therefore, standardizing curriculum and practices may detrimentally affect their programs' abilities to meet these needs (1990). What Savage wrote in *Power and Legitimacy in Technical Communication* remains true today: "Because of the field's lack of consensus about our knowledge and professional identity, as academic programs proliferate, so do iterations of what constitutes the knowledge of the field" (2004, 6). To achieve buy-in for the TCBOK and any other professionalization steps that follow, STC will need to persuade members of these diverse organizations that its professionalization interests are also their own.

Where do we go next? If these early steps are eventually successful, scholars speculate that the next step toward professionalization is the development of certification or licensure standards that determine who may or may not become a member (Savage 1999; Hayhoe 2005), but much work has yet to be done before this can happen. Professions, historically and culturally, connect closely with a specific, identified audience, develop a sense of social responsibility toward this audience and others, and have an ethical awareness that guides and directs their professional identity (Faber 2002, 316). As an example, think of the profession of medical doctors: Doctors are recognized because they work with specific individuals (sick people, for instance), because they have a social responsibility to heal, and because they have an ethical system that guides them as they do this work. While technical communication is currently taking many of the early steps toward professionalization, it is far from developing a cultural or historical identity, such as those we recognize for doctors, lawyers, or even engineers. Obviously, technical communicators are far from this type of recognizable professional status; nor can we assume that all technical communicators or even their national organizations agree on what it means for technical communication to be a profession. For these reasons, this latter step is still distant on the horizon, but it is possible that, within your career, this final step toward professionalization may occur.

How do these developments affect technical communication students? Like STC and its members, technical communication students are positioned to strengthen and support our discipline as it matures. In a sense, your professional development directly affects the discipline's development as a profession. As your knowledge, skills, and competencies grow, you will find yourself better situated to respond to the challenges our discipline faces as it matures. To support this maturing process, you should focus your work and your professional development in three areas: by learning everything you can about technical communication, by engaging with others who do work similar to yours, and by leading if you are called upon to do so. The Professional Development Life Cycle heuristic outlines preliminary steps you can take as a student as well as those you can take as a graduate and a practitioner to continue your personal professional development as well as contribute to that of the discipline's.

The Professional Development Life Cycle Heuristic

Technical communicators trained in academic programs have at least three stages in their career development. At first, these stages are chronological: you develop your knowledge and gain basic skills or competencies as a student, you apply what you know as a job seeker, and you maintain or expand your basic skills as an employed practitioner. You'll find, however, that you may repeat these stages one or more times as you gain experience or change your goals.

You will likely change jobs many times during your career, and, frequently, you will need to retool with each change. The U.S. Department of Labor, according to Jablonski, reported in 2002 that the average length of time employees spent with the same employer is 3.7 years (2005). "Since 1983, when the U.S. Department of Labor first began keeping such statistics, the average tenure has ranged from 3.4 to 3.8 years" (Jablonski 2005, 17). If these averages remain stable, you can expect to change jobs as many as ten times during your lifetime. This section is designed to help you, at whatever stage you find yourself. As illustrated in Table 1, the professional development life cycle is divided into three stages—student, job seeker, and practitioner—and each stage includes three sets of professional development strategies: education and training, workplace experience, and other activities.

The Professional Development Life Cycle	**Student** *Learning skills*	**Job Seeker** *Applying skills*	**Practitioner** *Maintaining & expanding skills*
Education & Training	Choose courses that challenge and increase your skills	Engage in continuing education (e.g., conferences, workshops, training sessions, online learning, graduate school)	Engage in continuing education (e,g, conferences, workshops, training sessions, online learning, graduate school)
	Minor in a relevant subject		
Workplace Experience	Intern in positions that expand your skills	Hone job search skills	Seek advancement opportunities
	Develop job search skills	Intern and volunteer as you look for a permanent position	Seek new learning experiences that expand your skills and competencies
Other Activities	Conduct informational interviews	Conduct informational interviews	Give back to your community by sharing what you know through informational interviews and presentations
	Join professional organizations	Maintain your professional organization memberships	Maintain your professional organization memberships
	Increase your professional network and practice job search skills	Use your professional network and job search skills to locate possible jobs	Accept leadership opportunities that present themselves to you

Table 1. The Professional Development Life Cycle: Stages and Activities

Student professional development strategies. If learning is a key to professional development, then a degree in technical communication is among the most important means of gaining new knowledge. Professional development strategies you apply as a student are keys to your future goals, whether you are enrolled in undergraduate or graduate studies. First, you should carefully select courses that challenge your abilities and increase your skills. Look for courses that expand your knowledge of technical communication practice or that require you to think about developing or designing information in new ways. As you consider courses to take, remember the core competencies and skills outlined in recent technical communication literature, and choose courses that develop your knowledge of audience and other rhetorical skills, require you to conduct research—including usability tests—allow you to collaborate with others, and strengthen your oral and written communication skills. Courses that introduce you to business practices can build your understanding of what it's like to work and communicate outside the classroom, and courses that focus on culture—both in the workplace and outside of it—help you understand how to work in a global market. Finally, be sure to take a variety of courses that require you to learn different software tools—word processing, desktop publishing, graphic, and design software—and remember the specific software you learn is less important that learning how to learn new software. Software changes so quickly that you'll always be learning to use something new. Establish these skills in the classroom, and you will apply them for the rest of your career. By matching course objectives and outcomes to the competencies and skills necessary for success as a technical communicator, you will graduate with a strong foundation for work you will do thereafter.

Technical communication coursework is not the only part of this picture for students. You should also consider a minor in a relevant subject, depending of the kind of industry or workplace you find interesting. If your program of study does not require you to take a minor or you do not have time for one, consider electives from this list, to name a few possibilities: business, marketing, instructional technology, computer science, foreign languages, graphic design, communication, journalism, public relations, corporate communications, sciences (e.g., biology, chemistry, geology, zoology), natural resources, computer science, civil engineering, political science, nutrition and food sciences. Courses in pre-professional programs, such as pre-med and pre-law, can provide you with an excellent introduction to the discourse of these fields. Taking courses in a relevant minor provides you with knowledge of the language that specialists use in these fields, which will make writing with and for them easier if you take a job in one of these fields.

Even as a student, gaining workplace experience is necessary if you want to compete for the best entry-level jobs after graduation. Internships, whether paid or unpaid, give you the opportunity to learn from practitioners and allow you to take the basic skills you learn in your courses and apply them in specific workplace settings. As an intern, you will likely find that your coworkers understand that you are a novice, and they are generally very willing to help you learn. This kind of advantage can greatly increase your understanding of workplace practices while expanding your professional network. Many programs have internship officers or faculty members designated to help students find technical communication internships. Ask your instructor about the opportunities available in your program. Whether your internship is paid or voluntary, it is invaluable experience because it will provide you with many opportunities to put your knowledge into action, and it will give you an understanding of technical communication practice that is hard to replicate in the classroom.

Internships and other workplace experiences also allow you to put your job search skills into action. You will probably learn how to write resumes and cover letters in your technical communication courses, and you may even create a professional portfolio to use when you interview, but this work is not fully tested until you use it to look for your first job as a technical communicator. Internships interviews can provide you with opportunities to test and hone your skills. Applying for internships, you will quickly learn what works and what does not, and this knowledge will be invaluable to you when you enter the next state of your career as a job seeker.

Finally, as a student you can engage in several other activities that develop your skills for future application. These activities are key to extending your professional network. They include conducting informational interviews, joining professional organizations, and using professional social networking sites. Informational interviews are a great way to learn from individuals doing jobs that you desire after graduation. An informational interview is different from a job interview in several ways:

- You are asking the questions, not answering them.
- Your interview's purpose is not to get a job but to learn about technical communication jobs.
- Your secondary aim is to get to know another person who does technical communication work that interests you and, thereby, establish a personal connection that will extend your professional network.
- Another opportunity for extending your professional network is to join a professional organization. As you know already, the Society for Technical Communication (STC) is the largest professional organization for technical communicators, and it has many student and local chapters. You may find student chapters of other professional

organizations on your campus, especially if you have minored or taken electives in another subject. Any of these organizations can help you to connect with others with interests like yours, and these connections may provide you with many opportunities for employment before and after graduation. According to a 2003 survey, almost 62% of interviews for managerial positions were obtained through networking (Bloch 2003, 12). Given these numbers, it is easy to see how important developing your personal network can be.

Finally, you might be surprised to learn that social networking sites on the Internet are also great ways to connect with others professionally. Professional networking sites like LinkedIn, Ecademy, and Xing are all dedicated to helping individuals keep track of colleagues and connections. Of course, social networking sites like Facebook and Twitter are also available to you, but use any Internet site (or archive) with caution. These more popular sites are more often used for disseminating personal information, and your connections may learn more about you than you'd like. In fact, anything you post on the Internet (including the automatic archives generated by many email discussion lists) can be located using search engines. For this reason, you should always be thoughtful and cautious when you post on the Internet because searching the Internet for an applicant's name is often one of the first steps employers take when deciding who to interview. The wrong kind of personal information, too much personal information, or indiscreet images can diminish your chances for getting the job of your dreams after graduation.

Job-seeker professional development strategies. Many of the skills you learn as a student come directly into play when you graduate and start your first job search. Depending on the economic conditions when you graduate, the time between graduation and employment could be negligible or it could take months. If you are fortunate enough to graduate when jobs are plentiful and technical communicators are in demand, then your work will be much easier than if you graduate during tougher economic times. In either case, to find the best jobs, you'll want to apply skills from both your coursework and internships.

Even though you have graduated, you may still find that you need to add to your skill set as you apply for jobs. In these situations, continuing your education through self-study and professional workshops is a great way to get the additional knowledge you need. For example, you may find that the jobs available to you require technology skills that you do not have. Fortunately, most software packages have inexpensive or free demonstration copies that you download for a limited time, and the creators often provide tutorials and other documentation. Take advantage of the evenings during your job search to learn new technologies, so you can honestly say that you have worked with them when you have interviews. You might also discover that your professional organizations offer workshops on job searching, technical communication skills, or technologies that will strengthen your knowledge and competencies. Attend your local professional organization meetings to take advantage of such workshops or investigate the possibility of online training. Many online courses are affordable and reputable. Like workshops, they are often a quick and easy way to gain or sharpen your marketable skills. Finally, when job markets are particularly tight, graduate school enrollments tend to increase. If work is not an option, then the time may be perfect to earn a graduate degree. Consider advanced degrees in technical communication or in related areas that will enhance your marketability upon graduation.

In the meantime, you can add to your workplace experience through additional internships or volunteer job opportunities. The career services department at your university or college can often point you to possibilities for employment—both paid and unpaid—after graduation. You can also find many opportunities at non-profit organizations that are always in need of communication specialists. If you have time, consider volunteering for such organizations to gain additional experience and to improve your community. Whether you write a proposal, create marketing brochures, or simply design a form, you will be gaining experience that can help you in your later job search, and you will be doing good for your community at the same time. Additionally, continue the professional development activities you began as a student. Conduct more informational interviews, extend your personal network, and maintain your memberships in professional organizations. These activities are even more important now that you find yourself on the market. Opportunities can materialize through these connections that would not be possible working on your own.

Practitioner professional development strategies. Once you are employed as a technical communicator, your professional development strategies may change slightly, but they do not end. You should continue to think about education and training, workplace, and other professional development activities to enhance your work and advance your position within the organization. If you have not already done so, then now is the time to continue your education by attending conferences, workshops, and training sessions to extend and sharpen your tool set. You can learn new techniques and technologies easily through these interactions, and, if your schedule allows, consider graduate school. You will find like-minded professionals in graduate school, and you will deepen your understanding of technical communication practices through further study of theories behind these practices and their applications across different industries and organizations.

Doing your job well and continuing your education through opportunities like these will also provide you with new challenges and opportunities to advance your career. These opportunities may become available to you within your current organization or by moving to a new one. One of the defining characteristics, according to recent career theorists, of 21st century workers is their mobility: "They often voluntarily move to new companies, new careers, and new geographic regions" (Jablonski 2005, 16). Regardless of whether you find growth opportunities in your organization or outside of it, seek out new experiences that expand your skills and competencies, and be willing to share what you know with others.

One of the best methods of sharing this information is through other professional development activities, which can be found in your community and professional organizations. As you develop your competencies and skills, you will likely find that you are among those individuals asked to provide training for others or that you are asked to lead organizational activities. Doing so places you in a position opposite to the one you had as a student: you are now the mentor, not the mentee. Acting as a mentor, training junior employees or interns, or serving as a leader in a community or professional organization rewards those who accept these opportunities, allowing you to give back to the community that first supported you. In exchange you will find that you continue to learn as you interact, engage, and lead others in their professional development. By talking to students who request informational interviews, you will learn what is being taught in undergraduate classrooms and be able to provide practical experience to sharpen their understanding of technical communication workplaces. Through training others, you learn to articulate what you know in clearer ways, and often you find that you learn as much through these interactions as you teach. Through leading others, you shape the future of your organizations, providing more and better support for those who follow you. Cycling through these stages, you will find many opportunities to grow, learn, and share your knowledge with others.

The Professional Development Life Cycle in Action

The three technical communicators you met earlier in this chapter—Stephanie Wilson, Ben Minson, and Emily Cook—have all fully engaged in the professional development life cycle. In this section, they will tell you in their own words how they have put the recommendations and strategies in this heuristic into practice and provide you with examples for how you might do the same.

Stephanie Wilson. When I initially approached graduation, and the prospect of finding a job, I was nervous. I wondered if I was ready to publish documentation for end users and if I could carry myself with confidence as I met with subject matter experts. As I agonized over these and other questions, I had an epiphany: I'd already performed many professional duties as an undergraduate, and I possessed the skills necessary to fulfill future job functions. I prepared myself throughout my undergraduate experience by taking relevant coursework and consulting with my professors. I took classes in rhetorical theory, document design, writing technology, and the publication process, and I translated my theoretical experience into professional experience by seeking internships and conducting information interviews with industry professionals. I conducted an information interview with one individual who just started her first professional job. I asked her questions about the hiring and interviewing process, which put many of my worries in perspective as I approached my own job search.

My first internships accurately prepared me to apply my classroom experiences to the workplace. From January 2007 to my graduation in May of 2008, I worked as a tutor in the USU Writing Center and also as the sole technical writer for Utah's Local Technical Assistance Program (LTAP). These consecutive jobs gave me a two-sided perspective: one, as a tutor, teaching the writing and reading theory that I'd learned in class, and two, as a writer, trying to employ that theory to communicate complex ideas in clear, accessible language. I began to understand the writing process on a much deeper, more practical level, and my writing, editing, and communication skills improved.

Closer to graduation, I found additional internships, and after working as a public relations assistant, a computer lab consultant, a marketing intern, and a web designer/content manager, I began to trust my new abilities. My internships fostered my sense of mastery as a writer, developed my understanding of the way people think, and introduced me to the conventions of professional workplaces. I began to understand that it was not necessarily a particular skill set that would make me successful in the workplace, but rather the confidence and acuity to use my skills, and the aptitude to learn new skills to apply to future situations.

As I contemplated the number of skills I could develop, I began to consider the various career paths available to me. I joined a few professional organizations, including the Society for Technical Communication (STC) and the Public Relations Society of America, on the recommendations of my professors, and I started participating in their communities, through both online groups and in-person interviews. I expanded my understanding of topics that were interesting to me, such as web content strategy and user experience, by subscribing to professional blogs and participating in local technical communication communities like the USU Content Managers group and the Intermountain Chapter of STC.

As the president of our student chapter of the Society for Technical Communication, I invited a group of local technical communicators to speak to our students. They discussed their work, including their own career paths, their interns and student employees, and the role that academic theory played in their industry experiences. As I spoke with them, I collected suggestions ranging from how to format a skills-based resume to how to work with an ineffective team member. Their depth and breadth of industry experience answered many of the questions generated by my lack of practice. With my education nearly complete, my internships at a close, and the advice of industry professionals in mind, I began applying for positions that matched my areas of interest. I have worked in my current position for approximately eighteen months now, and I am currently applying to graduate programs in technical communication. I am looking forward to this new learning experience and the opportunities it will soon provide me.

Ben Minson. I remember two courses in particular from my technical writing undergraduate program: a class on publishing documents in print format and another on interactive media. In the first, I completed a project in which I learned the basics of Adobe FrameMaker and, at the same time, wrote a beginner's guide to the program. This guide was basic, beginner-level, task-based software documentation, and I believe having this document in my portfolio played a key part in my getting my current job. In the second class, I worked with another student to plan out an interactive educational experience, focusing on the audience and on meeting the needs of a client.

As a student, I looked for ways to complement coursework (and of course, to add to my resume and portfolio). Internships were a large part of this effort. I accepted a Web administrator internship offered at the Utah State University Writing Center, where I was working at the time as a tutor. In this position, I designed and built a website that presented information about the center to university faculty, staff, and students. This gave me experience creating a plan and design for a project, obtaining approval from a client, and then executing the plan. I also became a technical editing intern, working with engineering students to polish their project documents. This gave me experience collaborating and giving feedback to others. As vice president of the student chapter of the Society for Technical Communication (STC), I further developed skills in working as a team to make and execute plans. I also gained software training experience by providing workshops for STC members in the English department's computer lab. Being an undergraduate student can seem like a scramble to get as many bits of experience as possible and rack up points on some scoreboard. But due to the generally varied work of technical communicators, I found direct application for this range of professional development experiences I had while I was a student.

Now, as a practitioner, I continue to look for ways to develop my skills. One of the most important ways to do this is to connect with other professionals and learn from them. Social media provide ways to do this quickly. For example, I have a professional blog where I write mostly about technical communication and related topics. My blog demonstrates my interest in my field and the things I learn about it; it also gives me an opportunity to practice my writing and analytical skills and sometimes instructional writing skills. In return, readers comment on my posts and give me additional ideas and perspectives. Interestingly, one of my current colleagues was hired largely because of the expertise and enthusiasm his technical writing blog demonstrated. I read other technical writers' blogs in my RSS aggregator. I also have a Twitter account and follow other technical writers. Some provide useful links to articles and blog posts about professional communication that I likely would not find myself—I can surf the Web only so much.

The technical writing and training team I belong to in my job holds regular reviews of our projects and designs. We give each other feedback and talk about best practices. This helps us arrive at a unified presentation of documentation and training beyond merely following a style guide, and it expands our view of what is possible and effective. To connect with other professionals, I continue my membership in STC, where I associate with other technical communicators and learn about what is happening in the field. I have volunteered in situations such as helping the Instructional Design and Learning special interest group with its website design and also serving as webmaster and then president of the Intermountain Chapter. The skills I use to guide chapter activities through to completion are comparable to the skills I need for managing documentation projects. I have attended STC annual conferences, which help me see what is current in the field and how other professionals are improving their day-to-day work. Professional development is crucial to keeping my skills and deliverables at the level they need to be for me to be essential assets to my organization, as well as to be desirable in a competitive field. I can learn some things by working alone, but learning from others takes me farther faster.

Emily Cook. As an undergraduate, I majored in technical communication, but I also took a minor in marketing. I found that my business coursework (and fellow students, even!) were completely different than in my major. Minoring in business flexed me out of my comfort zone, taking classes in a differently structured and competitive environment. My minor also allowed me to see that I really love business communication. I had to think critically and be able to deduce information a little differently than when I was reading a book for a literature course or writing a paper for a technical writing deadline. This coursework was instrumental in landing my first internship and job. It was in one of my business courses that the instructor called me aside after a test and asked if I was interested in doing technical writing in a business environment. Wow, what an opportunity! These courses definitely set me on a path to finding my niche in business communications.

As an undergraduate I also gained invaluable experience as an intern. I worked as a technical writing intern at a small start-up in Logan, Utah, called Ingeo Systems, Inc. When I began, the company had approximately 15 employees. The small size enabled me to work with everyone, ask questions, and develop relationships. At Ingeo, I learned to have a thick skin. I was viewed as “young” or “the newbie,” which was frustrating and somewhat empowering at the same time. I worked closely with the full-time technical writer to review drafts; write frequently-asked-questions (FAQs), white papers, and press releases; and interview subject matter experts. In the beginning, the diversity of everyday tasks is what really excited me about the field of technical writing as a whole.

After working for a few years, I enrolled in USU’s online master’s program and began my graduate studies. In both my undergraduate and graduate courses, the work that tested me the most was the kind of class that left me feeling accomplished and motivated to move on to the next big thing. My master’s coursework was very diverse, but I loved the online group environment. I felt very much in control and accountable for my work, but I also had the flexibility to do it on my own time and hold down a full-time job. I found that I enjoyed classes that would have intimidated me in the past, including usability, designing an online course, and rhetoric. Having completed two degrees, I can honestly say all of my coursework translated in some way to my career as a professional communicator. My business is extremely dynamic, and most of my experiences as a student were as well, which lent itself nicely to some of the experiences I would have in the professional workforce.

As I mentioned earlier, over the years, I’ve held many positions as a technical communicator. All of these positions revolved around technical writing, but each was geared towards a different industry. These positions were heavily oriented toward documentation coordination and editing. All of them were usually driven by strict deadlines and expectations. To get these jobs, I used techniques I learned in my coursework, and I also drew upon my personal network to find opportunities. Without my networks, I would not have seen some of the opportunities I have had, but I am glad I had the opportunity to be flexible, learn, and develop the skills to do each of these jobs. As a practitioner, I continue to keep in touch with past colleagues and peers through email, listservs, blogs, book clubs, and networking sites (e.g., LinkedIn). Attending conferences and workshops allows me to see that learning should never stop. I am social by nature, and I have found that this type of environment gives me a place to network and learn, all while meeting new people and learning the latest trends. I believe that as professional communicators, we can get so busy with our daily tasks that we forget how fulfilling it is to have an opportunity to talk to and be with other professionals within our industry.

In addition to completing my master's degree, I dream of working on my PhD someday. Until then, I have taken an active interest in learning new software when work warranted it. As an example, I have learned Photoshop and InDesign through online help and self instruction while working full-time. I would like to get more involved with professional organizations again. I just renewed my membership in the Association of Proposal Management Professionals (APMP), and always feel I benefit from the knowledge-base and camaraderie that such professional organizations have to offer. I find that my professional organization memberships tend to ebb and flow, depending on my workload and the demands of work. When I am not able to commit time to my professional organizations, I focus on other forms of professional development. For example, I have recently enjoyed speaking to undergraduates at Utah State about my experiences. All of these professional activities stretch my creative muscle a bit, requiring me to answer questions and think about how I can improve my skills. When I think about my professional development, I see that I often get so busy that I forget to take time for myself, including my professional advancement. I would love to have a more structured way to incorporate professional development into my everyday life, but, in my case, the deadline-driven work has to come first!

Your Professional Life Cycle

All three of these practitioners began their careers just as you are beginning yours. They studied hard, applied what they learned, and engaged with and led others as they matured as practitioners. As you begin your journey through the professional life cycle, remember that at every stage, you should focus on learning, engaging, and leading. Although the path ahead for you and for our discipline is not fully visible, technical communication scholars are clear in this message: the future is in our hands. To become professionals, we must engage in the work necessary to develop our discipline of technical communication as a profession, and we should do so with our eyes open to the political, social, and economic challenges and changes this development will require. The development of its identity and status is linked directly to your successes and those of your fellow students. To begin this process, start your professional development today. The rest of this book will show you how.

Discussion Questions

1. Find a recent copy of your resume. Does it demonstrate the professional development stages you've taken? If so, where? If not, what can you add, and where would you add this information?
2. In addition to the medical profession, what other professions do you recognize? Do all these professions meet the characteristics described in this chapter?

3. What professional organizations have student chapters on your campus? What are the requirements to join? What kinds of activities do they sponsor?
4. Does your campus have a career center? What services do they provide to students and graduates of your school?
5. If you or your instructor is a member of the Society of Technical Communication, visit the TCBOK and analyze its contents. What are the key competencies you find there?
6. What internship opportunities are available on your campus? How to you find out about them? How do you apply for them?
7. Think about recent graduates of your technical communication program. Where are they employed? What courses and minors did they take with their degrees? Were these courses and minors beneficial to them? Discuss how you might connect with these graduates to build your own personal network.
8. As a class, conduct an Internet search for technical writing blogs. Choose an article that interests you and discuss its contents with your classmates. How might the information you gathered from the article help you to develop professionally?

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Section Two:

Situating the Field

Introduction

While Section One asks relatively specific questions about contexts, in Section Two you will step back slightly to consider a broader series of problems (Figure 2). You will start thinking about ways for both mapping the field and learning how to situate the field in the context of larger social, historical, and theoretical concerns. Learning how to situate technical communication as one field among many is crucial because no profession exists in isolation from the rest of the world: Professions and professionals themselves serve larger constituencies, draw on and contribute to projects in other disciplines, and generally try to belong in productive and integrated ways to communities both local and global. The emergence of networked communication devices has opened up new opportunities for work not only in interface design, but social networking, microfinance in developing countries, political activism, and much more. Taking advantage of these opportunities involves adopting a broader, more complex perspective on how technical communication is situated as one field among many that addresses user activity in technological contexts.

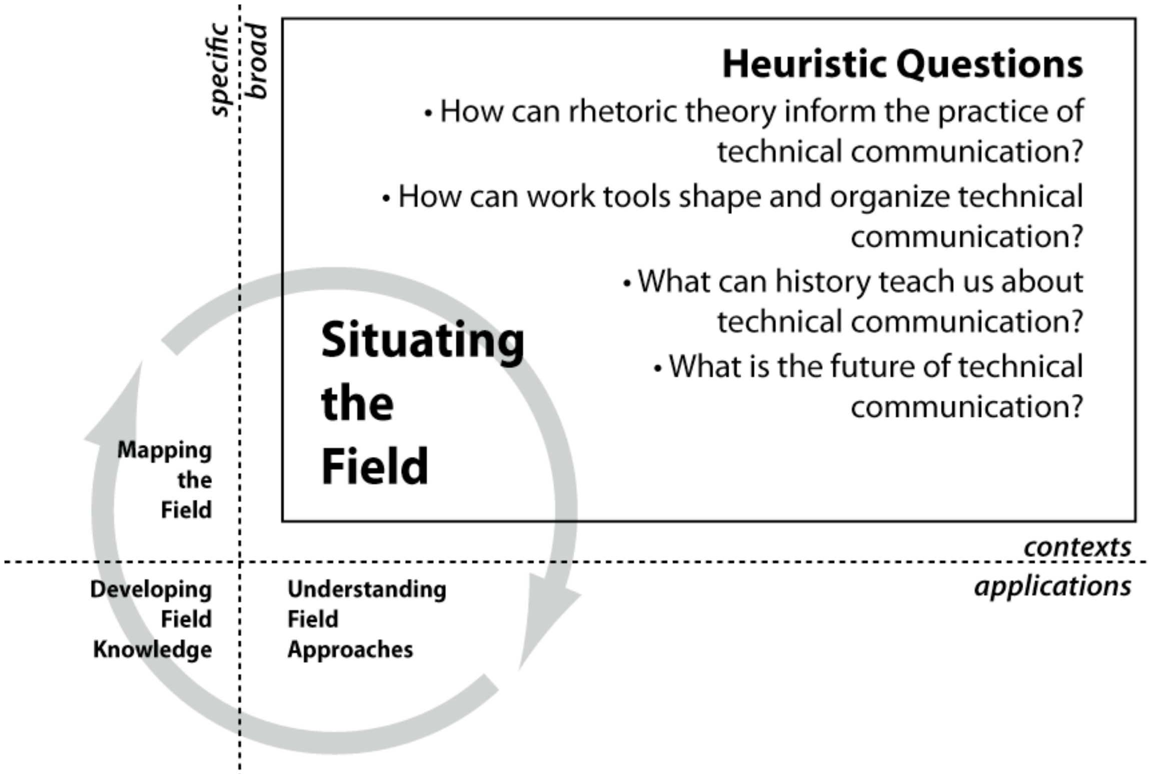

Figure 2. Heuristic Questions for Situating the Field

The second section begins with a discussion of rhetoric, one of the oldest but still most powerful sets of theory about communication. James E. Porter's "How Can Rhetoric Theory Inform the Practice of Technical Communication?" will help you understand and respond to complex writing situations. As Porter notes, rhetoric is often seen as an ivory tower issue that only concerns academics. In reality, however, rhetoric can provide you with approaches to new communication situations that help you figure out how to act and work productively. Porter focuses his efforts on an expanded view of writing and on a key and complex element in all technical communication situations: rhetorical purpose.

Jason Swarts addresses the flip side of the theory/practice binary in "How Can Work Tools Shape and Organize Technical Communication?" Although Swarts focuses on a very concrete tool for doing technical communication—Cascading Style Sheets (CSS) used to structure, among other things, advanced Web sites—he simultaneously demonstrates the importance of thinking about both concrete and conceptual matters, understanding how the use of a specific tool can affect and be affected by larger issues. His chapter emphasizes the need to see technology as a non-neutral element in technical communication settings.

In "What Can History Teach Us About Technical Communication?" Bernadette Longo and T. Kenny Fountain move back and forth between broad and local histories. Beginning with a discussion of several key publications about the history of technical communication as a field, Longo and Fountain proceed to construct a set of heuristics that can be used to generate local histories of technical communication within specific organizations. Connecting up the larger historical contexts of technical communication with the actual practices adopted at your own organization can provide you with powerful ways to understand the forces affecting how you work, including ways to challenge and change things to make yourself a more effective technical communicator.

Brad Mehlenbacher closes the second section by sketching out some responses to the difficult question, "What is the Future of Technical Communication?" Mehlenbacher suggests that we answer this question by touching base with our theories, histories, and practices before looking forward: Where we have been and where we are now place us on trajectories pointed in specific directions. Technical communicators, as Mehlenbacher points out, will need to deal with increasingly complex communication problems, including users who rely on multitasking as a way of life, increasing amounts of information to filter and sort, and workers and users whose job functions are extraordinarily complex. Although we often think that new technologies can solve these problems on their own, Mehlenbacher's heuristics demonstrate that emerging technical communication problems are best understood as *communication* problems.

Chapter 5: How Can Rhetoric Theory Inform the Practice of Technical Communication?

James E. Porter, Miami University

"There is nothing more practical than a good theory." (Lewin 1952)

"I write for users, not readers." (Foucault 1974)

Summary

This chapter examines the function of theory, particularly rhetoric theory, in technical communication, addressing this primary question: What does theory do? How does it help technical communicators do their work, what value does it add, what is its usefulness? While theory is sometimes viewed as an academic pursuit without much practical value in the real world of work, this chapter argues that theory is an indispensable tool for the technical communicator. (Like thinking, you can't get very far without it.) However, the potential usefulness of theory lies in the details of how — how it is methodologically and situationally applied. For theory to be truly useful and helpful, it cannot remain abstract and speculative, philosophical and academic; it must be concretely and strategically intertwined in action, practice, and work.

Scenario

Max is a technical communicator working on a development team for a new software company specializing in developing new applications for web-based social media. His job on the team (and in general at the company) is to write and test online user documentation. So in a sense he wears two functional hats: he serves as both documentation writer and usability specialist. (Note: This scenario of Max is based on an actual case study reported in Sullivan and Porter 1997.)

Max is having a difficulty with one particular piece of documentation he has written and that he is currently testing, aimed at helping users register and then set their preferences for a new application. Using an iterative usability testing model, he has tested and then fixed the documentation several times — but each new time he tests the documentation, the new set of users continues to have problems with it (new problems with each set of testing). He dutifully fixes the errors in the documentation, takes the revised documentation to the next set of users, and then encounters more problems (new ones). Through each round of testing and document revision, he adds more language and diagrams aimed at providing more thorough explanations to help users understand the functions they are learning to use. Nothing seems to work. Max gets frustrated, and decides that users "just don't get it."

We could characterize Max's problem here as the problem of instrumentalism: that is, he relies on a certain a linear theory of communication, a transmission model of communication, that says that documents are supposed to transmit a reality — in this case, a procedural "reality," an ideal narrative about how new users are supposed to set up their accounts — to readers who must first comprehend that reality and then imitate the steps to successfully to complete a task. When the transmission fails to work, the answer, Max feels, lies in adding more language or more clarification of existing language — what we might call "eliminating noise" from the viewpoint of the Shannon-Weaver model. So Max focuses on the document, on getting the language just right and making sure the language accurately and completely reflects the reality of the procedure. That still doesn't work. This model or theory of communication is so deeply embedded in Max's thinking about the problem that he cannot think himself out of this box. He is caught in what Robert Johnson (1998b) would call a system-centered approach to thinking about technology and its relationship to users.

Would theory help solve Max's problem? Well, he already is working with <u>a</u> theory, but the problem is that he doesn't <u>see</u> his theory; it is, for Max, simply reality, "the way things are," rather than one framework of many for explaining communication processes. What Max needs here is an explicit self-consciousness of theory (his own), an ability to critique theories (to understand their strengths and limitations), and also some understanding of alternative theories and of how to apply them to solve problems. He needs to do some *theorizing*, in other words, to examine alternative models of communication, multiple methods for usability, and, surely, to develop a more robust notion of audience. For example, if he were to explore alternate methods of usability, he might become aware of the system-centeredness of his approach and turn his focus away from the document and more to understanding the complexity of his audience. Methodologically, he might scrap the document altogether and try a different approach focused more on the users (e.g., contextual inquiry, starting out by learning more about the users themselves and what help they need to do their work). Such an approach might then have an effect on product development: maybe the issue is the design of the interface or the nature of the procedures? Rather than focusing so intently on the document as the answer to this problem, Max needs to think more broadly about the entire rhetorical context: about the relationship between the technology, the interface, the user help, and real users' needs.

Introduction

The word *theory* carries immense negative baggage: it means abstruse speculation, pie-in-the-sky philosophizing, Derridean word play, impractical political critique, jargon-ridden academic blather. It is abstract, idealistic, speculative ... the antithesis of what the pragmatic, scientific, empirically-minded, precise technical communicator working for a business or engineering firm or software development company ought to be doing. Theorizing is not for real people working on practical issues in the dog-eat-dog world of business, engineering, and IT development. Imagine Rodin's statue *The Thinker*: Theorists sit and ponder. They waste time. They don't perform useful or productive action in the world.

In technical communication, theory is often portrayed as counter to practice, and "the theory-practice debate" is one that the field frequently engages in:

> The cartoon version of this debate pits the working technical writer (who thinks that academics are theoretical people who are out of touch with the "real world" and who cannot program their VCRs) against the academic professional writing teacher (who sees working professionals as people who have no time to read, think, or reflect and who are more interested in what they are doing than why). (Sullivan and Porter 1993, 221)

The debate pops up repeatedly in technical communication publications. In 1979-1980 Carolyn Miller, Elizabeth Harris, and Elizabeth Tebeaux had a lively exchange in the journal *College English* regarding the value of rhetoric theory in technical communication. But the issue has come up many times, in different forms, since then. (See Discussion Question #1 for other examples.) I don't intend to revisit these debates here, but only wish to point out that the theory vs. practice question has been an ongoing, perhaps even defining, tension in the field. What value added does theory, particularly rhetoric theory, provide technical communication? That has long been a serious question for technical communication.

In this chapter I consider how one type of theory, rhetoric theory, significantly informs the practice of technical communication – so you can see right away where I stand in this debate. My discussion examines how theory works to build knowledge and to solve problems in technical communication. My purpose in this chapter is not to summarize or "cover" the theories that you need to know, but rather to show you how rhetoric theory works, what to do with rhetoric theory, and how rhetoric theory can be useful to your research and work as a technical communicator.

My position is that you can't do very much useful work — basically none — as a technical communicator without some kind of theory, implicit if not explicit, guiding your work. If you are running a usability test, you need a theory of usability method to guide how you design your study, select subjects, and manage your testing procedures. If you are working collaboratively on a team to design a content management system for your company, you need a theory of collaboration and team work that guides how you work with others, and you need a theory about the design of interfaces and systems that guides your development of the CMS product. *Theory* in this sense of the word is not abstract and useless, but rather it is the fundamental and necessary principles guiding your work as a technical communicator.

What Does Theory Do?

What Is "Theory"?

Theory is often understood as abstract philosophical musing. Jacques Derrida, Michel Foucault, Judith Butler, Katherine Hayles, Donna Haraway — these are all well-known academic, postmodern theorists whose writing is abstract and speculative, barely comprehensible to most, unnecessarily verbose it seems, without much apparent reference to actions, events, or phenomena in the world. Often such theorists write theory about other theories — which they expect that you have read, damn them. Foucault doesn't even bother to cite his theoretical sources. Let's not forget, though, that Foucault started out as a psychologist, one who used an historical methodology to understand the conception of medicine as a field of knowledge. *Madness and Civilization*, his doctoral dissertation, was an extensive historical investigation into how the concept of madness evolved as a medical condition — and in doing this project he was also beginning to study how medicine developed as a profession and as a field of knowledge, a very imprecise field of knowledge at first. His next major work, *The Birth of the Clinic*, further explored medicine as an institution. Foucault may be known more for his later, more abstract work, but his theories are founded upon very thorough research investigation into the history of disciplinary institutions. Often, as we will see in a moment, theory is based on empirical study that is not always explicitly referenced in the theoretical discussion.

But what is *theory*? Conversationally, a theory is simply a speculative idea that someone has: "I have a theory about why that garbage is on the kitchen floor ... aha, the dog!" This sense of theory aligns with the notion of theory as a research question or hypothesis to be tested: "My theory about this blog interface is that the instructions for creating new pages are unclear: users will have problems creating new pages in their blog space." *Theory* can mean a yet-to-be-confirmed question, hypothesis, or possibility.

This meaning is, ironically, the opposite of another definition of theory: the scientific notion of theory as a well-established, even proven axiom that is "purported to be universal" (Culler 1997, 7). Karl Popper (1963) discusses these two senses of the word: *theory*, first, as a scientifically true proposition, true in the sense of verifiable through inductive observation (e.g., Einstein's theory of gravitation), versus a less empirically verifiable notion of *theory* as an overall system for understanding human behavior (e.g., Marxist theory or Freudian theory). In *A Brief History of Time* (1996), Stephen Hawking further describes the scientific notion of theory: "A theory is a good theory if it satisfies two requirements: It must accurately describe a large class of observations on the basis of a model that contains only a few arbitrary elements, and it must make definite predictions about the results of future observations" (15). *Theory* in this sense means a principle that has universal or nearly universal explanatory and predictive power; it operates as a truth.

But there is yet another sense of theory – more a rhetorical and humanistic notion of theory as a conceptual framework, a map, or a lens if you will that provides us a way of looking at the world. We all have these conceptual maps in our heads, and they are useful insofar as they help us navigate our lives and solve problems. However, these conceptual maps can also become ruts — as the Max scenario illustrates. These conceptual maps can blind us if one way of seeing the world becomes the only way of seeing the world and we are not open to alternative conceptions. Hence the usefulness of *theorizing* as an activity: theorizing, or reflecting critically about the theory/ies that underlie our thinking, can expand the way we think by challenging our existing frameworks and giving us new ways of seeing.

This metaphor of theory as "framework" recalls Kenneth Burke's notion of a "terministic screen," which he describes in photographic terms as a kind of "color filter" that influences one's perception (45-56). To exemplify, he cites three different analyses of infant behavior, one by a behavioral psychologist, one by a social psychologist, and one by a medieval theologian (St. Augustine). In a sense all three of these analysts are observing and describing the "same" infant behaviors or "instinctual responses" (crying, smiling, sucking, clinging, following), and yet because each analyst has a different methodological frame of reference, each derives different kinds of knowledge about infant behavior. The behaviorist focuses on causation: how certain stimuli produced predictable effects in infants. However, the social psychologist sees the baby's behavior fundamentally from a social frame of reference, focusing on the behaviors as guided by the relationship between mother and child. St. Augustine sees the infant behavior as fundamentally expressive of a relationship between child and God (48-49). According to Burke, "All three terminologies [terministic screens] ... direct the attention differently, and thus lead to a correspondingly different quality of observations" (49).

You can see how different theoretical frameworks influence perceptions of the Internet. Some see the Internet as primarily a *space*, as a communication medium or a publishing space akin to a library. Others see the Internet as a *place*, a community or home or culture, an environment in which people live and move and interact. That metaphoric distinction — a theory distinction — matters in terms of issues such as privacy, research ethics, and intellectual property. If we view the Internet is a *space* for storing published work, like a library or a vast database, then we might suppose we have the right to treat whatever is posted there as publicly available for research purposes. If, however, we see the Internet as a *place* where people interact socially — more like a street cafe (which is public in one sense, but where people could be having a private conversation at a table) — then we might be inclined toward a different ethics, viewing some material on the Internet as "private" even if it is possible to access it and download it.

Think of theory, then, as a kind color filter that you use, that you must use, in order to comprehend and analyze human behaviors, social events, or texts. The ability to self-reflect and to articulate your particular theoretical filter — to identify it, to critique it, to understand its strengths and limitations, and to imagine alternatives — is the activity of *theorizing*. Granted, some people get carried away and start theorizing about theory all the time — they are called philosophers or rhetoricians, and they typically live in universities. (Be wary of them.) But don't underestimate the value of theory and of theorizing to your work: theory itself is essential to technical communicators, and theoretical self-awareness, an ability to theorize, a considerable strength.

As Jonathan Culler (1997) describes theory, it has several distinctive characteristics:

> 1. Theory is interdisciplinary — discourse with effects outside an original discipline.
> 2. Theory is analytical and speculative — an attempt to work out what is involved in what we call sex or language or writing or meaning or the subject.
> 3. Theory is a critique of common sense, of concepts taken as natural.
> 4. Theory is reflexive, thinking about thinking, inquiry into the categories we use in making sense of things, in literature and in other discursive practices. (Culler 1997, 14)

In Culler's third point, theory as the critique of common sense, theory almost always makes our lives more difficult by complicating things. When Burke notices that there are two different views of language use – scientistic and dramatistic – he is complicating our notions of language, literary, and reading. He is making two things out of what we thought was one thing. Is this a violation of Occam's Razor? William of Occam's philosophical razor — *Entia non sunt multiplicanda praeter necessitatem* — insists that entities should not be unnecessarily complicated. If you are going to make something more complex, it should serve the purpose of providing a better tool for analysis and problem-solving. So is Burke unnecessarily complicating? The test of his theory, any theory, is its usefulness and productivity, whether the complexity it creates helps us in some way: increases our understanding of a situation, helps us solve a problem, or allows us to generate new knowledge.

What does theory *do*? It attempts to arrive at knowledge or understanding by questioning, critiquing, and problematizing something that we normally think or do — "the critique of common sense," in Culler's terminology. It uncovers something hidden or at least under-appreciated, calls attention to it, and says, This is important to thinking about this topic or question. It provides a distinctive point of view, a lens or filter, that helps us understand people, actions, texts, events. Theory should have heuristic and explanatory power: that is, it should help you to *do* things, it should help you to *see* things in a different way, it should enable you to *produce* things ... findings, conclusions, recommendations that have a real effect — an action — in the world.

How Does Theory Work in Technical Communication?

As an example of how theory works, let us take a detailed look at one particular theoretical statement in the field of technical communication, a well known and highly regarded piece of theory: Patricia Sullivan's article "Beyond a Narrow Conception of Usability," published in 1989 in the journal *IEEE Transactions on Professional Communication*. (The journal issue in which this article appeared won the 1990 NCTE award for "Best Collection in Technical and Scientific Communication.")

In this article Sullivan is not reporting on a usability study she herself has conducted. Rather, she is speculating more broadly on the overall methodology of usability. She is doing a kind of meta-analysis — that is, analyzing others' usability studies according to a particular framework for organizing and evaluating those studies. It is also important to note that, as with

Foucault's work, underlying Sullivan's theory of usability is a considerable amount of practical experiential knowledge about usability; she has consulted with corporate usability departments, and she has conducted her own usability studies — although the primary purpose of her 1989 article is not to share or describe her own experience and that experience is not explicitly evident in the article itself. She has also read a lot of usability research — and that extensive reading is evident in the article.

Based on her extensive reading, Sullivan notices that different disciplinary groups uses different approaches, or filters, for conducting usability research:

> Psychologists and engineers in human-computer interaction typically use experiments and case studies to study the usability of interfaces and systems; sociologists and anthropologists use ethnography and field methods when they study the computing of organizations; marketers typically use interviews and surveys to study consumer preferences; document designers, educational psychologists, and writers in technical communication use various exploratory and text-based methods to study the usability of educational materials. (257-258)

Sullivan starts, first, by observing that different disciplines favor different methods. She next proposes that researchers do not restrict themselves to using only the methods from their own disciplines, but rather look outside their disciplines to methods that are suited to the research questions and contexts they are examining. Table 3 in her article presents a list of available usability methods. This table is a heuristic, that is, a generative framework listing the various methods used in usability research and evaluating those methods in terms of the quality of information they provide about various usability metrics, such as Success and Satisfaction (see Figure 1).

TABLE 3
VARIOUS EVALUATION METHODS' STRENGTHS IN YIELDING INFORMATION ABOUT DOCUMENTATION USABILITY

Method	**Situated Use** (in workplace)	**Strategy for Use** (how plan to use)	**Action Record** (how actually use)	**Success** (tasks correctly done)	**Satisfaction** (user's response)
Direct Questioning					
Surveys [30, 31]	may			may	good
Interviews [32, 33]	good	may		may	good
Comprehension tests		may		may	
Observation					
Informal observations		good		good	may
Lab observations [34, 35, 36]		may	best	good	
User protocols [37, 38]		best	good	good	may
Reading protocols [37]		may	good	good	
Keystroke records[39]			good	good	
More Traditional Evaluation					
Computer text analysis [37, 12]					
Editorial review [37]		may		may	
Technical review				may	

Figure 1. Table from "Beyond a Narrow Conception of Usability" (Sullivan 1989)

Table 3 in Sullivan's article is a piece of theory — a tabular presentation of a verbal narrative that aligns usability methods (listed vertically in the left-hand column) with usability metrics (listed horizontally across the top of the table). With this table, Sullivan is bringing rhetoric theory to usability studies by emphasizing the importance of context to usability research design. This table presents in digested format a good deal of information but it also makes an argument based on Sullivan's practical judgment and experience in usability studies. The table presents theoretical and abstract information — but it also references, through endnotes, particular usability studies that are discussed elsewhere in the article. The purpose of this piece of theory is to encourage usability researchers to think beyond their disciplinary preferences to employ a broader repertoire of methods useful to solving various usability problems.

Sullivan's analysis is also a form of critique. It is critiquing how usability studies, in 1989, had drifted into a kind of mono-methodological mindset, seeing the work of usability as consisting of one primary type of method: testing finished documentation, in a lab setting, at the end of the documentation design cycle. (This is of course Max's approach to usability.) Sullivan argues that "usability testing is weakened when confined to validating all-but-finished documentation," and she points out that end-of-development usability fails to capture important user input that can be of great value earlier in the design cycle" (see also Johnson, Salvo, and Zoetewey 2007, 320). Sullivan is suggesting that usability has drifted into defining itself too much in terms of methods and not enough in terms of inquiry purposes: that is, focusing too much on the *what* (the method), not enough on the *why* (why are we conducting a usability study?). So she is critiquing the field, but not in a harsh sense. Rather she is circumspectly pointing out a limitation in the field's approach and recommending a different approach, visually represented in Table 3, which serves as a heuristic map of her overall argument.

Similarly, Robert Johnson and Barbara Mirel have also argued for a more complex, more nuanced understanding of usability — in a sense, they have also brought rhetoric theory "to" usability studies by emphasizing the importance of involving users in the design process and focusing on user action-in-context. In his book *User-Centered Technology* (1997), Johnson "rhetoricizes" user-centered design by showing how various contextual factors weigh in the user's situation, and he builds a model to represent that complexity of factors (Figure 2-7 on p. 39). Mirel (2002) has argued for a shift in the focus of analysis for usability studies: from users and discrete tasks to "work in context ... from task actions to task structure — to the structural arrangements and relations between people, resources, and contextual conditions for a given task or problem."

In each of these cases — Sullivan, Johnson, Mirel — a rhetoric theorist is both pointing to a deeper complexity but also striving to make that complexity manageable by offering a model, heuristic, or research strategy for implementing the theory in situated contexts. In each case, too, the researcher is using rhetoric theory to "problematize method" (Sullivan and Porter 1997, 64). Theory in this case is making research design and methodology more complex, but, ideally, the theory also adheres to Occam's Razor: The added complexity should serve the purpose of providing a better tool for analysis and problem-solving for usability questions.

Would this kind of usability theory ever show up in a corporate usability report? It is unlikely that extensive theorizing would show up — that's just not tolerated in corporate reports (too much verbiage). But I can imagine a report including a citation to Sullivan's work, perhaps even a brief summary or quotation. I can imagine usability specialists using Sullivan's Table 3 heuristically to guide their decisions about research design for a planned usability study, or to teach usability methods to new hires, or to argue to their clients for the validity of a certain methodological approach to a usability study. If your clients are program developers who think that lab tests are the only valid method for usability research, then you will need to make the argument that lab tests are good for answering some research questions, but not so good for others.

In a 2007 article in *IEEEE Transactions on Professional Communication*, Johnson, Salvo, and Zoetewey provide a retrospective on Sullivan's 1989 article. From a vantage point twenty year later, they see the same problems that Sullivan identifies persisting in usability research. They theorize the problem as being that usability occupies an uneasy space between two cultures — usability as science vs. usability as art (Johnson, Salvo and Zoetewey 2007, 323). The art part is messier, as it involves the complex rhetorical variable of users, audiences, people

— and, as we all know, the variability of audiences poses quite a challenge for rhetoric. To win recognition and respect in the workplace, usability needs to be scientific, to an extent even positivistic — that is the scientific paradigm that persuades engineers and computer scientists. But to be valid as a methodology, and to be true to its primary mission, usability needs to function also as an art. This binary tension — a theoretical framework — helps explain many of the challenges that usability specialists face. Usability itself, as a field, has to address two different kinds of audiences (at least) and, often, bridge the gap between those audiences (Johnson, Salvo, and Zoetewey 2007, 328).

Such theoretical discussion — Sullivan's (1989) original piece and Johnson, Salvo, and Zoetewey's (2007) response to it — is an abstract discussion to be sure, but one with practical implications for usability education and workplace practice. Taking "a broad view" toward usability means that you shouldn't get comfortable with one method but that you need to develop a broad repertoire of usability methods, and understand how different methods may be applicable to different kinds of research questions, different kinds of products, different kinds of audiences. A "one size fits all" approach limits choices and problem-solving potential. Even though Sullivan's article is now over thirty years old, it still does good work, is still relevant to usability studies.

Sullivan's 1989 article is an example of a piece that is almost entirely theoretical. But more often in technical communication research, theory is used as the framework or critical lens for a research study. For example, Stewart Whittemore does precisely this in a 2008 article in *Technical Communication Quarterly* called "Metadata and Memory." In this piece Whittemore explores the role that memory plays in the design of content management systems. He begins by building a theory of memory using research on visual and spatial imagery in the field of cognitive psychology and, less intuitively, discussions of memory from classical rhetoric, chiefly from Cicero and Quintilian. He argues that Quintilian's theory of rhetorical memory has something to offer technical communication:

> this Quntilianic strand of the memory tradition ... provides the final piece of the puzzle for enabling inventional activity in content databases: Writers need to be given larger design views of their texts-in-progress so that they can keep track of their larger discursive goals through exploration and consolidation and so that they can meet the needs of real users in real situations of use . ... [For example] CMS toolkits should provide some on-the-fly means for generating an equivalent of the Print Preview offered by word processors like Microsoft Word. (Whittemore 2008, 106)

Whittemore skillfully deploys this 2,000-year-old bit of theory into practical advice for the design of databases: We can use visual representation as a tool to prompt memory, as classical rhetoricians recommended. Here is an example of where theory helps shed light on practice — and, beyond that, even makes recommendations for productive action.

Sometimes researchers have to build new theories, rather than "borrow" theories, particularly when existing theories are not adequate to the task at hand. In a research article published in *Technical Communication Quarterly* in 2006, Huatong Sun does precisely this. (This article is based on Sun's 2004 doctoral dissertation at Renssalaer Polytechnic Institute, which won the CCCC Award for Outstanding Dissertation in Technical Communication for that year.)

On one level, Sun's article is a simple research report: She conducted a comparative case study of users using mobile messaging technology in two different locations: Albany, New York in the United States, and the Hangzhou region of Zhejiang province, China. The purpose of the study was to determine, first, if users in different cultures would employ text messaging in different ways — and, if so, what would be the implications of this finding for design of IT products, particularly mobile technology interfaces.

However, before collecting her data, Sun recognized that she had to develop a framework for understanding the scene for her users' actions; she needed a definition of culture, but a robust definition that would take into account both culture in the sense of "dominant cultural values in a national culture" (460) but also account for the "complexities of local contexts" and "subgroup culture (e.g., age group, gender, and organizational affiliation)" (460). In other words, Sun recognized the need to develop a complex notion of culture that would avoid gross generalities and that would, rather, take into account the many ways and levels on which culture operates.

A significant portion of Sun's article (pp. 459-466) is allocated to building a theory of cultural usability that will serve as the lens or perspective through which she can observe her users' behaviors. She builds her theory by synthesizing and critiquing others' notions of culture. Her "new framework integrates key concepts and methods from activity theory, genre theory, and British cultural studies" (461). What results from this analysis is a table and an accompanying diagram (465) that constitutes a model for cultural usability, a model that she then uses as the framework guiding data collection and analysis for her study. This model — one very much like Sullivan's in that it is a tabular representation of a complex narrative — allows Sun to "see" her data in a richer, more complex way than would be possible without it. She sees, for instance, that her users live in a variety of cultures, not only a broad national culture (China, the United States) but also in local cultures of work and recreation and social/personal networks of friends and family. One implication from the analysis is that technology designers need to develop "a deep understanding of concrete use activities in local contexts while considering cultural and structuring factors" (477). In other words, a monolithic and macro understanding of culture is not sufficient to explain how users engage and interact with technology.

This richer, more complex notion of cultural usability is increasingly needed in a networked world where people of different cultures interact and intersect in different ways, and where, increasingly, the older notion of culture as an isolated and distinctly different national identity (e.g., "Chinese culture") is not a viable model for understanding the design and use of digital technologies. Designers of interactive systems intended to be used broadly across global marketplaces need to move beyond nationalistic notions of culture because in a digital age, increasingly, those notions don't help us understand how users interact with interfaces and with each other.

These examples of the uses of theory — Sullivan, Whittemore, Sun — also show us the importance of seeing theory as a *conversation*. Rather than seeing theory as the isolated and autonomous statement of a great thinker, see theory as a conversation among reflective thinking professionals (plural) who are collaboratively and intertextually working together, discussing ideas, sometimes across chasms of time and space — e.g., Johnson, Salvo, and Zoetewey "conversing with" Sullivan; Whittemore "conversing with" Quintilian; Sun "conversing with" various theories and definitions of "culture" — to develop useful frameworks and systems. That is why it is often difficult to read *one* piece of theory with full comprehension because to understand a theory usually requires significant awareness of prior context: it helps to be familiar with the previous conversation that has led up to that one piece of theory.

Does such abstract analysis do any useful work? Granted, this type of analysis does not provide any new data. But the analysis does provide us with a systematic and coherent framework for thinking about the design of usability studies — a framework that pushes usability researchers to think broadly about methodological choices. It also provides usability researchers with a rationale, a backing that they can use to make methodological arguments when they need to persuade others to view new methods as useful.

This kind of theory serves a heuristic purpose and is thus a form of rhetorical invention. In classical Roman rhetoric, *inventio* was one of the five key canons of the art (along with arrangement, style, memory, and delivery). To promote invention, classical rhetoricians developed *heuristics* — that is, procedures for prompting and developing ideas, arguments, and content for discourse. According to Janice Lauer (2004), heuristics are

> ... questions, operations, and perspectives used to guide inquiry. Neither algorithmic (rule governed) nor completely aleatory (random), they prompt investigators [writers] to take multiple perspectives on questions they are pursuing, to break out of conceptual ruts, and to forge new associations in order to trigger possible new understandings. Heuristic procedures are thought to engage memory and imagination and are able to be taught and transferred from one situation to another. (8-9)

Heuristics, then, are open-ended questions, prompts, categories, memory devices, and/or visual grids — such as Sullivan's table — that aid thinking, discovery, deliberation, research, and design. In the classical era, the art of rhetoric included invention — it was there quite prominently in the rhetoric handbooks of Aristotle, Cicero, and Quintilian — and those inventional strategies constituted theory in the sense of conceptual maps or frameworks useful for exploring topics.

Heuristics for Technical Communication

I want to introduce two basic rhetoric theories — one about writing, the other about purpose for writing — and their accompanying heuristics to show how two simple forms of rhetoric theory can work heuristically to help technical communicators.

Heuristic #1 — Views of Writing

Writing is a deceptively simple term. We all know what it means, but like the terms *culture* and *audience*, the word has a wide variety of meanings and functions. It helps to view writing heuristically from four different perspectives:

- Writing as **PRODUCT or DOCUMENT** — This is the traditional formalist view that sees the text as a product, as a formal artifact that you produce following certain genre conventions (a memo, a report, a web site, an online user help forum).
- Writing as **SELF** — This perspective sees a piece of writing as an expression or extension of an author/writer — either the individual, the team, or the collective group, and often all of the above — what we sometimes call *ethos*.
- Writing as **PROCESS** — This is a dynamic view of writing as the process of composing, as a process of that can include inquiry and research as well as collaboration with others. It also includes downstream reception and interaction, the ways in which readers and users interact with a document and, perhaps, provide feedback to developers.
- Writing as **ACTION** conducted for the benefit of some **AUDIENCE** — This is the performative perspective that focuses on what effects the writing has on its intended audiences (its outcomes or value added).

Technical communication has traditionally been defined primarily by the product perspective: that is, with the emphasis being on the genres and types of documents that technical writers produce and also on the design of those documents. From that perspective, technical communicators have been, primarily, producers of instructional manuals, then computer documentation, then online user help, and then finally designers of web sites, content management systems, and user help forums. Thanks in part to the influence of the field of rhetoric/composition and to empirical research on workplace practices (aka, “workplace research”), the field of technical communication over the past twenty or more years has moved more toward thinking more about process, action, and reception. Usability research is of course predominantly focused on questions of reception and interaction: How effectively will documents work with their intended audiences?

Technical communication has never been all that concerned about the expressive function, much preferring the appeal of logos over ethos over pathos. But I would argue that technical communicators have always been attentive to "the expressive function" of their workplace writing: that is, recognizing that all writing creates an *ethos* or identity, an image of the author. For most organizational writing, the author identity is usually not of an individual but is a collective identity. For public discourse this identity is often constructed through graphic means — e.g., the logo, the web site design, the product branding. Companies are flocking now toward an identity of being “green,” because that helps to develop an *ethos* of civic responsibility. *Ethos* in this sense is corporate image.

But even internally writing has an *ethos*: for instance, a usability department might need to develop its reputation as “methodologically scientific” in order to convince programmers and designers to heed the results of usability testing — and the usability researchers make sure to fashion their usability reports in order to convey their allegiance to quantitative measures of validity. If I am a new employee writing memos and reports to my supervisor, then I will take a great deal of care with my first writing on the job, because those writings will play a large part in constructing my as-yet-unformed identity in the organization: Am I careful and precise in my language use? Am I attentive to detail? Are my conclusions and recommendations appropriately backed by the data I have collected and carefully nuanced and limited to what is actually demonstratable (or am I prone to exaggeration and overstatement)? Readers will make judgments about *me*, and about the quality of my thinking and my character, based on the writing I produce. The *ethos* of a piece of writing — the character that writing displays — says something about the writer or writing team or corporation that produced it.

To focus and simplify this heuristic — these four ways of looking at writing — let us abbreviate it as DEPAA. ("Depa" is a Sanskrit word meaning "lamp," indeed an appropriate acronym for a heuristic.)

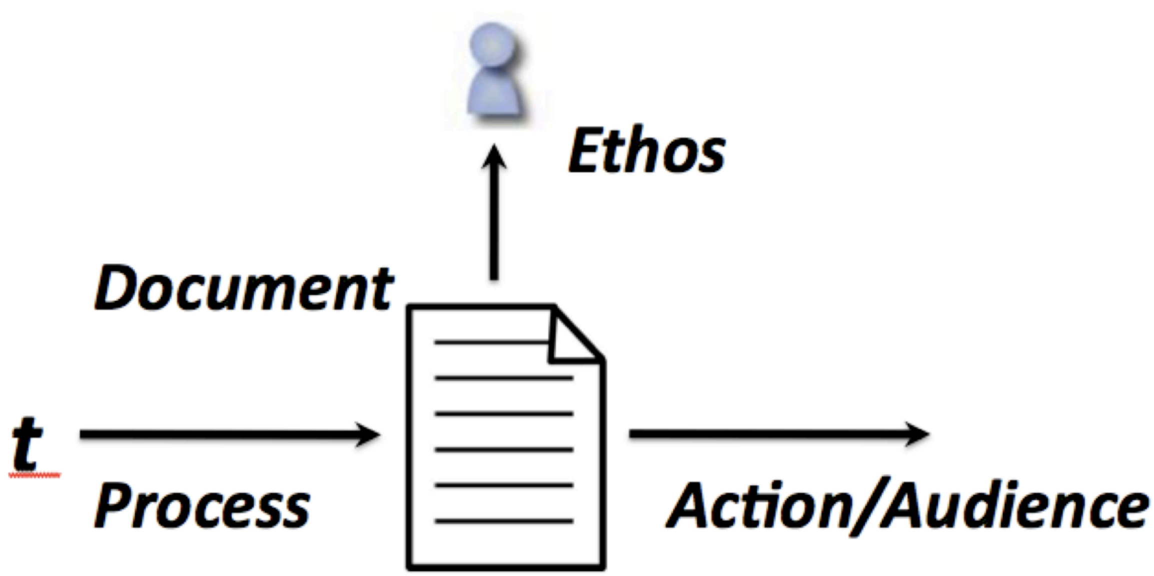

Figure 2. Heuristic #1: Four Perspectives on Writing

Demonstration of Heuristic #1

How might this simple heuristic apply to the work of the technical communicator? If we see writing primarily from the formalist framework as a text, a document, or a product, that perspective can sometimes be powerful but it could also lead us to take a limited view of our role in the communication process. Let us say that we are given the assignment to construct a content management system as a way for an organization to produce and distribute information internally in the organization. That's an assignment that asks us to take a product view: produce a document — in this case an online system for document management. If we already think that way, we can happily go off and create a product that we think will do the job. This approach dovetails neatly with the way that academic assignments are often pitched: Write an essay. Create a web site. Produce a report. Conduct a usability test. These are all assignments that focus on product and genre and hence take a *document* perspective.

However, if we apply a slightly different theoretical lens to the task, we might begin by asking, What is our goal here? What is this system supposed to accomplish? What is the desired outcome for the content management system? Or, even backing up a bit more: What is the problem we're trying to solve with this content management systems? These are *action* or results oriented questions. What is this system supposed to accomplish? Why — and, very importantly, for whom?

The why and for whom questions are of course the most basic questions of rhetoric theory: Why are we writing (or communicating)? For what audience?? And what effect or outcome are we aiming for? Why — or So what? if we want to put a sardonic spin on it — is a key question that should guide all rhetorical events, all writing projects, all document development. (I will talk more about purpose in the next section of this chapter.)

The process of thinking here parallels the process of thinking applied by Hart-Davidson et al. (2008) in their article on “Coming to Content Management” published in *Technical Communication Quarterly*. Hart-Davidson et al. describe and reflect on two projects involving two clients — NPO (national professional organization) and Michigan State University Libraries. In their approach to these projects, the team used rhetorical theory heuristically, first, to understand the assigned task from a different framework and, then, to design an approach to the task that would allow them to solve the problem for the client. “Solving the problem for the client” in this circumstance meant, in a sense, questioning or critiquing the assignment as given, challenging the frame in which it was viewed by the client — in a nice way, to be sure — and then constructing a different frame that would be more productive, more helpful to the client in the long run.

When clients come to you and say “Build us a web site,” that is a product orientation that requires some critical exploration. Ask back, Why do you want a web site? What purpose are you trying to accomplish, and for whom? Hart-Davidson et al. (2008) apply this shift in perspective to a very practical problem for their client: How do we design our website to provide useful information to our clients and customers? They shift from a typical static, product-oriented notion of *content* to a dynamic notion of *content development*: As they phrase it, “Your website is not something you have, but something you do for, or even with, your clients/members/customers” (12). This shift in perspective allows Hart-Davidson et al. to redefine the location of their client’s problem: the locus of the problem is not the writing as document (the website), but rather the writing as process ... the how and who part (who produces the writing and how).

This shift in the theoretical framework has practical implications for the methodology of solving the problem. Instead of focusing on the content and design of the client's current website, Hart-Davidson et al. ended up studying "the roles and workflows of content developers" (25). In short, they studied the process, not the product, with the aim of developing a content management system that would maximize the efficiency of content development as well as the usefulness of the content for end users. Yes, some of the recommendations for their clients are product based, but many pertain to workflow and communication practices (see pp. 27-29 for example). In short, the solution to the client's problem lies in the relationship between process and product, not simply in product. Here is an example of where a theory about writing — specifically, about writing as composing process — helps solve a real-world client problem.

An ongoing problem in technical communication is the danger of drifting away from audience into "the systems-based approach" that focuses too much attention on the design of products, documents, and systems and forgets the human interaction side of systems — aka the presence and contribution of the audience or user. In his work promoting "user-centered technology," Robert Johnson (1998b) most famously reminded us of this problem in regards to the design of computer documentation. George Pullman and Baotong Gu (2008) also caution us about the dangers of systems-based thinking (a kind of product thinking) in regards to the design of content-management systems: "Another factor contributing to the difficulty of CMS implementation is that most content management systems take a systems-based approach toward managing content/information/knowledge at the cost of considerations for content and user needs. ... The very expression content management excludes any idea of writing or communicating and focuses on information independently of the people who produce or consume it" (2). The heuristic perspectives of *process* and *action* can help us think beyond the more static product orientation.

Heuristic #2 — Views of Purpose

Purpose is of course fundamental to technical communication: Why are you writing, why are you communicating, that's the main question that should guide your work. "To help users learn how to use this application." "To provide information to management, and to make a recommendation." "To create a useful social network that people will want to join." These are all expressions of purpose.

But of all rhetorical topics, purpose is the one "most susceptible of dissolution," as Kenneth Burke put it (1969, 289) — meaning that notions of purpose can degrade, that people can easily confuse means and ends and begin to see acts as having their own intrinsic purposes. Writers can lose sight of their goals when they are immersed in the details of a project; the project can become its own end or goal, the means can easily slide into becoming the end (e.g., "finish this document"). Burke discusses how in a capitalist economy, money tends to become a purpose in itself, as opposed to a means toward some other purpose (e.g., "happiness")(314).

Aristotle was perhaps the first rhetorician to notice the slippery quality of purpose, in identifying the differing senses of "cause." In Book II.3 of *Physics* and in Book V.2 of *Metaphysics*, he distinguishes between four ways that we talk about "cause": material cause, formal cause, efficient cause, final cause (*Physics* II.3, 194b24; see also Cuizon 2007; Falcon 2008). These four causes refer to ways in which we can talk about meaningful action: How something, like a statue or speech, gets created and what motivates or "causes" its production.

We can talk about cause, for instance, in terms of why and how something comes into being (efficient cause) versus what it exists in order to do or accomplish (final cause).

In rhetoric theory, the theorists who have focused most prominently on the notion of purpose are Kenneth Burke and James Kinneavy. For Burke, purpose is one of the five key terms of dramatism — and arguably the most important term. In Aristotelian fashion, James Kinneavy (1971) developed a comparably complex theory of purpose, a framework identifying four distinct discursive purposes, or what Kinneavy called the four *aims* of discourse: expressive, persuasive, referential, literary. The purpose or aim is "all important ... [as it] determines everything else in the process of discourse" (48). A given discourse has a predominant aim, each of which has its own distinct intention, logic, method of development, approach to organization, style, etc. Purpose — or the why we are writing is the driving motivation behind all communication — and the why always presupposes a WHO, we are writing for somebody for some benefit to someone, we have an intention and a desired outcome. WHY and WHO go together. Purpose has to do with the underlying Why of human behavior: Why do we work — or write?

For both theorists, purpose is at the center of their conception of rhetoric — and, most importantly, both recognize that purpose is not one thing, but rather several different things hiding under a single term.

When rhetoric asks questions about audience and purpose — What is my purpose for writing? Who is my audience? — it is also implicitly asking questions about the economics. What motivates someone to produce and distribute a piece of writing? What motivates someone else to access it, read it, interact with it? What drives the interaction and makes it productive for both parties?

Why do we write? The stock answer in technical communication (as well as rhetoric/composition) has often been something like "to inform, to persuade, to report," etc. But that answer itself confuses means with ends: That is, why would anyone want to inform somebody or write a report? What's the point of doing that? There's another calculus involved in any act of writing: purpose in the sense of *value*. There must be some value for the reader(s) and/or for the writer(s) in the act of producing, distributing, exchanging texts. Somebody has information, somebody else needs it. But what motivates such an exchange? Writing — all writing, I would say — resides in economic systems of value, exchange, and capital. Not always monetary or commercial systems, but economic systems nonetheless. The kind of economics I am talking about has to do with value more broadly defined. It might well involve the exchange of money, but the motivation could just as easily be based on desire, participation, sharing, emotional connectedness.

But what is the *ultimate* purpose for writing? If we are Aristotelians or pagans, perhaps we would say happiness. If we are environmentalists or Buddhists, we might say peace and harmony with all things in this world. If we are politically liberal, the goal might be prosperity and justice for all in this world. If we are Muslims or Christians, the goal might be salvation in the next world. Purpose in this ultimate sense means something other than our immediate purpose for writing ("to inform users") or for working in business ("to create a successful software product").

My purpose here is not to explore ultimate purposes — that's not typically a concern for technical communicators (though maybe it ought to be — see Katz 1992; Katz 1993). Rather, I wish to call attention to the fact that there are purposes beyond immediate ones and to highlight the multifaceted nature of purpose. In fact, I use an adaptation of Aristotle's theory of causes to talk about purpose in my technical communication classes. I refer to purpose in terms of "The Three Whys," my heuristic for talking about purpose in technical communication contexts.

The Three Whys

- **Why #1 — originating cause, initiating problem or question**: It refers to the motivating purpose behind a piece of writing, an information product, a rhetorical action: What is the need, problem, or question that is prime mover for this document? It is usually important (for reader understanding) to identify Why #1 clearly in the opening of a memo or report.
- **Why #2 — immediate cause or document (product) purpose**: What is the purpose of this piece of writing, this document, this information product: What will this document contribute vis-à-vis Why #1?
- **Why #3 — ultimate cause or hoped-for change in audience**: What is the hoped-for outcome or benefit of this document — for the client, the customer, the user, the reader, the designer?

This approach encourages the writer to see a given DOCUMENT or PRODUCT as also an ACTION, as existing in the world of action: There are issues at the front end (Why #1) that create the need for the document; and, at the back end (Why #3), the document should act in some way to produce a positive result in the world. You can see lurking behind this discussion not only the influence of James Kinneavy, but also Aristotle's discussion of causes and Kenneth Burke's discussion of motives.

When someone asks you why you wrote a particular document, you can answer that question in one of three possible ways (at least). "I did the usability study because we'd been getting complaints from users who had trouble using the interface to register for voting" — that is a Why #1 notion of purpose that identifies the originating problem that generated the need for a study in the first place. Or you can respond, "I wrote the report in order to inform the web designers of what problems users were having with the registration process and highlight places in the interface and instructions they ran into problems" — which is a Why #2 notion of purpose focusing on what the document itself contains. Why #3 is the hoped-for outcome, the ultimate or final purpose vis-à-vis audience: "I wrote the report so that we could fix the problems in the interface and so that a higher percentage of users — ideally, all of them! — could figure out how to register to vote online."

Demonstrations of Heuristic #2

You can see The Three Whys functioning in technical communication research as a way to establish the purpose — or rather, purposes— for that research. Looking again at Huatong Sun's 2006 research article from *Technical Communication Quarterly*, we can see that in the introduction she identifies Why #1 — the motivating reason for her research project:

> [L]ocalization specialists focus most of their attention on the delivery aspects of technology, such as what colors or page layout would be preferred by some ethnic cultures and how the dialog box should be resized for a certain language (Esselink, 2000; Kano, 1995; Lingo & LISA, 2000; Musale, 2001). Generally they design for operational affordances—the properties of a technology that afford nonconscious and automatically performed functions—and instrumental affordances—the properties of a technology that support goal-directed actions in the material context. At the same time, they neglect possible design options for social affordances—the properties of a technology that support object-oriented

> activity and social behaviors in a sociocultural and historical context (Sun, 2004). (Sun 2006, 460)

Her statement identifies, first, that there has been considerable attention paid to one aspect of interface design for international audiences (the delivery aspects), but that another focus has been neglected: "social affordances," the functionality aspect of an interface that supports social behaviors. She thus identifies a "gap" in the research — a gap that her project will attempt to fill. Her next statement of purpose — the Why #2 statement — explains what she will do in this article:

> In this article, I examine and compare user localization efforts of mobile messaging technology in two distinctly different cultural contexts (the United States and China) to understand how users localize a hard-to-use technology into their everyday life to augment work and life. (Sun 2006, 459)

And her ultimate purpose for doing this work — the Why #3 purpose — she explains at the end of the article:

> With this understanding, information designers will not seek to design fully localized interfaces or products (because that is never possible) or regard the product shipment (or developer localization) as the end of design. Instead, they will look for ways to initiate a communication channel and to build a support network to enhance user localization and help repair the possible breakdowns in contexts of use. (Sun 2006, 478)

In short, Sun hopes that her project will make a concrete difference in the way that information designers approach interface design for culturally and internationally diverse audiences — that it will change their design methods. Instead of focusing mainly on format and delivery features (what research has emphasized so far), she wants to shift the focus to social affordances or functionalities that allow new forms of social interaction. Her empirical research project aims at uncovering what some of these social affordances might be.

Notice that her expression of the problem or need — the Why #1 purpose — is stated in the form of A-but-B:

> A —> “[L]ocalization specialists focus most of their attention on the delivery aspects of technology [and] design for operational affordances ... and instrumental affordances ...”
>
> BUT
>
> B —> “they neglect possible design options for social affordances—the properties of a technology that support object-oriented activity and social behaviors in a sociocultural and historical context.”

The A-but-B pattern is commonly used in the write-up of social science research and in technical communication, as it is conventional way for researchers (A) to identify and credit the work or previous research, but also (B) to carve out a niche, a rationale for doing a new research project, which will address a gap or a need that currently exists. Within rhetoric theory Richard Young, Alton Becker, and Kenneth Pike introduced the A-but-B approach to problem identification in their book *Rhetoric: Discovery and Change* (1970). The technique was applied to technical communication contexts by Leslie Olsen and Thomas Huckin in their textbook

Technical Writing and Professional Communication (2nd edition, 1991, 96-109; see also Swales 1990). The A term sometimes also expresses a belief, value, or assumption that is generally accepted by the audience or community being addressed. The B term then notes a contradiction, exception, gap, inconsistency, or unknown with that generally held position.

In his 2007 chapter "Through the Eyes of Researchers, Rhetors, and Audiences: Triangulating Data from the Digital Writing Situation," Kevin DePew uses this same strategy to identify the need or gap that current exists in digital writing research. Methodologically, according to DePew, too much digital writing research focuses on textual artifacts and doesn't pay enough attention to contextual factors, such as the writer's intentions and the audience's responses. He expresses the problem (Why #1) in A-but-B format:

> A —> [Extensive lit review demonstrating that] "most digital writing researchers are focusing on textual artifacts." (49-51)
>
> BUT
>
> B —> "[A]s rhetoricians, we should be examining more features of the communicative situation rather than merely an artifact it produces. What else can we learn about digital rhetoric when we also study the rhetor's intentions? The audiences' response to the text? How local contexts shape the interaction?" (52)

DePew goes on to explain that the purpose of his chapter — his Why #2 — is to explain why looking beyond the text to the broader contexts in which it resides is important, methodologically speaking, to effective digital writing research:

> WHY 2 —> In this chapter, I explain triangulation strategies and argue why this methodological process is conducive and desirable for studying multiple features of a rhetorical situation, especially for digital writing studies. I will closely analyze four digital writing studies ... (DePew 2007, 52)

What is the purpose for this purpose heuristic? Ultimately, the aim from the standpoint of the reader is to understand WHY researchers and theorists are doing certain kinds of work — and why from several perspectives: What problem are they trying to solve, what need are they trying to fill? What outcome or action-in-the-world do they expect to achieve? From the standpoint of the writer, using the The Three Whys heuristic is a way clarify (for yourself, for your audiences) the significance of the project you are working on: it meets some need, it solves some problem, it helps somebody. WHAT you are doing makes some sense in terms of WHY — it has a meaning and significance for the audience.

What this purpose heuristic is also doing is taking the two As from the DEPAA heuristic — A for Action, A for Audience — and parsing it out into more detail to understand purpose in a more developed and more nuanced way. For rhetoric theorists such as Burke and Kinneavy, focusing on purpose — and, especially, purpose vis-à-vis audience — is the single most important thing rhetoric does. From this theoretical standpoint, rhetoric is primarily about ACTION and effect on AUDIENCE. The most important we can ask as technical communicators about our rhetorical activities (documents, products, research) is this one: What is the benefit, positive outcome, for audience?

As you can probably see, these two separate heuristics I have presented here are have a common category, a point of overlap: ACTION means achieving some positive outcome (purpose) for some AUDIENCE. Putting the two heuristics together visually would generate a diagram something like this:

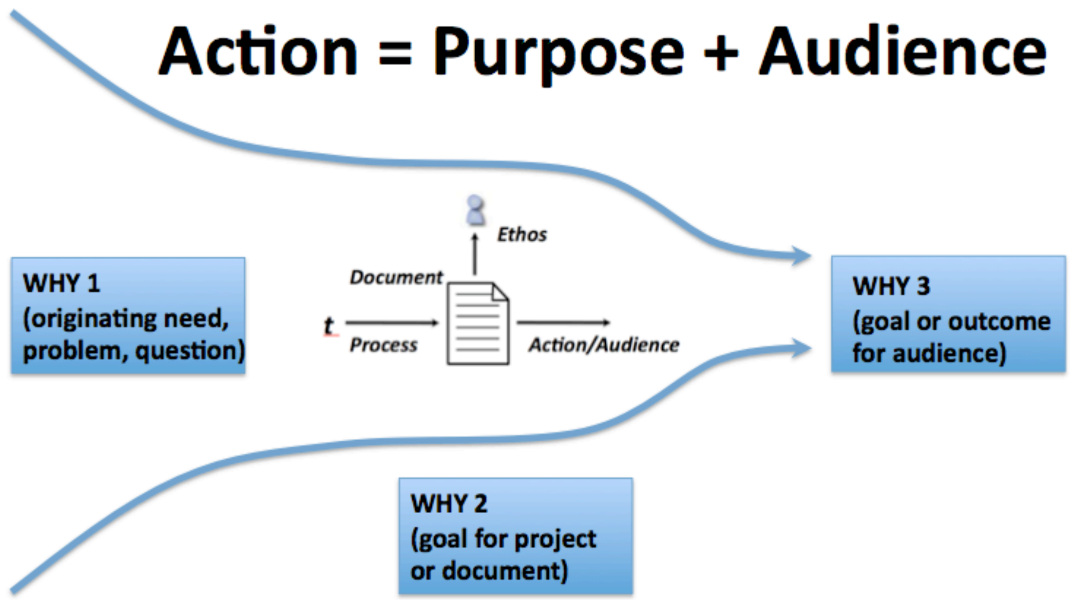

Figure 3. Viewing Writing Primarily as Action

What this visual heuristic does is put questions of document/product and questions about product "inside" larger questions about action, purpose, and audience, shifting traditional rhetoric's dominant focus on document and even process and more emphasizing action action and purpose. The document is a means, not an end.

Conclusion

To be effective, usable, and useful, a heuristic must prompt and push deeper thinking; it must be powerful in the respect that it requires you to *see* in a new way — to see events, texts, processes, positions, and people in a way that deepens your understanding and leads to more production action. Heuristics also need to be simple, memorable, and portable — transferable across a wide variety of situations and contexts.

In this chapter, I have offered two simple heuristics, based on rhetoric theory, that I think can be useful across a wide range of technical communication contexts, ranging from designing web sites, to developing content management systems, to setting up virtual worlds for corporate training, to producing environmental impact statements, to creating user help systems, to designing interfaces, to writing business reports, etc. These heuristics can be used as tools for production of a new product or for critique and evaluation of an existing product or to design a research study. They can be used to diagnose problems or, more strategically and proactively, as a way of thinking about communication products and processes to avoid problems in the first place.

When Foucault says, “I write for users, not readers,” he is saying that he hopes his theory is usable — that is, he is more interested in how people use his theories methodologically to critique and change institutions rather than whether people respond as readers who understand what he is saying, who like it or dislike it, but who don’t do anything with it. The point, after all, is *doing* — and that, ultimately, is the test of a successful theory or heuristic: it does useful, valuable work in the world. “There is nothing more practical than a good theory” (Lewin 1952).

What I have argued in this chapter is not just that rhetoric theory is useful, but that rhetoric theory is indispensable to technical communication as it provides the conceptual framework necessary for all work in the field. It guides how technical communicators think about documents and design, it guides their view of the writing process, it influences their approach to research and methodology, it shapes their interactions with others, the audiences they are writing for, the co-writers they are writing with, the clients whom they are representing. Technical communicators who don’t acknowledge the significance of rhetoric theory to their practice — or who underestimate its power or who fail to use it productively to deploy its power

— are likely caught in a theoretical framework that they can't see and that, therefore, is likely to limit their ability to adapt to changing circumstances in their work.

Discussion Questions

1. Examine one of the many instances of a theory-practice debate in the field of technical communication. (See the list below for some possibilities — or locate another instance of a theory-practice argument.) In exploring a particular debate, be sure to: (1) Understand the context for the debate. What was the starting point for the debate (if one is identifiable). What are the issues involved and the main points of contention? Who takes what positions in the debate and why? (2) Evaluate the arguments that are being advanced. What are the claims of various sides? What evidence do advocates provide for their positions? (3) Where do you stand on this particular argument — and why? Develop your own response contributing to the conversation, imagining that your response will be published as the next installment in the debate. See Warnick (2006) for a model demonstrating how such an analysis might work.

a. The debate in *College English* over the role of rhetoric theory and the value of a humanities perspective in technical communication (Miller 1979; Harris 1979; Tebeaux 1980; Miller 1980; Harris 1980; Moore 2006)

b. The "Cruel Pies" debate in *Technical Communication* over the ethics of visual representation (Dragga and Voss 2001a; Dragga and Voss 2001b; Hayhoe 2002; Dragga and Voss 2003; Moore 2008; also see the letters to the editor regarding

"Cruel Pies" in *Technical Communication*, Volume 48(4), 2001 and Volume 49(1), 2002)

c. The debates in the *Journal of Business and Technical Communication* and *Technical Communication Quarterly* over instrumentalism (Miller 1979; Moore 1996a; Kreth 1996; Miller 1996; Moore 1996b; Moore 1997; Johnson 1998a; Moore 1999; Warnick 2006)

d. The debate in *the Journal of Technical Writing and Communication* over the meaning and relevance of Aristotelian ethics to technical communication (Katz 1992; Katz 1993; Moore 2004; Katz 2006)

6. Use the DEPAA heuristic as methodological tool for analyzing a technical communication project that you have worked on. Think about not just the document itself, but the entire project that led to the creation of a document/s. Begin by describing a complex technical communication project you have worked on — one that involves working for a client, producing multiple documents over a relatively long period of time (weeks or months), and some collaboration with others. First, identify the stages of the project, and its distinct deliverables. Analyze your experience using the DEPAA model as heuristic. How does applying the heuristic generate different views of the project — from its starting point to its final outcome? How does the DEPAA heuristic provide helpful prompts for thinking about the project and understanding its distinct phases, documents, and, possibly, problems? Are there important aspects of the project that the DEPAA heuristic doesn't surface or emphasize?

7. Use the "The Three Whys" heuristic as a tool for understanding, analyzing, and critiquing the purpose for a longer research document — either a professional report or white paper or a published research article in the field of technical communication. (For a research article you might look in one of the five major research journals in the field of technical communication: *Technical Communication*, *IEEE Transactions on Professional Communication*, *Technical Communication Quarterly*, *Journal of Business and Technical Communication*, *Journal of Technical Writing and Communication*.) (a) First, describe. Use "The Three Whys" heuristic to identify in the report or article the multiple purposes at work in the document: the initiating need, problem, or question that has motivated the creation of the report or article (is that problem stated in A-but-B form?); the stated purpose of the article itself; and the expected outcomes or effects on some audience(s). Are all three whys present? Are some implied rather than stated explicitly? Are some missing altogether? If so, is this a failing in the document, or is there a good reason why one is missing? (b) Next, evaluate the purposes within the report or article. Is Why 1 a real problem or need? Is there evidence (or strongly held belief) that this need is real and significant? Are the three purposes coherent? Does Why 1 fit Why 2 and lead logically to Why 3? (c) Finally, evaluate the hoped-for outcome beyond the report or article. Does this report or article DO something useful, helpful, beneficial for its intended audience? Is it likely to have a positive, practical outcome in the world? Why or why not?

8. Closely read, analyze, and discuss one of the pieces of research listed below — or another of your choosing. In reading the research, describe and evaluate the theory or theories that each researcher is using as the foundation or framework for their study. (a) What theory (or theories) is the researcher using — where does it come from? Is the researcher borrowing a theory from some particular place — or building a new theory of their own? (b) Why is the researcher using this particular theory? What value does it add to the researcher's project? What argument does the researcher offer for using this theory? (c) Evaluate the researcher's use of this theory: Does it serve a useful purpose? Is it an effective theory, given the researcher's purposes? Would a different theory have worked better? (c) Does the researcher's findings or discussion change or challenge the theory in some way?

Spinuzzi (2003)

Whithaus & Neff (2006)

Kostelnick (2007)

Baskerville & Nandhakumar (2007)

Cardon (2008)

Mirel, Barton, & Ackerman (2008)

9. This is a particularly tough assignment for experienced technical communicators: Develop your own heuristic for a particular kind of work or application or document genre in technical communication. You could build a heuristic for thinking about: designing usability studies to test mobile technology interfaces; or factors involved in planning large-scale collaborative projects; or cultural factors involved in interface design; etc.

Doing this task well requires, first, that you have read widely and deeply, both research and theory, within a specific area in technical communication. Second, the task requires that you have some practical experience working in that area, that you understand the problems and challenges facing those who work in this area (why tasks succeed, why tasks fail). Third, the assignment requires that you consult and collaborate with others, with technical communicators who have also thought deeply and worked extensively in this area. To do this task well might require that you have had some significant workplace experience and read widely.

If you have the requisite background knowledge and experience, then begin your assignment by cataloguing and classifying the various ways that theorists and practitioners approach the topic area. Summarizing what people say and do, then building a table and "mapping" various practices and positions is a great way to start exploring your topic. Your goal is, first, to find the essence of the topic: What are the questions, subtopics, stages, principles that everyone agrees are essential for this area? Then focus on the diversity of perspectives and alternative approaches: What are the different ways that people have approached this topic? Where are the points of disagreement (whether implicit or explicit)? Finally, what are some other ways of exploring this topic that no one has yet thought of? (That last one is particularly hard to achieve, and it may require looking in other places — e.g., in other disciplines — for ideas.)

Once you have done significant ground work, summarizing and synthesizing a broad range of experiences and sources, then you boil down: to a set of categories, to a grid, to a map, to a set of questions or prompts that capture both the essence of the topic but also its breadth of diversity. Remember, the most important characteristic of a heuristic is that it is powerful in terms of generating ideas, new ways of thinking about a problem or topic: it has generative capabilities for those who use it, pushing them to think beyond their usual categories. Second most important is that it is usable and applicable across a wide range of contexts. Ultimately, an effective heuristic helps probe and explore, answers questions, solves problems, and results in positive, productive change.

Once you have developed a preliminary heuristic, then share it with others — others who themselves might test it out, and others who are specialists in the area who can give you feedback and ideas for revising the heuristic.

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Chapter 6: How Can Work Tools Shape and Organize Technical Communication?

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Summary

In this chapter, I discuss how tools shape and organize technical communication. I use the term tool broadly, to include writing technologies as well as texts. The extent to which tools shape and organize is similarly broad, encompassing not only the practice of writing but also interactions supported by texts. To examine the influence of tools, I provide a heuristic to assist readers in investigating tools, their histories, and their impacts on actions and interactions in a given context. I use the heuristic to study the influence of cascading style sheets.

Introduction and Scenario

To examine the shaping and organizing influence of tools, we need to be clear about the nature of that influence. A cause and effect structure, in which the introduction of a tool precedes and appears to bring about an effect on technical communication, is too simple and more problematic than helpful. The problem is that a cause and effect structure isolates a tool as the source of given effect. Technical communication is more complex, comprised of a series of actions and interactions that are historically, culturally, and technologically situated. Understanding the influence of tools requires us to examine this larger context.

Nancy is a technical communicator at a mid-sized software company, who, like everyone at that company, is responsible for following a style guide. In addition to articulating style standards, the guide also indirectly reveals routine business practices and expectations about how information is shared and used. The guide reinforces standards for more than just aesthetic reasons. Information formatted according to approved style rules is more usable for a variety of internal and external audiences. The style guide ensures that what people write comes out in a form that can be readily transformed into other kinds of texts that support a variety of work practices (see Spinuzzi 2008, 139-141). The style guide also reflects changes in writing tools.

Nancy has been tasked with updating this style guide, a task occasioned by the company's decision to adopt a content management system (CMS) for use by all divisions responsible for producing various kinds of product documentation, such as user guides and training materials. This CMS relies on cascading style sheets (CSS) to control the application of style rules. Until now, only some divisions had regularly encountered CSS. To revise the company style guide, Nancy must consider how CSS will shape and organize practices of technical communication. One approach is to study how the company style guide has changed, over time, in response to the adoption of other tools, some of which are functionally linked to CSS. The result will be a picture of how tools have shaped the practice of technical communication in this company and how CSS might do so as well. Before returning to this scenario, I will briefly discuss the importance of tools in technical communication and present a vocabulary for talking about the influence of tools. From this literature, I develop a heuristic to assist in analyzing the shaping and organizing influence of tools. I then construct a brief history of tools related to CSS as well as a history of style guide revisions in this company. Then I return to the scenario to show how the heuristic can be applied.

Technical Communication Is a Tool-Mediated Field

From its origins in land grant universities and engineering schools at the turn of the 20th century (Connors 1982) and its development during the wartime and postwar eras of the 20th century (Kynell 1999, 148), technical communication has been a tool-centered field. On one hand, technical communicators are users of tools. Steel-tipped pens, typewriters, carbon paper, and photocopiers have, without question, changed the practices of written communication (Yates 1989, 21-64).

Tools are also the topics of technical communication. At the heart of the field, some argue, is a responsibility to accommodate readers to tools within contexts of use (Dobrin 1983, 242). Yet technical communicators are more than technicians, skilled writers who reveal the workings of a tool in a dispassionate and unbiased way. Technical communicators have a responsibility to understand that tools are not neutral; they are built to serve a purpose, an ethic, that resides in the social context where the tools are used (Sullivan). Tools have politics, which is to say that they guide people to interact with one another and with their environments in ways that serve particular social values (see Winner 1977, 237).

Tools Shape Actions and Interactions

In sum, we can say that a tool shapes both the practice of technical communication and the social interactions that the products of technical communication foster. It may appear strange to attribute such influence to tools, until we consider a broader definition of the term, one that shows both the plentitude of tools around us and the subtle ways that our interactions with tools alter our perception of the world.

Lev Vygotsky offers a broad definition of tools that reveals a connection to writing. To Vygotsky, tools describe a broad category of objects that includes texts, signs, and written language, in addition to more traditional tools like keys and chisels (1978, 7). His work also suggests that tools influence mental processes, by shaping the activities in which tools are employed. For example, a set of sticks helps children learn to count. Over time, those children learn to substitute words and signs to serve the same function as the sticks. "The sign acts as an instrument of psychological activity in a manner analogous to the role of a tool in labor" (1978, 52). It takes on an "organizing" function (1978, 24) by which it shapes and extends thinking beyond what a person might otherwise be capable of without the tool (1978, 39). This definition gives us one way to understand the kind of shaping and organizing that tools do. They extend otherwise limited human abilities.

To say that a tool shapes an activity means that with a tool one sees and approaches an activity differently than without the tool. For example, when creating a website, one might approach the task differently with a simple text editor than with a graphical HTML editor. Although the result may be the same, a text editor draws the designer's attention to marked up lines of text, while the HTML editor draws attention to the rendered design, which is a different object of work. The tools support different views that foreground one activity (visual design) over another (coding).

A more common way to describe how tools shape and organize activities is to say that they "mediate" those activities by imposing a structure that is not inherent to the activity. (Hutchins 1997, 38). Ed Hutchins offers the example of using a checklist to mediate the act of shopping. The checklist presents shopping as a series of simple activities (i.e., items to purchase). Conventions associated with the checklist form (e.g., checking off completed items) mediate the task of shopping by shaping and organizing it.

While tools may have the potential to mediate, people must still decide to use those tools. They must recognize that the tool could provide some useful mediation. When people recognize a tool's potential, we say that they have perceived an affordance (Norman 1999; 2002). James J. Gibson originally used the term affordance to describe a tool's "action possibilities" or potential to be used in service of a given task in a given setting. For example, a maul may afford splitting wood, but only if the user is able to perceive that use and is motivated to take advantage of that affordance. A component of both Gibson's and Norman's definitions is that the ability to perceive affordances is socially situated, which implies a social dimension to mediation.

People perceive and take advantage of a tool's affordances within a social setting, often with the aim of participating in it (Sullivan). In so far as a tool mediates the actions of an individual, it also mediates that individual's interactions with other people (Ihde 1991, 96-97; 102). Take our example of the HTML editor discussed earlier. Before using the tool, the technical communicator may have relied on colleagues to assist in the development of the website. Now those work relationships may no longer be necessary.

Tools shape not only the appearance of the information, but also the ways in which others can use it. Users with different backgrounds and specializations use the same information for different purposes (Winsor 2001). Even the material form that information takes can enable complex social interactions to take shape or to degenerate (see Sellen and Harper 2002, 110). What begin as mediating interactions between people and their tools become mediating interactions with other texts and people the further out we trace the effects.

Studying Mediation

Analyzing mediation is not easy because there are few direct causal relationships to track. What is needed, instead, is broader scope of analysis that accounts for both the mediating influence of tools on individuals as well as the ripple effects throughout a social setting.

One useful approach comes from Activity Theory, which advocates understanding the mediating influence of a tool in a larger historical and cultural context. The Activity Theory approach considers a community, its rules, structures, and divisions of labor (Cole and Engeström 1993, 8) when trying to understand mediation. How does a person formulate an objective and recognize the value of a tool for meeting that objective? The process both influences and is influenced by community norms, rules, and relationships. Engeström has used Activity Theory for describing how tools like medical records mediate the operations of a clinic (Engeström 1993) and how an automated "postal buddy" is shaped and ultimately undone by forces at work in the contexts where those devices were deployed (Engeström and Escalante 1996).

While Activity Theory is helpful for analyzing a social setting and its influence, this perspective can be enriched by another that considers how the social comes together, holds together, and takes on the appearance of reality (Jonassen 2004, 210). From Actor Network Theory (see Latour 2005) I borrow one idea, that tools develop historically by connecting with and incorporating other tools. At different moments in a tool's development, it reflects the needs of the people who enacted those designs. Tools have histories and by reading that history one can understand both how that tool has shaped an activity over time and how those mediating influences persist in the accumulated design. Summarizing both kinds of mediation discussed in this section:

> The use of tools is an evolutionary accumulation and transmission of social knowledge, which influences the nature of not only external behavior but also the mental functioning of individuals (Kaptelinin, Nardi & McCaulay 1999, 32).

Through their designs, tools accumulate knowledge and perspectives that have situated value. For example, the units of measurement etched onto some navigational instruments reflect valued ways of measuring the world (see Hutchins 1995, Ch.3). In this case and others, the perspectives afforded by tools reflect some values to the exclusion of others. The next section considers how these ideas can be repackaged as a heuristic to study the mediating influence of tools.

A Heuristic for Analyzing Tool Mediation

At the very least, the research surveyed here suggests a need to ask questions about the design of a tool, including its design history and cumulative impact on the enhancement of human activities. At the same time, we must ask questions about social impacts, by looking into the situations in which these tools are placed and used.

1. How do the concepts and operations associated with a tool mediate a user's understanding of a given task?
2. How do the concepts and operations associated with a tool mediate social relationships and reinforce particular socially-situated values?
3. What is the tool's design history and how does that history influence current uses of the tool?
4. To what other tools is this one connected in practice or function?
5. By what means are the mediating effects of a tool made more stable?

These questions are the focus of the next section, in which our hypothetical technical communicator, Nancy, uses them to understand the mediating influence of CSS.

Making a Style Guide – An Example

Our scenario focuses on style guides and CSS for a few reasons. First, style guides are products of technical communication that reflect changes in writing tools. As different tools alter what a technical communicator is capable of doing to a text, style rules change to control the use of those expanded capabilities and to reinforce valued practices of writing. For example, an entry on bulleted lists might say "Insert a 0.25" space between the bullet and the start of the list item. Follow each list item with a semi-colon." This entry specifies the look of the list item but it also presumes that the writer is capable of controlling the spacing as specified. In other words, the style dictum is mediated by available writing tools. Subsequent changes may also correlate with changes in writing tools. For example, the next version might say, "For 'To Do' bulleted lists, use a checkmark instead of a round bullet. Follow each list item with a semi-colon." The assumption here is that the writer can change the style of bullet and that a document may contain different kinds of bulleted lists. Upon adoption of structured writing tools using CSS, the rule about bullets might disappear altogether, the assumption being that bullet styles are automatically controlled by the CSS depending on the kind of list object selected. The second reason to focus on style guides and CSS is that CSS is a tool whose mediating influence is likely to show up in a style guide. CSS and style guides have similar functions – both control style.

Admittedly, by isolating CSS as the tool most likely to impact style guides, I am perpetuating a fiction about tool mediation. Tools do not mediate by themselves. Because tools emerge from design histories that point to other tools, they reflect values and perspectives associated with tools from which they developed. In this sense, mediation is usually an aggregate effect of multiple tools. CSS points to a lineage of tools out of which it emerges and in which it is commonly used (e.g., HTML, structured writing, browser technologies). CSS also points to the technological, social, and organizational conditions that encouraged the development of now-common technical communication practices like single sourcing. To be direct, technical communicators might not be using CSS if there was no underlying set of values that highlighted the advantages of the tool.

The situation Nancy is facing is that her company is transitioning to the use of a CMS that utilizes CSS. Other divisions have already adjusted to using CSS and those changes are reflected in their local style guides. Now that the company is making a full-scale change toward the adoption of CSS-based writing tools, Nancy must consider how the change should be reflected in the company style guide. To tell the story of how CSS may mediate technical communication, it is necessary to sketch the story more broadly and to situate it historically.

Technological History

A cascading style sheet is a set of rules that is either integrated with or attached to structured content, in order to control styling and positioning. A few key features of CSS make it valuable to technical communicators. First is “inheritance,” which refers to how style characteristics are passed on from parent content elements to child content elements. More specifically, style characteristics associated with a given content element are passed on to any content elements it contains. For example, an unordered list or bulleted list (i.e., a <ul> in HTML) contains bullet points (i.e., <li> in HTML). The unordered list is the parent element and the bullet points are the child elements. Styles associated with the <ul> parent element, such as font, are inherited by the <li> child elements. The second concept is "cascading," which is related to "inheritance," but refers more to a set of priorities that determine the order in which different style sheets are applied under different conditions. For example, the author of a document may assign a style sheet that specifies the look of <ul> and <li> elements. The user may apply a different, local, style sheet. To illustrate cascading, assume that the user's style sheet only specifies a <li> style. The two style sheets cascade in that the author's <ul> style is applied but his <li> style is superseded by the user's <li> style.

CSS came to be associated with structured content through a series of technological developments in web design. The problems that CSS helped solve provide some information about how CSS is used with a CMS.

- **1970's** –Standard General Markup Language (SGML) is developed as a practical way to mark up pieces of text as structural units, like paragraphs.
- **1986** – International Standards Organization (ISO) adopts SGML.
- **1989** – Tim Berners-Lee develops the World Wide Web using HyperText Markup Language (HTML), a variant of SGML.
- **1992** – Following open conversations about HTML, the markup language rapidly cycles through a variety of iterations (HTML +, HTML 2, HTML 3.2) until finally becoming HTML 4 (Raggett).
- **1993 (June)** - Robert Raisch of O'Reilly and Associates proposes "stylesheets for html," a set of author-defined stylesheets.
- **1993 (October)** - Pei-Yuan Wei develops markup that looks like modern CSS. This markup included the function of inheritance (Bervendsen).

- **1994 (October)** - Håkon Wium Lie releases markup that will become CSS1. The ability to cascade is included.
- **1994 (November)** - Joe English proposes using CSS with SGML syntax.
- **1996 (December)** – World Wide Web Consortium (W3C) releases CSS1 specifications, "a simple style sheet mechanism that allows authors and readers to attach style (e.g., fonts, colors and spacing) to HTML documents." Among the features is the ability to cascade -- "authors can attach a preferred style sheet, while the reader may have a personal style sheet to adjust for human or technological handicaps" (Wium Lie and Bos). Authors are also able to attach style sheets to IDs and Classes of HTML content.
- **1990's (mid-late)** – XML is developed.
- **1998 (May)** – W3C releases CSS2 specifications. Included in this release is the ability to attach style sheets to "structured content." Authors now have the ability to create style sheets for specific media (e.g., for handheld devices, Braille devices, and visual browsers) and to use CSS for content positioning (Wium Lie, Bos, Lilly, & Jacobs).

This history marks key developments in CSS as well as associations with other writing tools. All help articulate the kind of mediating work CSS does today. Another purpose of this history is to show the problems out of which CSS emerged. In this context, we can see what CSS was designed to do, what it is good at, and with what kinds of tools and within what kinds of operational constraints CSS is used. Along the way, this history also shows where tools associated with style sheets and CSS appear to undergo some stabilization, by becoming standards. Around these points in history, new tools, including SGML-based writing tools and Web design software with built-in CSS capabilities, were developed to embody and enact the technological developments.

A Local History of Style Guides

The earliest style guides Nancy can find date to the 1970s. In them, there is little explicit mention of document design and layout. Unlike the current style guide, in which there is a similar lack of focus on document design, versions of the style guide from the 1970s reflected a time in which layout and document design were delegated to professionals in those fields. Today, layout and document design are delegated to style sheets, templates, and other technological agents. In the interim, those styling choices were the responsibilities of writers and editors.

1970s: In versions of the company style guide from the 1970s, the overwhelming focus was on creating consistency by controlling expression (Blair 1). The style guide contained little discussion of layout, and when it was addressed, its importance was downplayed or treated as falling outside the realm of a writer's concern (Lee 3). The focus on expression over layout was partly due to the limited range of layout choices available to writers. Word processing capabilities at the time did not afford many options for controlling layout. Much of that work would have been sent to specialists. Also noteworthy is that style guides of the time were bulky, printed manuals that must have been expensive to produce.

1980s: Throughout the 1980s the company style guide expanded to include guidelines for controlling layout and visual design, while retaining a strong focus on controlled expression. Around this time, the company started to expand, spin off subsidiaries, and open international offices. Now documents had national and international audiences. The resulting translation and localization needs required increased control over variation in expression and layout. At the same time, company expansion also created needs for more internal documentation to coordinate the efforts of distributed work teams. Style guides of the period appeared to respond to these organizational changes (Blakely and Travis 1987, MPD-63).

The style guides also reflected changes in tools. As word processing and document design technologies grew in sophistication and availability, technical communicators at the company had control over a larger range of stylistic features that had previously been the concern of printers (Lalla 1988, WE-176). The style guides then focused more on rules governing new stylistic possibilities.

1990s: Starting in the 1990s, revisions were more common, perhaps as production and distribution costs came down (Taylor-Collins 1996, 473; Wieringa 1996, 531). A revision from 1991 revealed a significant shift in emphasis, away from specifying many detailed rules of usage and style to focusing on style rules for genred sections of common documents – for example overview sections, feature lists, examples, and screen captures (Washington 1991, 554). In other words, the focus shifted to content types to which different style rules might be applied. The significance of the shift is that it reflected a motivation to see documents as structured content, a perspective afforded by structured writing tools that would come to be associated with CSS. While the 1991 revision preceded CSS, values were in place that would make it easier to accept the kind of mediation CSS would provide.

There was also increased reference to document templates that automated formatting and styling. The templates marked an important shift in how styling rules were enforced. Before, the detailed style rules emphasized the role of the editor, but now, enforcement was partly delegated to document templates and to the writers themselves (Caernarven-Smith 1991, 140-142).
By 1993, the style guide started referencing document type definitions (DTDs) which are rules specifying how structured content is to be assembled for different document types. DTDs were

used by some divisions in the company that had already adopted SGML-based structured writing tools. Also at the time, divisions in the company started to develop their own local style guides (see Dalton 2002, 2; Rude 2002, 139). Compared to the company style guide, the documentation division's style guide was slender and more focused on styling concerns specific to the documentation division, some of which touched on issues of visual design and layout. On general styling matters, the guide still deferred to the company style guide. Nancy noted a resemblance to the CSS principles of inheritance and cascading. For now, though, the definition and enforcement of style rules were delegated to templates, DTDs, and other automated agents. A 1994 revision marked the first time that web content was mentioned as an alternative delivery format (Nichols 432). Personal computers were growing more ubiquitous. Word processing and desktop publishing software was increasingly capable of handling more complicated styling and layout. Still, shifting documentation from high-fidelity print to low-fidelity computer monitors exacerbated the problem of stylistic variation, uncovering problems with layout and font choices that reduced onscreen legibility (Nichols 436). As a result, the style guide addressed a wider range of display and layout issues.

A 1995 revision showed continued concern with visual styles. In addition to legibility concerns, there were also concerns about unchecked variation across national and international offices. The documentation division's local style guide reflected similar concerns, amid continued and increasing references to DTDs, templates, macros, and other automated agents to which style rules were now being delegated (Latour 1999, 187).

Revisions in 1996 and 1997 revealed an increasing focus on expression over appearance (see Gelb and Gardner 1997, 469; Marks 1996, 478). In fact, content was increasingly referred to separately from concerns about visual appearance (see Corbett 1996; Weber 1997).

In early 1998, the documentation division started using structured writing tools with CSS capabilities. A revision to their local style guide later that year revealed a reliance on CSS for applying style rules automatically to structured content (Perkins and Maloney 1998, 25). Style enforcement continued to move into the interface as CSS1 standards allowed writers to attach style sheets to content types. CSS reinforced the apparent modularity of writing, as seen through structured writing tools.

2000s: By 2000, the integration of style guides with tool interfaces appeared well established. Submerged in the interface, style rules implicitly guided writers, while shaping the product that emerged (Hart 2000, 12, 14). These rules tacitly mediated writing by shaping what writers perceived to be afforded within the technological environments where they were writing. The separation of style from content also appears to have facilitated company adoption of single sourcing, outputting the same content into multiple document types, each with its own style sheet (O'Neill 2001; Quesenbery 2001, 3). Device-specific formatting rules that came with CSS2 standards seem to have facilitated single sourced publication on the Web as well.

By 2005, Nancy has seen the proliferation of local style guides. What was a long and comprehensive company style guide back in the 1970s has now splintered and shrunk into highly flexible, easily adaptable, localized style sheets that reinforce style rules, often without a writer's direct awareness (see Bright).

Applying the Heuristic

Looking at a history of style guides framed by the technological history of CSS teaches Nancy a few things:

1. why style guides look like they do,

2. how style guides mediate the way writers look at texts and share them with their colleagues,
3. why tools were adopted and how the features of those tools (e.g., embedded and largely invisible CSS rules) served distinct economic exigencies and corporate values, and
4. how making changes to a style guide requires an understanding of the kinds of work and social relationships different writing tools afforded.

These two histories provide the necessary context in which to apply the heuristic.

How do the concepts and operations associated with a tool mediate the user's understanding of a given task? A number of CSS concepts started to show up in discussions of style over the years, especially once the company started using structured writing tools to accommodate economic interests related to corporate growth and diversification, internationalization, and single sourcing. Incrementally, as different tools were introduced, some practices started to appear that were later formalized with CSS.

One CSS concept that found its way into the style guide was the "cascade," the ability for a single document to have different styles attached to it, prioritized depending on the output. Originally, the idea of prioritized application of different style guides was accomplished informally as different divisions decided when to apply the company style guide or their own local style guides. With the adoption of CSS, such cascading capabilities invited technical communicators to see their texts as having a greater range of potential uses and styling considerations.

Another concept that appears to have influenced technical communication was that styles are inherited. Early on, the company style guide was a single, comprehensive document used to enforce standards on any text. As the company became more distributed and diversified and the range of texts increased, there was a growing realization that one style did not fit all needs and that some departmental styles might need to take priority, while inheriting a look and feel from a common set of style standards.

More than just concepts, cascades and inheritance represent operations, habits, and assumptions about practice that future revisions to the company style guide need to retain, exemplify, and reinforce. Without good reason, no style rules should be introduced that conflict with these habits. Neither should revised rules require enforcement that differs radically from the way that rules are currently enforced.

How do the concepts and operations associated with a tool mediate social relationships occurring around it? As the company expanded, diversified, and spun off subsidiaries, the desire for consistency intensified. Consistency helped manage distributed units of the company by facilitating the free flow of documents and information. Later, concerns about consistency grew more prominent, concurrent with the rapid development and change in writing tools that made it easier to manipulate visual design and layout. The style guides fostered consistency, initially, by passing down style rules, but later by delegating style requirements to forms, templates, and macros and CSS rules. One way to read these delegations is as a need to improve consistency by assigning responsibility for enforcing it to technologies that are capable of doing so more reliably than editors might (see Latour 1999, 187).

A related issue is cost-savings. Before computers could check for consistency, the responsibility fell to writers and editors. As the company started producing more documents, the cost to vet them rose. Around this time, the company style guide started referring to forms and templates, which lowered the cost of enforcing stylistic consistency by reducing the number of style decisions writers could make. The responsibility for adhering to style rules started to fall back onto the writers and their templates, relieving editors of some responsibility. With this shift in responsibilities, the editors and writers could develop different working relationships.

In addition to being costly to enforce, style guides were also costly to produce. Early versions were printed, copied, and bound, but in limited numbers. Conceivably, the limited availability of the style guide effectively consolidated the distribution of that knowledge within the company. Those with access to the style guide were those who could speak about the rules most authoritatively. Responsibility for interpreting and applying the rules fell to them. While the ability to produce and distribute style guides electronically helped lower production costs, CSS further improved cost-savings by embedding style rules in a writing tool's interface. Such shifts are not always beneficial, however. A downside of the kind of mediation that CSS allows is that it divorces writers from a consideration of stylistic concerns, which are a necessary part of a document's rhetorical effectiveness.

What is the tool's design history and how does that history influence current uses of the tool? The concepts of tagged and structured content facilitated the development of HTML. HTML developed out of a desire to create structured content for the Web; although in doing so, it conflated structure with style, a problem addressed by the development of CSS. CSS merged back with SGML just before the adoption of CSS1 standards in 1996. At the time, it was proposed that CSS could be applied to SGML, meaning that the styling rules could be applied to specific content objects or overridden, depending on the output. CSS2 standards introduced the ability to reuse structured content and to style content dynamically, based on its destination.

Although the technological history of CSS is more complex than I have portrayed it, there are a number of ways this history shows characteristics of older technologies being preserved and enacted in CSS. In particular, CSS works with and anticipates structured content.

It assumes a need to keep content separate from style. These technological perspectives loosely derive from SGML and HTML, as well as from tools associated with using those markup languages. Companies found those tools worth adopting because they served corporate values at the time. Once adopted, use of those tools uncovered problems or shortcomings that helped spur the development of new tools like CSS that improved on the existing tools but still worked within the framework of mediation established by those precursor tools. What this means is that by adjusting a style guide to account for the influence of CSS, Nancy will also need to keep in mind the mediating framework it has inherited from precursor tools.

To what other tools is this one connected in practice or function? The answer to this question raises additional ones about how a discussion of CSS should entail a discussion of structured writing. Their histories blend; yet, there are other tools that also explain the mediating impact of CSS on technical communication. First is the increase in personal computing which ensured the ready availability of sophisticated word processing and document design tools and which likely led to a general increase in the number of texts that people produced and in the number of interactions happening around those texts. Personal computers were also convenient points for enforcing style rules. Second is the development of networking technologies (e.g., email, video conferencing) and network infrastructures, which made it easier for the company to diversify and globalize. As the effects of both were being felt, the values of consistency and cost-savings were highlighted in ways that helped lead to the adoption of technologies like CSS.

Each of these technological developments connects to one another in some way. While some tools influence how technical communication is practiced, other tools have a broader mediating effect on the context in which technical communication happens. The increase in personal computing power and sophistication gave writers the ability to make more stylistic choices. Corporate diversification and globalization created new opportunities for distributing the labor of technical communication. Both factors increased the threat of inconsistency that could then be addressed via CSS, instead of through an ever-expanding corporate style guide. To reiterate an earlier point, the mediating effect of a tool is not a simple cause and effect relationship. Tools work within networks of tools and humans that are temporarily aligned toward a given end. Mediation is an effect of the network rather than of a single tool. Technical communication is practiced across this assemblage of tools.

By what means are the mediating effects of a tool formalized and made more stable? Often, mediation describes the temporary influence of a mediating object. Mediation takes place in a given setting and is shaped by community values, rules, and divisions of labor that are continually changing. The values, rules, and divisions of labor at the company in our example were reinforced and entrenched by the adoption of structured writing and CSS tools. As a result of their widespread adoption, the mediating effects of these tools stabilized as people continued to use them. The question Nancy needs to ask is who or what are the actors that stabilize those mediating effects. One such actor is the style guide.

A style guide is a tool that mediates writing. Changes in style guides reflect changes in what companies value in their texts as well as changes in the contexts where a style guide might be employed. In some ways, a style guide articulates and reinforces values derived from and reinforced by the tools technical communicators may use. The style guide elevates guidelines on writing, document design, and usage to the level of policy.

A second formalizing effect comes through the ways that precursor tools and their mediating frameworks become enmeshed in the software and other tools that technical communicators use. Today, many technical communicators use some kind of structured-writing tools that either relies on SGML or XML to run DTDs, sets of rules that govern how structured content should be assembled into different text types. CSS is integrated into those tools to mediate the outputs, and those tools become inextricable parts of that interface.

Why Mediation Matters

Occasionally, it is useful to look at how our practices are mediated. Regarding the scenario explored in this chapter, it may be possible to imagine, for example, how different corporate values could have hindered the uptake of structured writing and CSS. By embedding styling rules in the CSS and attaching it to structured writing, some challenges of producing documents in that company are mitigated. Under other circumstances, however, a similar move might create problems by removing the styling decisions from the writer's control or even direct awareness. Under these circumstances, problems with a style guide might go unattended for longer, as fewer people would be in a position to make any changes to the style rules.

The larger point is that mediating tools must be balanced against values. As long as values remain constant and work practices static, then the tools in place to support that work will likely continue to work reasonably well. But few things are static, and soon enough breakdowns begin to emerge, which require us to take a hard look at the tools supporting the status quo.

Discussion Questions

1. Choose a function from a writing tool (e.g., columns or page layouts) and trace a brief history of it. Where did this technology or function come from? What kinds of specialized knowledge are tied up in that history?

2. Using the same example, think of concepts or operations associated that specialized knowledge? When applied to writing, how do those concepts and operations influence the way you think about a text?
3. Think about a tool that you use in class or at work (e.g., email, a course management system, an inventory control system). With whom do you interact through that tool? How does the tool mediate that relationship?
4. Using the same example, consider what kinds of identities are associated with the users of that tool (e.g., a course management system assumes teachers and students). What kinds of values are associated with those interactions?
5. Based on your reading of the scenario explored in this chapter, does it seem accurate to state that changes in tools caused the changes that Nancy saw in the style guides? Why or why not?
6. What could a technical communicator do, if anything, to be more critically conscious of the mediating effects of tools?
7. What information could one gather to illustrate the influence of tools on technical communication practice?
8. Where might one look for evidence that a particular tool's mediating function is becoming formalized?

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Chapter 7: What Can History Teach Us about Technical Communication?

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Summary

This chapter explores how the idea of history can be helpful for understanding the contexts in which technical communicators make decisions about document development. Relations between history and organizational culture are introduced as one approach for understanding why some things are considered appropriate or inappropriate in a particular workplace, and how these values can change over time. This three-part heuristic is introduced for exploring the role history plays in workplace communication:

1. What systems of order does my workplace create?
2. How does the history and culture of my workplace influence this process of ordering and the way I participate in this ordering?
3. How will my decisions in this workplace shape and order the actions of others?

These heuristic questions help to explore how contemporary practices and the histories from which they developed shape our ideas about our work, our values involving the profession, and our identities as communicators. In order to honor this rich, diverse, and unfinished history of our profession, we need to know not only the history of a document, the people who created it, and its current usage, but also the role we play in the larger social practices of science, technology, and business.

Introduction

If you have ever visited someone in the hospital or been in the hospital yourself, you have seen all the paperwork that is involved in keeping complete medical records. This record keeping is extensive in regular clinical units and even more so in intensive care units where medical care is more complicated. Nurses, doctors, and other hospital staff complete medical forms day in and day out as a routine part of their jobs. But where do these forms and other medical paperwork come from? Who develops routine medical paperwork and the systems that regulate it? What roles do organizational history and institutional culture play in the creation and use of these documents?

Most often, medical practitioners and administrators develop the forms and other paperwork they use on the job. When they carry out these document creation tasks, medical professionals fill the role of technical communicators—creating scientific, technical, and business documents that not only convey information but also create systems of order that influence the routine practices of hospitals and clinics. In other words, these technical documents help medical professionals do their job by helping them understand how to handle the tasks in front of them. In these settings, medical professionals rely on their past experiences and professional training to develop forms that embody this background knowledge in order to help ensure that future medical practitioners carry out the best practices for their patients. These medical professionals design documents to communicate historical knowledge about good medical practice through time to future professionals.

This situation with medical professionals serving as on-the-job technical communicators is not unique to hospitals and other medical settings. In fact, many people who are knowledgeable in their professional areas are called upon to develop documents that meet the needs of their workplaces, from administrative assistants who develop forms for internal use to software developers who write user manuals for software. It is probable that as much technical communication is accomplished by people who are not technical communicators as by people who are. If some people who accomplish technical communication tasks do not have communication theories and concepts to guide them, on what basis do they make their decisions about composition and design? In large part, they make their decisions based on their understanding of what worked well in the past – on their knowledge of institutional and organizational history. In fact, whether you're an engineer writing a user manual or a technical communication professional creating that same manual, you will rely in large part on your historical knowledge of your organization and your specific situation to help you decide what to include in and exclude from your communication.

The idea of history, even organizational history, is more complex than merely a chronological cataloging of important events and facts. Even in this most simple idea of history, though, questions arise about which events are deemed important and thus worthy of remembering, who decides this, and how these events will be recorded. And from whose perspective will these events – these stories – be told? Your telling of a historical event would not be another person's, even if you both participated in that event. Knowing that even a simple recounting of past occurrences can be complicated, people still write histories. After all, traditional accounts of important events and facts in a history provide valuable information for understanding future contexts for communication. But making use of history involves more than simply understanding the facts or what happened; one must also consider the cultural, societal, and even human forces that shaped those facts – the forces that have given us one historical narrative instead of another.

In this chapter, we will explore what history, specifically organizational history, can teach us about technical communication practice by illustrating some ways in which history influences the daily workplace practices of technical communicators. First, we will discuss technical communication as a history of ordering business, technical, and scientific knowledge. Second, we will explicate the ways in which organizational history operates as a contemporary tool of socialization, shaping the communication practices of writers and designers. And, lastly, we offer an extended example of one specific technical communication document – the medical protocol instructing healthcare workers on the use of insulin in intensive care settings.

History, Systems of Order, and Technical Communication

Though a great deal of emphasis is placed on the contemporary workplace, the field of technical communication has a rich and vital history that can provide productive insights into the way communications works today. In particular, understanding past practices can offer a better awareness of the ways in which technical communicators display, shape, and, more importantly, order scientific and technical knowledge. In the preface to *The Order of Things*, French philosopher Michel Foucault understands history, particularly the history of Western knowledge, as a complex process of ordering. Taking the presence and necessity of order as a given, Foucault seeks to better understand how "our [western] culture has made manifest the existence of order," in other words, "what modalities of order have been recognized" (xxi). This ordering involves two aspects: (1) a process of creation, of making categories and systems of order; and (2) a state of being ordered. Foucault argued that although we often understand this state of being ordered as a natural truth about an object, we have actually created systems of classification and definition that make the order seem integral to the object itself. Think, for example, of the way you save files to your computer. Think of all the decisions you make about which documents go in which folder, the names of those folders, the way those folders are stored, and even the number of folders to use. All of this represents a process of ordering, of both creating order and finding what (to you at least) seems like a natural or intuitive order. In all the work we do to create order, we often fail to acknowledge the complex historical and cultural influences that shape our systems of order—the forces that have made the world what it is today.

Many of the historical studies of technical communication describe its past practices as a history of ordering, of naming and shaping scientific and technical knowledge. This historical research often emphasizes the discipline's European and North American emergence in relation to science, engineering, and business education. Hoping to uncover a more complete picture of the past, these researchers show how technical communication works hand-in-hand with science and technology. In fact, they argue that technical communication is the means through which scientific and technological ideas and processes are communicated to both general and expert publics. For example, Teresa Kynell and Michael Moran's *Three Keys to the Past*, one of the first edited collections devoted exclusively to the history of technical communication, helped initiate a field of research that often aims at one of three goals: (1) to either recover the discipline's lost historical figures, (2) to recontextualize the significance of existing figures within the field of technical communication, or (3) to stress the importance of history for understanding contemporary practices. In that early collection of essays, James Zappen's study of Francis Bacon's contribution to the history of technical communication, R. John Brockman's essay on the early 19th century American inventor Oliver Evans, and Charles Bazerman's work on Joseph Priestly make plain the role engineers and scientists played in the development of technical communication, specifically the way they used sophisticated rhetorical techniques to accomplish their goals. This tracing of overlooked moments in the history of technical communication – by Jane Tolbert, Anthony Di Renzo, and others – offers a more robust understanding of the field as one that pervades all aspects of science and industry. For example, Tolbert's work recognizes Claude Fabri de Peiresc's attempts to "determine terrestrial longitude" while keeping the Church's blessing; Di Renzo's study of Marcus Tullius Tiro's roles as Cicero's confidante, secretary, and archivist offers a nuanced conceptualization of our history as one embroiled in the controversies of the past. Peter Hager and Ronald Nelson's study of Chaucer's *A Treatise on the Astrolabe* and Bernadette Longo's look at Vitruvius's *De Architectura* explicate the textual elegance and rhetorical savvy of these great works as examples of technical communication. All of this research unearths the ways technical communication's past has been shaped by the contribution of famous historical figures more commonly appreciated as scientists, engineers, literary artists, and politicians. By emphasizing their work as writers and communicators of scientific knowledge, this research underscores technical communication's role in shaping scientific information and thereby influencing the future of science and technology.

Others researchers have sought to show the way technical communication functions as a unique discourse of science, engineering, and industry. For example, Elizabeth Tebeaux's work focuses on English Renaissance technical texts and genres so as to trace the emergence of technical communication (in the English-speaking world) as both a collection of texts, namely manuals and how-to books, and as a set of discourse conventions, such as the use of page layout, audience awareness, and visual illustrations. *The Emergence of a Tradition* and other works by Tebeaux seek to explain the origins of discursive and rhetorical elements that have come to dominate technical communication practice and pedagogy by specifically seeking their historical emergence and arguing for their continued relevance (see Tebeaux "Technical"). In fact, one might argue that the work of Tebeaux and Michael Moran, beginning with his rhetorical analysis of the 1590 Map of Virginia, allowed others to take seriously the supposed mundane history of technical documents by arguing for their relevance to contemporary practices (see Moran "Renaissance"). Like Zappen's work, these studies strengthen connections between the history of ideas and the history of technical discourse, illustrating how technical communication has always been involved in the creation, promotion, and deployment of scientific and technical knowledge.[1]

With its intimate connection to the history of business, science, and technology, technical communication is not without ideological consequences. As a reading of mundane documents within their situated historical and cultural contexts makes visible, technical communication involves issues of power, authority, and legitimacy. Bernadette Longo's cultural history, *Spurious Coin*, focuses specifically on technical communication's contest for knowledge legitimacy within a scientific knowledge economy. Technical communicators, scientists, and engineers have understood technical texts as merely shaping and transferring scientific and technical knowledge – without the power to create it – thus rendering technical communication as the counterfeit currency of science. Useful as a control mechanism within organizations, technical communication has cultural power to authorize which knowledge is and is not realized. Longo argues that as a profession, technical communication pays dearly for its managerial role as the control mechanism in science and business, because often the only cultural capital the field can accrue comes from its role as the instrument of another. This process involves complicated ideological effects.

Technical communicators, then, make use of visual and other texts to order knowledge, shape information, and make implicit and explicit arguments about the social world. In fact, technical communication can often be understood as not simply influencing social practices—encouraging certain ways of being while discouraging others—but as actively developing social practices. For example, Miles A. Kimball's historical and cultural analysis of Charles Booth's maps of London poverty from 1889-1902 investigates the "cultural basis" of such technical communication notions as "transparency and clarity in information graphics" (353). By reading Booth's maps back into their historical context, Kimball argues that the preference for transparency in visual displays "arises from a broader visual culture that influences what readers will accept as simple or transparent" (355). In other words, these particular visual texts, which were created in response to the poverty of London, reflect the contemporary social and cultural attitudes that represented poverty as an easily corrected ill (355). Like Moran's studies, Carol Siri Johnson's analysis of an 18th century apologia and a collection of letters by a Scottish engineer bring to light what she terms the "pre-discursive" tradition of the iron-making industry. By focusing more broadly on the development of the industry from an oral and apprenticeship-based tradition (pre-discursive) to a more text-based one, Johnson explores how one important area of technical communication flourished through a complex network of social interactions that created and shaped technical knowledge even before this knowledge was set down in textual forms. Such work underscores the notion that technical communication has been implicated in cultural and ideological contexts even before this technical knowledge was passed down through texts. Technical communication is intimately connected to the historical and cultural circumstances that surround it. This is as true today as it was yesterday as it will be tomorrow. This notion of historical influence can be viewed from the macro-level of histories of science and technology as well as from the micro-level of organizational and institutional contexts where history still matters and where technical communication still operates as a system of ordering.[2]

Organizational History, Socialization, and Technical Documents

In her book *How Institutions Think*, anthropologist Mary Douglas investigates the role organizations and institutions play in the thoughts and actions of individual members. In an argument reminiscent of Foucault, Douglas asserts that institutions work by offering members the necessary frameworks, systems of thought, even “analogies with which to explore the world” and “justify the naturalness and reasonableness” of the institution’s rules and ways of operating (112). These analogies, which underpin the organizational or institutional culture, help shape not only the way members view the larger group, but also the way they view themselves and the types of practices they engage in: “[the institution] provides the categories of their thought, sets the terms for self-knowledge, and fixes identities” (12). To become a full-fledged member of an organization, including the technical communication workplace, one comes to accept a certain view of their work and themselves, a view that is mediated in large part by institutional history and organizational culture. This history and culture, which is rooted in the past but still playing out in the present, also helps determine the types of decisions one makes on the job. Both the tough choices and the easier ones we make as technical communicators are constrained by this complex matrix of workplace history and culture: “An answer is only seen to be the right one if it sustains the institutional thinking that is already in the minds of individuals as they try to decide” (Douglas 4). We need only remember the space shuttle Challenger disaster, and other failures of science and technology that involved communication, to understand the powerful force of organizational history as it shapes our present decisions and actions (see Challenger research by Dombroski; Winsor).

But how does one become a member of an institution to the extent that shapes thinking and action in these profound and invisible ways? How does one learn to “fit into” an organization? And how are the historical practices of that organization still being played out in the present? The question of how people learn to fit into an organization has been the topic of management research for decades (Argyris; McHugh; Schein; Chatman; Cable and Judge). Much of this research has focused on questions of how people learn salient information about an organization’s culture in order to know what is acceptable or unacceptable behavior in that culture—in other words, how they become socialized into that organization (Becker and Strauss; Berlew; Wheeler; Schein; Feldman; Van Maanen; Trice and Beyer). An assumption underpinning this research is that people new to an organization want to succeed. One important avenue for doing a job well is knowing how things are done in that workplace environment. After we have been on a job for a while, it seems that we just “know” the right way and the wrong way to do things in that setting. But this knowledge of acceptable and unacceptable practices comes through both direct and indirect processes of acculturation.

And even after you have been on a job for a while, situations arise in which choosing the right or acceptable course of action is unclear. How do we know which actions, which practices, will lead to success? Meryl Reis Louis argues that individuals *learn how to succeed* on the job by first *learning about the organization* through a process of socialization. She describes socialization into an organization as being “the process by which an individual comes to appreciate the values, abilities, expected behaviors, and social knowledge essential for assuming an organizational role and for participating as an organizational member” (229). This process of socialization is not, however, merely a process of learning the expected tasks. Instead, each “role change” that a worker is called upon to make involves an adjustment to that socialization process

(230). As Louis notes, an individual's socialization is not necessarily ever complete. As a person moves into a new position, there is a new culture to be learned. And as new information or research findings change how a job is done, this new knowledge can also change an organization's ideas about acceptable and unacceptable actions.

An organization's culture is a manifestation of the decisions and actions that went before. The values and background knowledge embedded in that culture are the historical artifacts of those decisions and actions. Some values and knowledge will stem from successful decisions that people want to emulate in the future. Others will stem from unsuccessful decisions that provide cautionary tales of actions to avoid in future situations. Whether as good examples to be emulated or bad decisions to be avoided, an organization's history lives in its current culture and is communicated through an organization's stories and documents. Lee Odell finds that this culture "influences 'practically everything' in the life of an organization" (25). On the job, technical communicators get work done by internalizing "values, attitudes, knowledge, and ways of acting that are shared by other members of the organization" (250). In fact, communication is the tool most often used to help people internalize organizational culture. Jean Ann Lutz argues that communication is "the primary tool through which members participate in an organization, through which nonmembers learn about an organization, and through which a corporation's climate and image are codified" (114). By understanding that an organization's culture is communicated through various media, including texts, verbal stories, and the design of physical spaces (to list a few), we can articulate the role workplace documents play in socializing people on the job and standardizing people's actions.

In a direct sense, documents serve to socialize technical communicators because they look to prior documents for examples of how to complete their current tasks. For instance, imagine you worked as a technical communicator at a biotechnology company or a medical device company. You are assigned the job of creating a new user manual for a medical device that surgeons will someday insert into a human heart. This user manual must not only be clearly written but also medically accurate. Where would you go to get started on that assignment? No doubt, the previous user manuals created by your company would be one starting place. Reviewing past manuals designed for other heart devices might help you understand the kinds of information to include and the design that information should take. In many ways, we look to earlier documents to learn how we should develop future documents. Lee Clark Johns describes this colorfully when he says that the "file cabinet has a sex life; it reproduces itself" (153). In fact, the file cabinet stores the historical information that *we* reproduce when we design those future technical documents. (For a discussion of the problems of reproducing culture, see Herndl, "Teaching Discourse and Reproducing Culture.") In the example of the manual for a heart device, when we look at a past document to understand a current writing situation, we are using historical knowledge to make decisions about our current practices. This use of past documents transmits existing information and organizational culture into current documents and workplace practices. It is as if technical communication is a conduit for sending information from a past sender to a future receiver. But as Jennifer Daryl Slack, David James Miller, and Jeffrey Doak point out, this simple understanding leaves the technical communicator only the ability to "transmit the sender's meaning as a perfectly executed message" (178) with no power to influence or change the meaning or the cultural context of the message. If we view the technical communicator as merely a conduit – a neutral channel through which information passes from the past to the present – then the technical communicator becomes an impotent worker, whose agency is denied except in cases of failure or when something goes wrong.

David Dobrin famously defined technical communication as "writing that accommodates technology to the user" (242). However, according to this model, the technical communicator only conveys appropriate technical information for a particular user without the ability to use historical understanding to impact the information or the culture of the communication. Slack, Miller, and Doak argue that a more empowered way to conceptualize the technical communicator's role is as someone who articulates meaning, using an understanding of historical circumstances to craft documents that participate in ongoing processes of cultural (re)formation and (re)alignment. In this view, the technical communicator knows what came before and uses that information to either recreate the past or perform different actions in response to new information and new circumstances. Being successful as an articulator of meaning, though, relies on the communicator first being successfully socialized into the organization, understanding what is currently acceptable and unacceptable based on historical knowledge, and exercising good judgment regarding what needs to be changed and how to effect change within the current organizational culture. Much of this socialization, this habituation into an organization's culture, is communicated through the actual documents and tasks in the technical communication workplace. In fact, the technical documents themselves can be understood as exerting influence on individuals' communication decisions and professional actions.

As previously stated, an organization's history lives in its current culture and is communicated through its documents, which most often resemble earlier documents. For example, a memorandum written today will have the same format and similar content structure as earlier memos—even though most memoranda today will probably be sent as electronic documents in the form of email. A report written today will have similar headings and structure as earlier reports. These types of documents, or genres, embody conventional structural elements that help readers anticipate what kinds of information will be in the document, where it will be located, and how it will be formatted. Charles Bazerman describes a genre this way:

> A genre is a social construct that regularizes communication, interaction, and regulations. Thus the formal features that are shared by the corpus of texts in a genre and by which we usually recognize a text's inclusion in a genre, are the linguistic/symbolic solution to a problem in social interaction. (*Shaping* 62)

In other words, a document's regularized generic features help that document to solve a social problem; the document then can be understood as having a certain kind of agency in a social interaction. JoAnne Yates and Wanda Orlikowski find that "genres are enacted through rules, which associate appropriate elements of form and substance with certain recurrent situations" (302), thus giving these generic documents that ability to shape appropriate actions for individuals within an organization or profession. A single document genre is especially influential when considered in relationship to the other professional genres that work to shape the communication in an organization or profession. For example, Amy Devitt shows how various genres of accounting documents (memoranda, letters, tax reviews, research reports, etc.) work together to regulate professional practice in that field. These networks of professional document genres are based on historical knowledge and social relationships that regulate future document decisions, influencing technical communicators in their decisions about what is (in)appropriate in a current situation.

Two recent studies of medical technical communication, have investigated the genre and rhetoric of medical forms as instruments that both reflect larger institutional cultures and shape the practices of members. Roger Mungar's study of the evolution of EMS run reports finds (1) that changes in the forms themselves reflect changes in the ways practitioners used the forms and

(2) that medical forms created for multiple users offer insights into the status, authority, and power of those various users. Susan Popham's examination of medical forms analyzes common paperwork of medicine, namely patient examination, patient visit, diagnosis, insurance, and billing forms, in order to understand how the fields of science and business – as well as the competition for disciplinary power – are constructed and represented through these documents which influence patient care. These studies carefully illustrate the ways in which social practice and disciplinary knowledge are represented in technical documents. In a very concrete way, historical knowledge and judgments are reflected in a document's visual and verbal conventions, which serve to address social needs and relationships. These technical documents are artifacts shaped by historical circumstances. As such, they both direct human action and offer a window into that action.

Learning From Technical Communication History

In sum, the history of technical communication is a history of ordering knowledge, of socializing communicators into certain cultures of writing, of creating technical documents that reveal the past and shape the present. In order to prove this point, we have made several claims about technical communication. First, technical communication operates as a system of ordering that shapes and produces technological, scientific, and often business knowledge through the creation and use of texts. Because all forms of communication are influenced by their contexts and circumstances, technical communication practices are embedded in historical and cultural processes that influence what counts as *technical* communication, as well as the consequences of that communication. Second, these processes of ordering often take the form of organizational culture or institutional memory, which continue to influence the contemporary technical communication environment. Third, through this continued influence of the past on the present (and even the future), technical communication practices and documents play a socializing role; they encourage or legitimate certain practices while discouraging or complicating others. And finally, the traces of this history, and this socializing function, can be witnessed in the actual technical documents that constitute workplace communication.

But how exactly do we learn from our organization's past? What lessons can our local historical context teach us about technical communication more broadly? At this point, we wish to answer these questions by providing a three-part heuristic for exploring the role history plays in workplace communication. This heuristic translates our major argument into a practical framework for guiding current technical communicators' practices in light of the past.

One: What systems of order does my workplace create?

Because technical communication practices work to order scientific, technical, and business knowledge, each technical communicator is involved in this ordering process. In other words, we are doing more than simply communicating information by creating technical documents and presentations. If we focus only on the specific task before us, we will forget and even neglect the important cultural and historical role our work plays in shaping and making meaning from scientific information. The first step, then, is to consider our part in the process by first understanding what types of order our specific workplace seeks to create.

Two: How does the history and culture of my workplace influence this process of ordering and the way I participate in this ordering?

Technical communication does not happen outside of historical circumstances, but instead is connected and responds to them. The systems of ordering that each workplace initiates are linked to the larger historical contexts, which in turn influence that workplace and the practices of that workplace. The second step is two-part: (1) consider what larger historical forces and movements directly influence the work you do today and (2) consider how the history and culture of your organization encourage certain actions and discourage others. Particular institutional histories are still alive in the organizational culture of a workplace. These histories shape the values, environment, and practices – or culture – of contemporary technical communication. And when we learn to succeed in a particular workplace, we absorb the culture of that place and become socialized in particular workplace practices. This socialization operates as a perceptual lens, allowing us to see the work we do through the lens of that organization's history. In order to insure that we operate as ethical communicators, we must never forget how the history and culture of a workplace influence our decisions.

Three: How will my decisions in this workplace shape and order the actions of others?

We have argued here that technical communication cannot be understood as standing outside of history. Likewise, technical communicators cannot be understood as standing outside of an organization's culture and context. Our socialization into a particular workplace culture shapes the way we understand our work, and also the work itself – the actual processes in which we participate. The texts we create communicate processes of ordering to others: telling the users what to do, how to do it, and what to avoid doing. In these documents, we pass along this user-centered information as well as the values, the assumptions, and the ideology of our workplace.

With every document we create and every presentation we give, we communicate the organizational culture of our workplace. As technical communicators, we are not passive conduits for transmitting technical information; we must remember to reflect on the consequences our actions have for other people. Specifically, we must consider how our documents shape the practices and ideas of the user.

In the section that follows, we offer an extended example to illustrate the utility of this framework for technical communication practice. In this final section, we will return to the hospital workplace we introduced earlier to explore how one document – the insulin protocol used in intensive care units (ICUs) – makes previous knowledge tangible in people's actions.

Medical Technical Communication & ICU Insulin Protocols

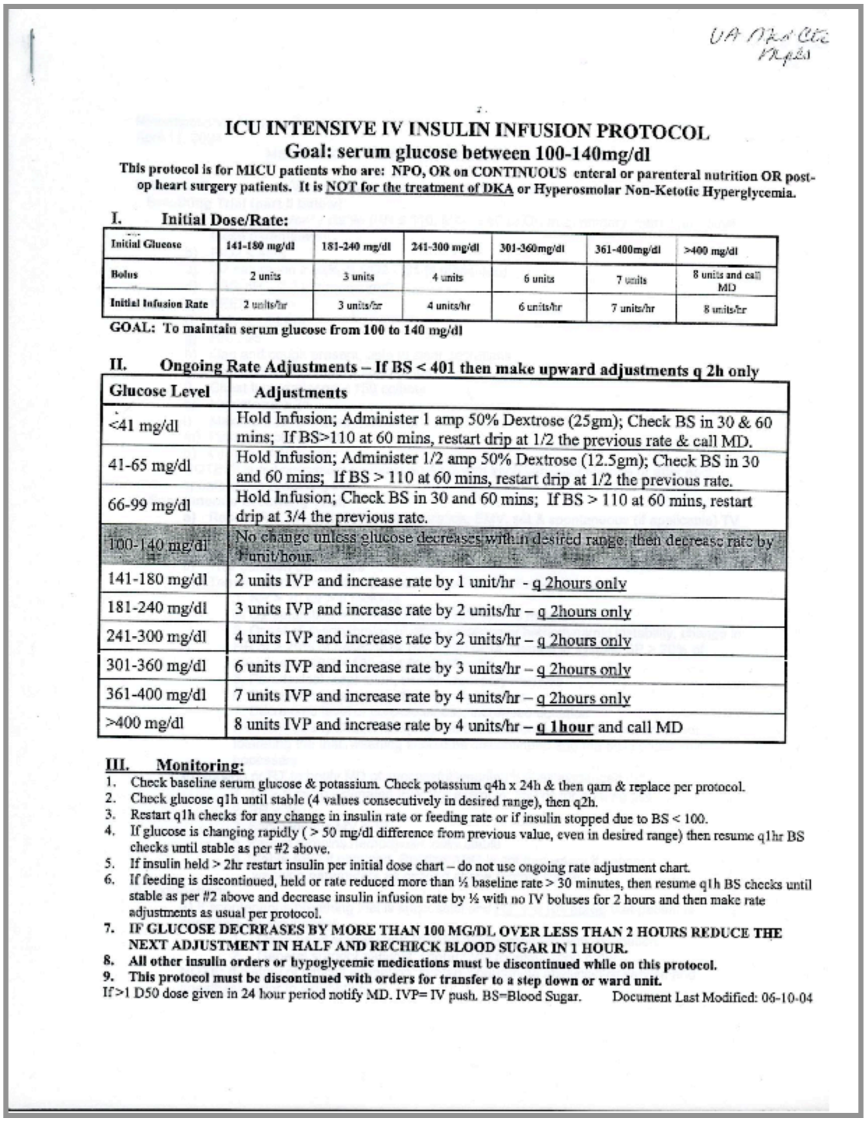
Protocols are used in medical settings, like hospital intensive care units, to convey medical information and regulate the patient care delivered by clinical professionals. Medical protocols are forms of scientific and technical communication, specifically instructional documents, which convey patient care directions for use by medical professionals in clinical contexts. In these documents, medical knowledge is presented through both visual conventions and verbal text, often as flow-charts or step-by-step directives, which nurses, doctors, and other healthcare workers use to regulate patient care. Similar to clinical practice guidelines, the purpose of protocols is to "reduce inappropriate variations in clinical care, minimize harm, promote cost effective practice, and produce optimal health outcomes for patients" (Steering Committee 874). Unlike clinical practice guidelines, however, protocols function more like standing orders rather than recommendations: "Standing orders programs authorize nurses and pharmacists to administer vaccinations [or treatments] according to an institution- or physician-approved protocol without a physician's exam" (CDC). A clinical protocol, then, serves to authorize a specific set of patient care actions to be carried out by qualified nurses, pharmacists, or technicians without a doctor's orders for that individual patient. Though these protocols may take different forms, from "elaborately designed" charts to a list of "general recommendations," they all have two features in common: (1) they are intended to lead medical professionals through a sequence of events and (2) they are inspired by (if not always specifically conforming to) medical research findings (Berg 1081).

What systems of order does my workplace create?

Hospitals and clinics can be understood as technical communication workplaces because of the role technical documents and presentations play in daily medical practices. In these settings, healthcare professionals create, order, and communicate medical information to a variety of users. They use this medical information, often in the form of written documents, to promote health and treat illness. Consequently, these documents create systems of order that make possible the work of the hospital. The medical protocol is one technical document intended to create order by guiding medical practice. The technical communicator who designs and composes a protocol works as part of that larger system ordering medical practice. By creating a document that will tell a healthcare professional what to do and not to do, this communicator is working to fulfill historical and cultural goals of a particular organization, as well as the medical profession more broadly.

Protocols are, however, just one component of what has come to be known as the evidence-based medicine (EBM) movement in contemporary healthcare, which seeks to "eschew unsystematic and 'intuitive' methods of individual clinical practice in favor of a more scientifically rigorous approach" (Goldenberg 2621). Evidence-based medicine, then, seeks to make clinical research and deliberate decision-making the foundation of medicine. The collection of techniques and practices which constitute EBM finds its origin in the work of doctors from McMaster University in the late 1980s, whose publication *Clinical Epidemiology: A Basic Science for Clinical Medicine* (Sackett, Haynes, Guyatt, and Tugwell, 1991) showcased the utility of epidemiological research for "individual patient care" (Lambert 2633; also see Sackett, Haynes, Guyatt, and Tugwell; Sackett, Rosenberg, Muir Gray, Haynes, and Richardson). Although epidemiology has not always been a field considered relevant to direct patient care, Sackett and the McMaster University team illustrated its benefits in hospital settings and advocated for a research-based approach to patient care that deemphasized routine use of procedures based largely on an individual physician's preference (Lambert 2634). Arguably, the movement caught on in part because of the growing understanding that medical professionals, like all humans, are prone to error and to habitual actions that might not represent the best possible practices (see Berg; Lambert). By structuring patient care according to standardized guidelines drawn from both clinical research findings and other verifiable evidence, proponents of EBM argue that such practices – based on historical findings – potentially enhance health care quality by increasing evidence-supported procedures across a number of clinical settings (Berg 1082). And though EBM has been the subject of ongoing debate, most medical professionals and medical schools agree that evidence-based medicine is here to stay, whatever its limitations and however it is specifically articulated in practice (For thorough and thoughtful discussions of this debate, see Berg; Lambert).

One common manifestation of the EBM movement is the growing use of medical protocols in what has become protocolized medicine (Lambert 2637). In the case of insulin protocols in intensive care units, medical knowledge is presented both visually and verbally in order to provide step-by-step directions needed to measure blood glucose levels and, if needed, administer insulin to non-diabetic patients. The protocol regulates a decision-making process that care providers should go through in order to ensure that standards of care are achieved. In



ICU INTENSIVE IV INSULIN INFUSION PROTOCOL
Goal: serum glucose between 100-140mg/dl
This protocol is for MICU patients who are: NPO, OR on CONTINUOUS enteral or parenteral nutrition OR post-op heart surgery patients. It is NOT for the treatment of DKA or Hyperosmolar Non-Ketotic Hyperglycemia.

I. Initial Dose/Rate:

Initial Glucose	141-180 mg/dl	181-240 mg/dl	241-300 mg/dl	301-360mg/dl	361-400mg/dl	>400 mg/dl
Bolus	2 units	3 units	4 units	6 units	7 units	8 units and call MD
Initial Infusion Rate	2 units/hr	3 units/hr	4 units/hr	6 units/hr	7 units/hr	8 units/hr

GOAL: To maintain serum glucose from 100 to 140 mg/dl

II. Ongoing Rate Adjustments – If BS < 401 then make upward adjustments q 2h only

Glucose Level	Adjustments
<41 mg/dl	Hold Infusion; Administer 1 amp 50% Dextrose (25gm); Check BS in 30 & 60 mins; If BS>110 at 60 mins, restart drip at 1/2 the previous rate & call MD.
41-65 mg/dl	Hold Infusion; Administer 1/2 amp 50% Dextrose (12.5gm); Check BS in 30 and 60 mins; If BS > 110 at 60 mins, restart drip at 1/2 the previous rate.
66-99 mg/dl	Hold Infusion; Check BS in 30 and 60 mins; If BS > 110 at 60 mins, restart drip at 3/4 the previous rate.
100-140 mg/dl	No change unless glucose decreases within desired range, then decrease rate by 1 unit/hour.
141-180 mg/dl	2 units IVP and increase rate by 1 unit/hr - q 2hours only
181-240 mg/dl	3 units IVP and increase rate by 2 units/hr – q 2hours only
241-300 mg/dl	4 units IVP and increase rate by 2 units/hr – q 2hours only
301-360 mg/dl	6 units IVP and increase rate by 3 units/hr – q 2hours only
361-400 mg/dl	7 units IVP and increase rate by 4 units/hr – q 2hours only
>400 mg/dl	8 units IVP and increase rate by 4 units/hr – **q 1hour** and call MD

III. Monitoring:
1. Check baseline serum glucose & potassium. Check potassium q4h x 24h & then qam & replace per protocol.
2. Check glucose q1h until stable (4 values consecutively in desired range), then q2h.
3. Restart q1h checks for any change in insulin rate or feeding rate or if insulin stopped due to BS < 100.
4. If glucose is changing rapidly (> 50 mg/dl difference from previous value, even in desired range) then resume q1hr BS checks until stable as per #2 above.
5. If insulin held > 2hr restart insulin per initial dose chart – do not use ongoing rate adjustment chart.
6. If feeding is discontinued, held or rate reduced more than ½ baseline rate > 30 minutes, then resume q1h BS checks until stable as per #2 above and decrease insulin infusion rate by ½ with no IV boluses for 2 hours and then make rate adjustments as usual per protocol.
7. **IF GLUCOSE DECREASES BY MORE THAN 100 MG/DL OVER LESS THAN 2 HOURS REDUCE THE NEXT ADJUSTMENT IN HALF AND RECHECK BLOOD SUGAR IN 1 HOUR.**
8. **All other insulin orders or hypoglycemic medications must be discontinued while on this protocol.**
9. **This protocol must be discontinued with orders for transfer to a step down or ward unit.**

If >1 D50 dose given in 24 hour period notify MD. IVP= IV push. BS=Blood Sugar. Document Last Modified: 06-10-04

Figure 1. Sample insulin protocol used in a hospital intensive care unit.

the case of this ICU insulin protocol in Figure 1, these standards are based on research findings of a clinical trial published in a widely circulated medical journal in 2001 showing a 42% reduction in mortality in patients that had hyperglycemia managed with a protocol with a glucose target of 80-110 mg/dl (Van den Berghe et al.). Thus, the intentions and content of this protocol document are based on the (historical) findings of a research study that took place before the document was developed. Because this past knowledge promised greatly improved outcomes for ICU patients, hospital staff considered it important to create a protocol that translated those earlier research findings into a document that would then regulate clinical practices at the bedside.

In an intensive care unit, the insulin protocol is one of many forms of "paperwork" that health care workers complete to keep records concerning the care of individual patients. When we go into the hospital today, we expect that our care providers will keep complete medical records about our case and add them to our existing file of records from previous care – our medical history. If we are in an ICU, the protocol document in this example would become part of our medical record, along with all the other forms and documents that record our medical history. We take it for granted that these records will be kept, but for patients only 100 years ago, this would not have been the case. Stefan Timmermans and Marc Berg describes how in the early 1900s, the only medical records kept were those physicians kept in their private notebooks. These "casebooks," as they were called, were often notes about patients arranged in chronological order, kept at the physician's desk, and they "hardly played a role in the clinical care process": "The casebooks were kept for administrative, teaching, and research purposes. They were mostly not even kept on the ward or at the site of care, but on a specially designed stand in the physician's personal office" (30-31). In the intervening century, medical professionals have come to value the benefits of more standardized medical care. Insurance companies have also played a role in encouraging more standardized medical record keeping for payment. And hospital administrators have implemented organizational systems of documentation in order to be able to receive reimbursement for out-of-pocket expenses from insurance companies. The use of insulin protocols and any protocol must be understood in light of the history of medical documentation and record-keeping.

In fact, the medical record seems like a natural part of today's hospital landscape. But even the small change from a physician keeping private records to moving those records into a hospital department has had far-reaching implications for organizational systems and individual practices. Timmerman and Berg assert that "innovation and standardization of record-keeping procedures" suggests a "transformation of both the practices involved and the standards introduced" (33). They do not understand standardization processes as "technical and neutral events," rather they consider standards as "reconfigur[ing] the health care practices involved, and thus directly touch[ing] upon political issues" (33). Lucille McCarthy illustrates how the development of standards and the documents to communicate these standards shaped professional practice in psychiatry. In two separate articles, McCarthy describes how a biomedical model of psychiatry gained dominance over an interpretive model through two revisions of the *Diagnostic and Statistical Manual* (*DSM*), the charter document in that professional field, thus influencing professional practice though the values implicit in these new standards of care. Like systems of socialization, systems of standardization work to regulate and order terminologies, procedures, designs, and job performance (Schryer, Lingard and Spafford 27; Timmerman and Berg 33). The functions of these ordering systems are largely carried out through mundane technical documents, such as the insulin protocol (Foucault; Yates; Longo *Spurious*) working together with the information technologies that support these systems (Swartz; Hansen).

How does the history and culture of this workplace influence this process of ordering?

To understand this particular technical document, the insulin protocol, we must understand the larger historical, cultural, and institutional processes that constitute the document. First, as a medical paperwork, the existence of the insulin protocol is a result of the history of medical recording keeping and documentation. Second, the insulin protocol is part of a larger cultural and professional shift in late-twentieth-century Western medicine, namely the evidence based medicine movement. This movement, influencing both hospital care and medical education, aims to increase research-based and evidence-grounded medical care through the use of more standardized procedures, such as medical protocols. These protocols, then, are created as a response to the EBM movement and represent a manifestation of it. Third, this specific insulin protocol for ICU patients finds its origin in both EBM and the clinical research of Van den Berghe and her team, whose findings became the gold-standard of practice for regulating glucose levels in all non-diabetic ICU patients. In creating this technical document, the technical communicators turned to the Van den Berghe et al. study because it was recognized as authoritative medical knowledge in this particular area. Here we see the development of a technical document generated from an awareness of the historical context (the results of the Van den Berghe et al. study) and institutional/organization practices (EBM).

In creating this protocol, hospital staff not only translated research findings, but also articulated updated goals for clinical outcomes in the ICU through new practice regulations. In this case, the hospital staff who designed the document performed as technical communicators in order to implement research findings into standardized professional practices within their organization. (For an analysis and discussion of the visual design of protocols and the effects of design on practice, see Longo, Weinert, and Fountain.) This particular document, and medical protocols in general, are created to order clinical practice by guiding the decisions of medical professionals. Antonio Cambrosio, Peter Keating, Thomas Schlich, and George Weisz, in fact, understand this particular use of EBM as striving for "regulatory objectivity" by way of "the systematic recourse to the collective production of evidence" (189). In other words, protocols function as a type of objectivity that seeks to order medical practice on agreed-upon evidence, which can take the form of clinical research, decision-making committees, or other types of verifiable results. In this case, the evidence at the heart of this regulatory objectivity is the article by Van den Berghe and her team. Rather than the individualistic and perhaps idiosyncratic deliberation process so often showcased on television shows like *Grey's Anatomy*, this insulin protocol—its creation and its use at the bedside—helps to manage medical decision-making by offering a procedure to follow. As a technical document, the protocol orders human activity by instructing medical professionals how to act in a given situation.

How will my work, in this workplace, shape and order the actions of others?

Perhaps one of the most fundamental questions to ask in creating such a document as the medical protocol is this: how will this document influence, shape, and order the practices of medical professionals? The development and use of a protocol has significant consequences; in the case of ICU patients, it means the proper regulation of blood glucose. Nurses and other medical professionals will use this document, whether in the form of a printed text or a computer interface, to administer medical care to patients. More than just a simple instructional manual, this document makes possible a specific medical approach, thus participating in the promotion of health and the treatment of illness based on research evidence. And one of the most powerful ways to contribute to this system of ordering is to produce a document that (whether embraced or questioned) allows the work of medicine to take place as smoothly and as responsibly as possible – a document that responds to, and even anticipates, the needs and expectations of medical professionals. And to do this, technical communicators need to understand the scientific and technical practices from which we develop our texts, as well as the practices our texts will make possible.

The implementation of insulin protocols shapes the work of ICU medical professionals. The protocols not only tell them what to do and how, but they accomplish this ordering as part of larger historical configurations that merge medical science with healthcare as a business (see Popham). The development of protocols represents one way that institutional and cultural histories shape contemporary technical communication practices. Yet the existence of the insulin protocol studied here does not translate into a transparent system of use. How closely a medical professional follows this protocol document is dependent on a number of factors. Beyond individualistic tendencies of medical workers who may or may not “buy into” the idea of protocolized medicine, different clinical units and different medical institutions will make use of protocols differently. Whether a worker faithfully administers care through the protocol or refers to it more as a guideline comes down to a number of complex factors, such as medical training, position of authority, and the organizational culture in a particular hospital or ward. A study by Varpio et al. of record-keeping practices at a medical program specializing in optometry found that students learned to keep accurate records not just by following the visual and verbal cues of the actual forms, but also by understanding the social context. Specifically, students often contradicted directions on the forms in situations that called for a less “bureaucratic” and more “patient centered” approach (367, 365). In this example, students learned authorized and official social practices, which often created tension between the task and the paperwork, in the actual social contexts of use. Using an insulin protocol effectively and authentically, then, involves a process of socialization through which a medical professional comes to share the same ideals and values as a particular medical ward or institution – ideals and values that encourage some actions while discouraging others. The communicators who develop a protocol contribute to this socialization process by shaping the work of medical professionals.

Conclusion

So what can history teach us about technical communication? The short answer is “a great deal more than we realize.” The history of technical communication involves both the past historical events of the field and the historical narratives and research written about those events. Our knowledge of our professional past comes to us through the texts of others, specifically the texts of historians and other researchers who investigate what used to be. Though this is an important avenue for uncovering past practices, historical research into the long lost past is not the only way to understand the roles and responsibilities of yesterday’s technical communicators. We can also look to our current workplace—the businesses and organizations where technical communication is being researched, composed, designed, and presented. These contemporary practices and the histories from which they developed shape our ideas about our work, our values involving the profession, and our identities as communicators. In order to honor this rich, diverse, and unfinished history of our profession, we need to know not only the history of a document, the people who created it, and its current usage, but also the role we play in the larger social practices of science, technology, and business. A more rigorous understanding of history can bring that knowledge into greater focus.

Discussion Questions

1. What does it mean to say that technical communication operates as a system of order and a process of ordering scientific knowledge?
2. How might this definition of technical communication influence the way we understand the history of science, of technology, of business?
3. What does it mean to be socialized into the culture of an organization? How might we understand technical documents as socialization tools?
4. Find a technical document that was created at least 15 years ago (an old user manual or set of instructions, for example).
   - How might we understand that document as a historical artifact?
   - How do the features of that document (the organization, style, language, and graphics) represent its social and cultural setting?
   - What type of order does this historical document create?
   - What influences does this document have on current technical communication practice?
5. Go online and check out the website for a technical communication company or any company where technical communicators work.
   - How much information is given about the company's history and professional philosophy? Why did they include this information?
   - What view of that organization's culture and values do we perceive from the company's website? How are the culture and values communicated?

- How might that company's philosophy and its organizational culture manifest itself in the actual technical documents of the company? In what ways to documents on the site represent the company's philosophy and culture?

6. What does it mean to say that hospitals and clinics are technical communication workplaces? Does the presence of technical communication in these settings influence your ideas about medicine as a profession? Why or why not?

Notes

[1] An important offshoot of these histories of recovery is the feminist research into the gendered past of technical communication, studies inspired in large part by Mary Lay's call for a more complex assessment of the historical roles played by women and gender-related issues (Lay "Value" 80). Here we are thinking of work by Katherine Durack, Gail Lippincott, Teresa Kynell, Elizabeth Tebeaux, and others.

[2] Elizabeth C. Britt makes an important distinction between organizations and institutions, namely that organizations "exhibit self-consciousness" while institutions "are marked by a certain taken-for-grantedness" (135). Though we agree with her assertion, in this chapter, we do not make a distinction between the two because we wish to suggest that our observations about history and workplace practices apply to both.

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Chapter 8: What is the Future of Technical Communication?

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Summary

The future of technical communication is ultimately uncertain and indeterminate. For this reason, many researchers anticipating the future of the field are tempted to focus on technology–related issues because we want to believe technology is the moving educational challenge and that technological knowledge is progressive and growing in complexity. But the most troubling challenge facing technical communication researchers and practitioners is how we are going to learn to adapt as communication professionals to the new “global, high-tech economy of the 21st Century,” “post-industrial economy,” “knowledge sector,” “global workplace,” “consumer society,” “information age,” “globalized commercialization,” “flat world,” “creative sector,” “third-wave post-capitalism,” “digitalized society” (choose your favorite millennial catch-phrase). Do the principles of communication derived from historical and contemporary rhetorical theory apply in meaningful ways to the new and emerging communication contexts facing us? After providing an example of technical communication work in a contemporary organizational context, this chapter draws on research describing the geographically and temporally distributed contexts that envelop technical communication activities, and offers a heuristic that helps readers conceptualize some of the 21st Century “skills” necessary to effectively operate as rhetorically-sensitive multi-communicators. Future technical communicators face ill-structured communication design situations characterized by diminished attention, multitasking, information overload, pseudo-attention deficit disorder, and high-speed polychronicity. The relationships between communication abilities, emerging technological interfaces, and heuristics

for strategic problem solving are explored. A conception of technical communication that stresses communication, rather than only technology, is described.

Introduction

Your problems are wicked and your work is fragmented, virtual as well as co-locational, spanning numerous stable and emerging technological platforms and applications, spatially and temporally distributed and high speed, collaborative and isolated. You are part of a virtual team developing a full documentation suite using XML-GL, a graphical version of the XML markup language, for a Web application designed to support instructional design projects. Before this project, you worked as an Intern student assisting a team with an established documentation suite of similar size and complexity. The on-the-job experience you gained using HTML and then XHTML to design Web-ready versions of some of the key documents reduced your learning curve for XML considerably.

Your current team is multidisciplinary and multilingual—consisting of a project manager, a programmer, an interface specialist, a graphics designer, and you; and your organization is nonhierarchical, your team interacting with other product development and product support units. The workflow of your team is intimately connected to the documents that your team creates and maintains to solve the problems that your team has been organized to address. Your team meets regularly via a Web conferencing application, rely heavily on real-time chat for day-to-day exchanges, and use a document sharing application to keep track of multiple existing and developing versions of their documentation. Members of your team value your collaborative abilities including your interpersonal and communication skills as well as your experience multitasking and working with tight deadlines. You are in a constant state of in-between states balancing your attention, energy, interpretive capabilities, and cognitive processing abilities across numerous cues from your environment. And your environment is not explicitly connected to any particular place or time but, rather, emerges as a mix of local and global issues.

This chapter forwards a somewhat stoic professional role for technical communicators, acknowledging the "wicked" and complex worlds in which they work and the contingent nature of all forms of expertise. While technological literacy is valued in the workplace, including familiarity with both specific (e.g., Adobe Acrobat) and general software applications (e.g., word processors and graphics programs), this chapter suggests that the greatest challenge facing future technical communicators is largely a communication challenge. I forward that technical communicators can benefit considerably from focusing on their problem solving capacities and learning processes, on their role as socio-technical mediators and genre specialists, and on the development and cultivation of conceptual artifacts that augment rather than hinder human understanding and activity.

Literature Review

Future technical communicators will operate in ill-structured work contexts that demand flexible problem-solving abilities, that make expertise difficult or impossible to acquire, that necessitate ongoing sensitivity to socio-technical mediation, and that demand learning during an ever-increasing time famine (even while we enjoy unprecedented freedom from the traditional constraints of space and time in our virtual work lives).

The good news is that profession of technical communication has, in Carolyn R. Miller's words, been liberated "… from the drudgery of manufacturing second-hand eloquence for people who might start to care about producing their own" (p. 108). As she anticipated 20 years ago, technical communicators have become experts in document production technologies and frequently influence, not only the design of the documents and user assistance systems that support software and hardware, but the interfaces and designs of the software and hardware as well. Technical communicators no longer work solely for the military or IBM writing systems documentation as they did in the 1970s (Rigo 2001). Indeed, in a recent survey of 67 technical communication managers (Rainey, Turner, and Dayton 2005), respondents reported that their technical communication groups work with an extraordinarily diverse range of genres, including for example PDF and hardcopy documentation, online help, style guides, reference and training materials, intranet sites, books, newsletters, annual reports, magazines, proposals, company websites, performances evaluations, video scripts, usability reports, marketing materials, and so on (p. 326).

The Problems of Technical Communication

Technical communicators routinely generate these documents in ill-structured domains, contexts that are unstable and that demand flexibility, that is, environments that demand a creative ability to organize across single data points and to understand, argue, and evaluate both conceptually and pragmatically. Organizing across data points requires that creative technical communicators not only work with information differently but also that they come to understand knowledge in new ways. As Resnick, Lesgold, and Hall (2005) argue, our understanding of what constitutes knowledge has changed dramatically during the last several technology-rich decades. Knowledge is no longer represented in the form of lists, *primary* sources, controlled areas of expertise, or fixed private states of understanding. Instead, knowledge is contingent, framed by higher-order and changing structures, publicly distributed, and drawn from multiple, emergent sources (p. 79).

As Spinuzzi (2007) describes, ill-structured domains are frequently characterized by "downsizing, automation, flattening of work hierarchies, increasing numbers of relationships between companies, continual reorganization, the breaking down of silos or stovepipes in organizations, and perhaps most importantly, the increase in telecommunications …, which has made it possible to connect any one point to any other, within and across organizations" (p. 265). Within these contexts, technical communicators collect, sort, analyze, interpret, design, and report data, and collaborate, communicate, interact, and negotiate with other professional problem solvers. And they do so by creatively acting as "presence allocators," that is, as problem solvers who can "survey the available communication technologies, choose a medium that provides the right cues for each interaction, and divide [their] presence among two or more interlocutors" (Turner and Reinsch 2007, p. 47).

Thus, technical communicators are routinely confronted with increasingly wicked problems, a term originally employed by Karl Popper (1972) to describe complex problems (Buchanan 1992). Wicked problems can be contrasted with "tame problems." Conklin (2005) defines tame problems as problems that are well-defined, have explicit stopping points and solutions that can be evaluated as correct or incorrect, and that belong to a class of similar problems with similar solutions (or that have a limited set of alternative solutions) (pp. 9-10). Thus, although playing a game of chess may be complex and require considerable expertise, problems and solutions in chess can be defined as tame versus, for example, the problems and solutions involved in designing documentation for a new vehicle.

In contrast, wicked problems—according to Kukla, Clemens, Morse, and Cash (1992)—have the following attributes:

- **There is no definitive formulation of the problem**. Because these systems are large and constantly changing, the person solving the problem does not have all the information needed to understand the problem fully.
- **There is no stopping rule to tell when the problem is solved**. The problem solver can never conclusively answer the question "Have I done enough?"
- **There is no immediate or ultimate test of whether the system design is successful**. The system design process has unbounded consequences, and there is no way to conduct comparative analysis.
- **There is no single, identifiable "cause" of a problem**. The problem may be a symptom of other problems, and the solution will change depending on how the problem is formulated (p. 43).

Wicked problems invite numerous misconceptions on the part of busy problem solvers. The first is oversimplification, that is, learners either develop incomplete conceptual understandings or they generalize features of one problem instance to other instances with different characteristics. That is, problem solvers tend to develop lone mental representations consisting of general features and to apply these representations to all future cases (e.g., all situations where proposing is required are the same). The second is the development of inflexible knowledge structures or rigid schemas that end up being applied as procedures to more complex cases (e.g., all proposing situations require written proposals). And the third is that problem solvers resist or ignore altogether indeterminate or uncertain information in favor of building problem representations that are easy to apply (e.g., all written proposals contain an executive summary, rationale, and budget section) (Conklin 2005; Spiro, Vispoel, Schmitz, Samarapungavan, and Boerger 1987). However, as Bereiter (2002) argues, although there may be "no single correct, complete, or ideal understanding" (p. 110) of complex subject matter, there can certainly be identifiably incorrect understandings—that is, insightful problem solving is only possible with deep understanding and deep understanding involves deep involvement with content, for different audiences, situations, and contexts.

But wicked knowledge work demands that technical communicators generate more in less time more efficiently. After Drucker (1994) and Tapscott (1997), Stinson (2004) characterizes our knowledge age as a time where

> Increasingly, employees are being called on to continually expand their capabilities, not to do more work, but to do more complex work, to make more decisions and make them more independently. This implies that people need to be continually developing competencies—not just job skills, but also intellectual skills. It implies that learning opportunities need to be available to them anytime and anywhere, and that learning needs to be available just-in-time as needed for their use (p. 167).

Snyder (2002), as well, describes how our "new communication order" has created a new work order that consists of

> more stressful and demanding work for those with good jobs; a proliferation of low-paying and temporary jobs and many without jobs; a widening gap between the rich and poor; a world in which national borders matter less. But the world of the new work order also includes the promise of more meaningful work, the valuing of diversity, the dispersal of centralised authority and the wider

> distribution of knowledge across communities. The sheer challenge of attempting to reconcile these apparently contradictory forces is sobering to say the least (p. 5).

Given such accelerated problem spaces and complex work environments, the technical communicator's goal of achieving what Bazerman (1988) describes as "rhetorical self-consciousness" is exceedingly difficult. Rhetorical self-consciousness involves the constant application of the following heuristics:

1. Consider your fundamental assumptions, goals, and projects;
2. Consider the structure of the literature, the structure of the community, and your place in both;
3. Consider your immediate rhetorical situation and rhetorical task;
4. Consider your investigative and symbolic tools;
5. Consider the processes of knowledge production; and
6. Accept the dialectics of emergent knowledge (pp. 323-329).

Bazerman's (1998) call for rhetorical self-consciousness parallels Selber's (2004) recommendation that "rhetorically literate" learners be versed in persuasion (interpreting and applying both implicit and explicit arguments), deliberation (acknowledging that ill-defined problems demand thoughtful representation and time), reflection (demanding both articulation and critical assessment), and social action (defining all technical action as social action) (p. 147). And Fleming (2003), as addition, advocates the preparation of rhetorically sensitive professionals, maintaining that such individuals would have an understanding of

1. **Circumstantial knowledge**: … an understanding of the people, places, events and history of the situation;

2. **Verbal formulae**: recurring linguistic patterns that make up the discursive repertoire of a particular community and particular discursive situations;
3. **Common sense**: that collection of truths, presumptions, values, and preferences that is operative in a community;
4. **Models of textual development**: conceptual patterns and structures that organize everyday argumentative thinking in a community; and
5. **Logical norms**: deep-seated logical knowledge, general warrants, rules of inference, and other "universal" principles that authorize arguments (pp. 105-106).

Before technical communicators can aspire to the role of rhetorically literate, sensitive, and self-conscious contributors to their professional endeavors, they must first acknowledge how their wicked contexts will continue to modify historical notions of expertise in emerging socio-technical settings.

The Death of Expertise

It is exceedingly difficult to find individuals we can label, with any degree of confidence, as "experts," that is, if we are defining an expert as someone who knows "everything" about a database we are accessing, a similar version of the same software application, a particular corporate policy or procedure for managing an unusual employee situation, or the features of a genre that is uncommon to our corporate setting. Yet much of the early cognitive science research was organized around the assumption that, if we learn how experts behave and think, novices can learn how to behave and think the way experts do (Chi, Glaser, and Rees 1982). We have learned, however, that both experienced and inexperienced learners develop rich mental models of learning tasks and concepts that guide them as they apply knowledge to given situations and acquire new knowledge for use in new situations (Johnson-Laird 1983). These rich models make it difficult for them to communicate effectively with each other. In a now classic series of experiments, Landauer, Egan, Remde, Lesk, Lochbaum, and Ketchum (1993) report that "… while, on average, each person can think of four or five different terms that might suit an 'information object', the total number of terms so offered by, say, 100 people is in the order of 30. The chance that any of the four or five terms offered by one person will match any one of the four or five offered by another is no greater than 50%" (p. 76).

So expertise is intensely contextualized and social (Brown and Duguid 2000; Lave and Wenger 1991). Moreover, expertise is dynamic and socially constructed and often changes from one problem setting to another. It may even be, as Sternberg (2003) posits, that expertise comes in many different forms, including the ability to think critically (analysis, evaluation) or creatively (invention, discovery) or practically (implementation, use) or wisely (social good, humility). As Brown and Duguid (1992) note, "Indeed, it is possible for people to be simultaneously novice and expert. The novice-expert distinction, when it gets reified in technology as an act of graduation rather than as a process of gradation, fails to deal with the needs of experts to learn" (pp. 172-173). Progressive myths of technological progress and notions of the "self-made man" tend to overlook the many situations in which experts must learn and, unfortunately, ill-structured situations increase how frequently these moments occur. Ill-structured situations demand forms of expertise that emphasize intelligent relationships to things or situations in the world rather than explicit or statable knowledge.

Given the historical positioning of technical communicators as user advocates who explain or translate technical concepts for nontechnical novices, the decentering of expertise has serious implications for the profession. Most importantly, technical communicators need to adapt themselves as facilitators and mediators rather than as instructors or experts. And mediators, as "interface persons," operate at the edges of communities, understanding, communicating, and negotiating solutions for different audiences with different rules for participation and contribution (Creplét, Dupouët, and Vaast 2003).

The Strategies of Socio-technical Mediators

Wicked 21st century technical communication work and the elimination of unqualified expertise potentially undermines the influence that technical communicators can and do have on the technological processes and products. Still, at the most profound level—drawing on the disciplines of rhetoric, psychology, linguistics, and communication—technical communicators will always aim to understand and mediate the relationship between complex symbolic systems and human beings.

We live in technology-rich worlds where work, leisure, and learning are increasingly conflated activities and where distinctions between real and representation are increasingly difficult to maintain (Mehlenbacher, 2010). As Burbules (2004) elaborates,

> Bifurcation of the synthetic and the real has obscured a deeper understanding of what is changing in the ways we make and explore our worlds, mediated by and through new technologies. Very rarely, if ever, is there a "direct perception" of anything; we actively observe, select, filter, and interpret our experiences in all sorts of ways that construct distinct and sometimes idiosyncratic *versions* of the world. Some of these mediations are overtly technological in nature: eyeglasses, cameras, telescopes—or, more subtly, concepts, categories, theories, and

> assumptions. The world we perceive is always already a world we "make" to some extent (p. 165).

Technical communicators operate at the intersection between these technological *versions* of the world and conceptual ones. So, ultimately, technical communicators must understand and invent the technological realities that we describe and create. Our preparation for this role has a significant historical precedent, the shift from an oral to a textual culture that Walter J. Ong describes in his (1982) *Orality and literacy: The technologizing of the word*:

> To say that writing is artificial is not to condemn it but to praise it. Like other artificial creations and indeed more than any other, it is utterly invaluable and indeed essential for the realization of fuller, interior, human potentials. Technologies are not mere exterior aids but also interior transformations of consciousness, and never more than when they affect the word. Such transformations can be uplifting. Writing heightens consciousness. Alienation from a natural milieu can be good for us and indeed is in many ways essential for full human life. To live and to understand fully, we need not only proximity but also distance (p. 82).

Writing is a technology with given document or genre characteristics such as text, syntax, lexicon, intended purpose and audience, and so on. And writing is also a technology for mediating between technologies and humans, allowing interactions between various audience attributes (e.g., reading level, demographic characteristics) and authorial goals for reader response, text use or purpose, and so on (Redish 1993). The information that technical communicators produce is as much *formed by* our technological contexts as it *forms* our technological contexts. As well, just as the technologies we invent require articulation, so too do those technologies invent us. The information that we produce to conceptualize, explain, support, market, and help us act is not an object, entity, or module that operates apart from our communities or our contexts. In addition to information *about* and *for* reality, Borgmann (2000) forwards "Information through the power of technology … as a rival of reality" (p. 2).

To mediate the relationship between technology and people, technical communicators must understand their scientific and technological contexts, operationally and critically. They need to understand audiences, their backgrounds, interests, motivations, emotional, and cognitive states. They need to understand human action and activity. And they need to understand not only human and technological interactions but also the complex communication that occurs between humans.

The core of this understanding is not, as some might argue, the technologies that we support and explain but, rather, our considerable investment and commitment to effective communication design. diSessa (2000) eloquently captures the power of our primary "interface," writing

> The enthusiasm we feel toward amazing new things does not come with a caution to consider whether they are suitable for deep advancement of civilization or whether they may be just a passing "wow!" (on the scale of civilizations). Our senses and short-term sensibilities just don't report to us on such issues. Current literacy provides a stark object lesson. Text is linear; it is black and white; it doesn't zoom around the page in 3-D; it isn't intelligent by itself; in fact, in terms of immediate reaction, it is quite transparently boring. I can't imagine a single preliterate was ever wowed at the first sight of text, and yet text has been the basis

> of arguably the most fundamental intellectual transformation of the human species (pp. 112-113).

It is through these “texts” (whether audio, visual, animated, graphical, or haptic) that technical communicators ultimately exhibit rhetorical self-consciousness by, as Bazerman (1988) summarizes, “interpreting, contributing, critiquing, amending, and elaborating” on existing and emerging artifacts.

The Time for Learning and Reflection

As socio-technical mediators, technical communicators operate at both the cognitive and social level, as what Schön (1983) describes as “reflective practitioners,” that is, “agents of society’s reflective conversation with its situation, agents who engage in cooperative inquiry within a framework of institutionalized contention” (p. 352), agents who must contend with “problematic situations characterized by uncertainty, disorder, and indeterminacy” (pp. 15-16). As well, technical communicators must acknowledge the exponential increase in perceived “busyness” (Putnam 2000), information overload (Farhoomand and Drury 2001) and polychronicity and multitasking (Turner and Reinsch 2007). Davenport and Beck (2001) even argue that our organizations have begun to suffer ADD (attention deficit disorder), allowing

- An increased likelihood of missing key information when making decisions;
- Diminished time for reflection or anything but simple information transactions such as e-mail or voice mail;
- Difficulty holding others’ attention (having to increase the glitziness of presentations and the number of messages to get and keep attention); and
- Decreased ability to focus when necessary.

Framed as we are by our hurried, ill-structured contexts, it is all the more important that we balance action with reflection. As Verbeek (2005) points out, “The facts that technological artifacts can be conceived as constructions, always exist in a context, and are interpreted by human beings in terms of their specific frameworks of reference do not erase the fact that systematic reflection can be undertaken of the role that these contextual and interpreted constructions play concretely in the experience and behavior of human beings. That ‘the things themselves’ are accessible only in mediated ways does not interfere with our ability to say something about the roles that they play, thanks to their mediated identities, in their environment” (p. 113).

Norman (1993) compares experiential cognition to reflective cognition, blurring the distinction between what we traditionally define as subconscious and conscious task processing. Experiential cognition is automatic and well learned and, Norman (1993) emphasizes, “the appropriate responses [are] generated without apparent effort or delay” (p. 22). In contrast, reflective cognition involves choice and decision making: “Reflective thought requires the ability to store temporary results, to make inferences from stored knowledge, and to follow chains of reasoning backward and forward, sometimes back-tracking when a promising line of thought proves to be unfruitful. This process takes time” (p. 23).

Eraut (2004), describes the relationship between modes of cognition in workplace learning, performance, and time, noting that “references to the pace and pressure of the workplace, … raise the question of when and how workers find the time to think” (p. 259). Thus, one’s mode of cognition can range from reflexive cognitive processes (pattern recognition, instant response, routinized action, and situational awareness) to rapid cognitive processes (e.g., intuitive interpretation, routines with decisions, and reactive reflections) through deliberative or analytic cognitive processes (review, discussion, analysis, planning, and monitoring) (p. 260).

Finally, Spinuzzi and Zachry (2000) outline a series of exploratory questions for research studies that are also useful for future technical communicators. Technical communicators need to consider, for example, how official and unofficial genres help them mediate their work, how printed and online texts, notes, templates, and other resources help them work, what "ecological niches" need to be filled beyond their documents to meet their audience's needs, how design can improve our existing documentation suite, how to learn from the creation of unofficial documents, and how stable or unstable their given "genre ecologies" are given existing and emerging document types (p. 177). Ultimately, by understanding their relationship to the genres they work with, technical communicators can more strategically mediate between technologies and their goal-driven audiences and problem situations.

Heuristics for Rhetorically Sensitive Problem Solving

It has become a truism that simple skills preparation cannot prepare us for a 21st century workplace made up of wicked problems, exponential technical and scientific development, accelerated timelines and distributed expertise. Numerous writers, instead, maintain that "learning how to learn" needs to be our chief professional and educational goal (Brown 2002; Fischer 2000; Merriam and Caffarella 1999). But what processes are involved in learning how to learn, in knowing, and in developing a deep understanding of our work and our profession?

After Bereiter (2002), who identifies eleven elements of understanding by describing what it means to understand another person (pp. 102-103) and Newton's theory (pp. 109-110), we can begin to outline another complex relationship between ourselves and what it means to understand technical communication:

1. Understanding technical communication "depends on your relationship to it" (p. 109). Understanding differs depending on whether you are a programmer, a teacher, a document designer, an engineer, an author of how-to books, an instructional designer, journalist, or an academic researcher studying communication in the workplace.
2. Understanding is critical to acting intelligently in relation to technical communication. What it means to understand technical communication depends on who you are and how intelligently you are able to act in relation to technology, managing technical specialists, deciphering research on technical communication, guiding learners as they become familiar with specific types of technical communication, or supporting technical communication activities.
3. Understanding interacts with interest. This is, it is difficult to imagine someone who has no interest in technical communication being able to claim an understanding of it.
4. Understanding technical communication requires some understanding of systems theory and logic, the social and cultural forces that shaped and are shaping technology and literacy, and so on.
5. Understanding technical communication does not mean that one can explain it. Explanation, however, could play an important part in developing and extending its understanding.
6. Just as "no single correct, complete, or ideal understanding" (p. 110) of technical communication can exist, there can be identifiably incorrect understandings.

7. Conversations about technical communication generally emphasize the products or processes of writing, their usefulness, importance, strengths and limitations, and so on.
8. Understanding is often conveyed through narratives containing key ideas such as orality and literacy, scientific and technological progress, discourse, design, social and cultural influences, and so on. Incomplete or incoherent narratives reveal problems with understanding.
9. A *deep* understanding of technical communication requires knowledge of deeper things related to it such as state-of-the-art technological developments and historical developments in rhetoric, literacy, communication, and design.
10. Insightful problem solving is possible with deep understanding.
11. Deep involvement with technical communication, for various audiences, situations, and contexts, is required for deep understanding.

Professional technical communicators (and learners in general) approach ill-structured situations using similar high-level problem-solving strategies. They begin by focusing their attention on the problem at hand, allowing them to build external connections between words and pictures and prior knowledge (Mayer 2001). Focusing attention requires both self-regulation and metacognitive monitoring (Antonietti, Ignazi, and Perego 2000; Kirsh 2005; Zimmerman 2002). From this position, communicators generate representations, that is, recognize, find, identify, discover, or frame the problem (Schön 1983). This activity allows them to form goals and, ultimately, to characterize problems and possible solutions available to them given the constraints of the situation (Burns and Hajdukiewicz 2004).

Once problem solvers have established a working representation of the problem, they begin the (sometimes extensive) process of accessing and navigating information (Mehlenbacher

1992; Norman 1990). These are increasingly complex activities given the proliferation of information resources available to productive professionals. In addition to forming an intention, technical communicators identify courses of action, begin naming the information types they are accessing, further refine navigational moves, access outcomes, and revise their intentions as necessary (ACRL 2000; Allen 1996). Working with information resources allows technical communicators to identify, explain, and analyze phenomena, connecting their efforts to initial representations, evaluating information critically, redefining their problem, and investigating empirically or from available information resources their subject matter (Margolis 2004). This process often includes sampling, annotating, and illustrating, all with the goal of taking a position. A position can only effectively be taken if problem solvers have assessed the alternatives, suspended initial judgment, and applied objective (or subjective) evaluations (Kozma et al. 2000).

Throughout these activities, communication plays an integral role, depending on the problem and specific demands of the situation. Although elaborating on all the activities involved in the communication process is outside the scope of this chapter, we can assume that most communication situations will require the planning, composing or designing, and evaluating necessary to use information effectively to accomplish a specific purpose for a specific audience (Lawson 2006). This may include illustrating, collaborating, instructing, arguing, generalizing, and so on (Bruce and Levin 1997; Unsworth 2000). Sophisticated communicators will understand the economic, legal, organizational, and social issues surrounding the information need. Moreover, they will use language in context to strategically communicate understanding and to make explicit connections and their representations of particular phenomena for meaningful purposes, well-defined audiences, and different contexts (Bazerman 1988).

Finally, technical communicators evaluate and reflect on their experience during the problem-solving process. At the most general level, this requires that they consider what worked and what did not work. If they actively engage in reflection, they will also review the process in the light of prior experiences, as well as for potential improvements, progress, and in terms of intrinsic meaning and effort expended (Brown 2002; Maehr and Meyer 1997).

Figure 1 presents the series of recursive stages that all problem solvers engage in as they go about identifying, solving, evaluating, and communicating solutions to contemporary problems. Each part of the process is well documented in the research on learning and problem solving (Mayer 2001). Importantly, heuristics are only meant to generate intelligent reflection about unfamiliar or well-learned processes. As promised at the beginning of this chapter, our goal is to emphasize our learning processes as technical communicators and to strive through reflection to develop our awareness and capabilities as rhetorically sensitive socio-technical mediators working in complex scientific and technical contexts (see Figure 1).

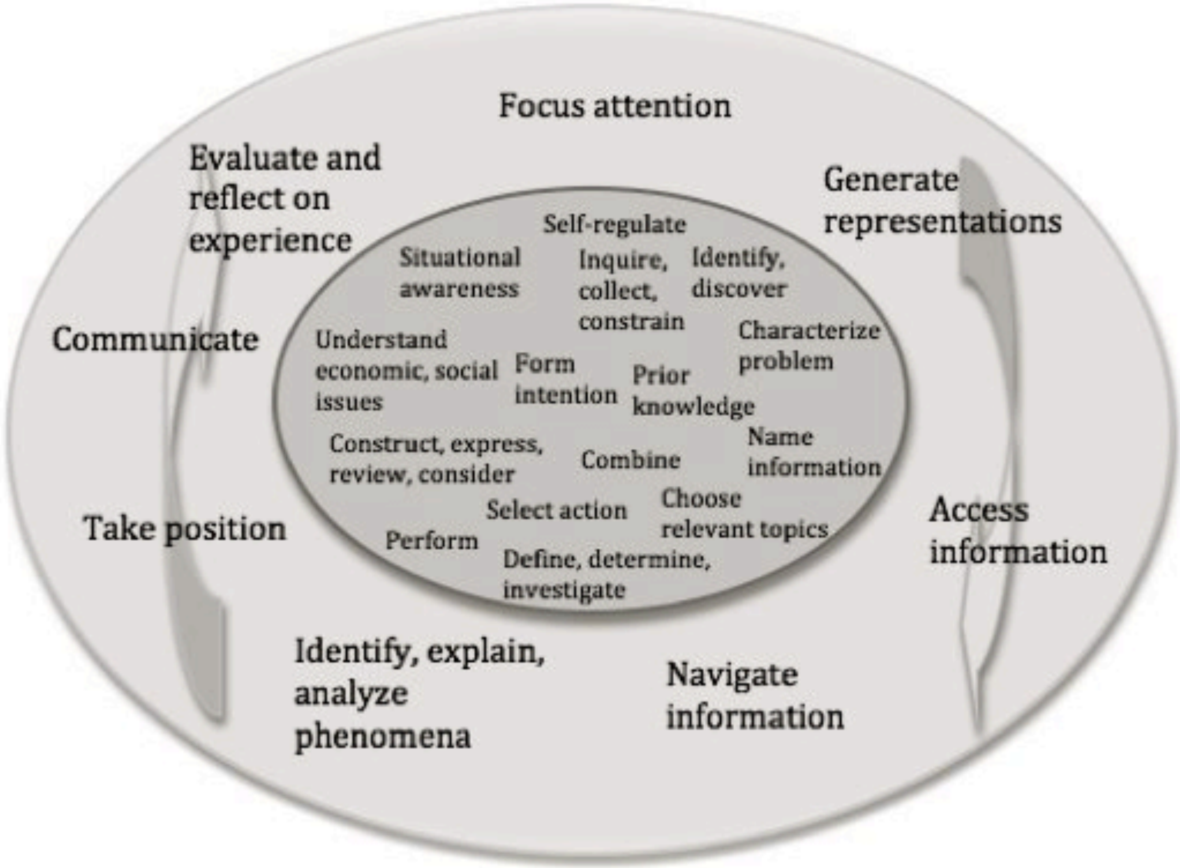

Figure 1. Problem-solving activities for the 21st century

Rhetorical Sensitivity in the World

The heuristics for problem solving in the 21st century workplace are meant to outline explicitly the various stages that technical communicators engage in while learning and solving problems. The goal is to pay attention to and reflect on these stages whenever we are engaged in tasks; ultimately, paradoxically, our systematic application of attention and self-regulation will allow us to balance our abilities with the complexity of our tasks (Csikszentmihalyi 1990; Montgomery, Sharafi, and Hedman 2004). The heuristics are not to be viewed as prescriptive steps but, rather, present technical communicators with a telegraphic overview of thirty years of research on how people learn and solve problems. As well, the recursive heuristic process exemplified by Figure 1 is meant to remind professional technical communicators that they move through these physical and mental activities whenever they address communication problems in any context. When they generate representations, and they always so, the activity always requires at some level that they are able to identify and characterize their problem; when they take a position towards a phenomena (product or process), they decide how they will express, review, articulate that position.

Within our fast-moving organizational context, technical communicators will increasingly act as problem solvers, attempting to discover or invent—through varying combinations of trial, error, and selectivity—accurate state and process descriptions of some element of our problem situation and environment (Newell and Simon 1972). Their problem-solving processes are both cognitive and social. As problem-solving individuals acting in concert with other problem-solving individuals, they will also create and contribute to various "intensional networks" where, Nardi, Whittaker, and Schwarz (2000) summarize, "Joint activity is accomplished by the assembling of sets of individuals derived from overlapping constellations of personal networks." Effectively maintaining their personal and professional networks requires that they employ a host of individual abilities (planning, inquiring, choosing, interpreting, arguing), coordination activities (communicating with others), and production activities (acting with others). Their work and learning will increasingly need to incorporate cognitive, social, and design sensibilities (Dietz 2005). And these joint activities must be accomplished in increasingly reduced product cycles under accelerated deadlines organized around teamwork, interruptions, involving multiple tasks and communication devices, and designed for multiple local and international markets (Perlow 1999).

Understanding how we learn and come to understand and the integral role of communication that is part these processes should, in turn, help us to focus on things we can control and improve on rather than on the

- Increasingly ill-structured and wicked problem situations we face;
- Distributed and diffused role of complete expertise in technological and scientific settings;
- Exponential development of technically sophisticated devices and genre ecologies that characterize our products and processes; and
- Accelerated workspaces, timelines, and learning worlds that comprise our everyday professional practice.

Conclusion

The stoic Epictetus, musing on a future challenge, asks “What should we have at hand in a situation like this? The knowledge of what is mine and what is not mine, what I can and cannot do” (2008, p. 7). Effective technical communicators understand and reflect on their own problem-solving processes. They understand their role and knowledge as communicators and are able to contribute socio-technical designs that mediate technologies and audiences.

Although the future of technical communication may be uncertain and indeterminate, our relationship to the study and practice of the multidisciplinary field continues to develop, and our development as rhetorically sensitive socio-technical mediators continues to hold an important place in our scientific and technical world. Deep involvement, understanding, and commitment to our role as learners, designers, problem solvers, and communicators will only increase as economic, social, technological, and cultural structures continue to reconfigure themselves in unpredictable, dramatic, and exciting ways.

Discussion Questions

1. If we are unable to test our solutions to establish whether they are correct or complete, what can we learn from solving a complex and wicked problem?
2. How does our accepting that contemporary knowledge evolves out of our interaction with and between technology and the real world help us to understand the role of information overload in our professional and personal lives?
3. How can understanding the structure of arguments help us as technical communicators?
4. If we are no longer experts who explain technical products and processes for nontechnical audiences, how do we define our emerging identity?
5. How does viewing writing as a technology help us to better conceptualize what we do as technical communicators?
6. What strategies can we use to engage audiences that are even busier than the audiences of twenty years ago who still did not read manuals?
7. What role does attention play in contemporary learning and problem solving?
8. Since reflection requires time and time is of the essence in our professional and personal lives, what strategies can technical communicators use to foster this critical part of problem solving?
9. How do recursive heuristics for problem solving differ from recipes or procedural steps provided to help technical communicators generate usable document?

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Part Three:

Understanding Field Approaches

Introduction

The third section moves back from theory to practice. However, it does not lose sight of the importance of theory; instead, it begins to look at some particular ways to apply theories to practices at broad levels (Figure 3). You will be connecting broad issues to actions: not just "How do I do this?" but "Knowing what I know about the Big Picture, *how* and *why* might I do this?" In some ways, what you will be learning here is how to use larger frameworks that have long-term rather than (or rather than only) short-term goals. As with questions about Situating the Field, Understanding Field Approaches keeps you from becoming so immersed in trees that you lose sight of the forest.

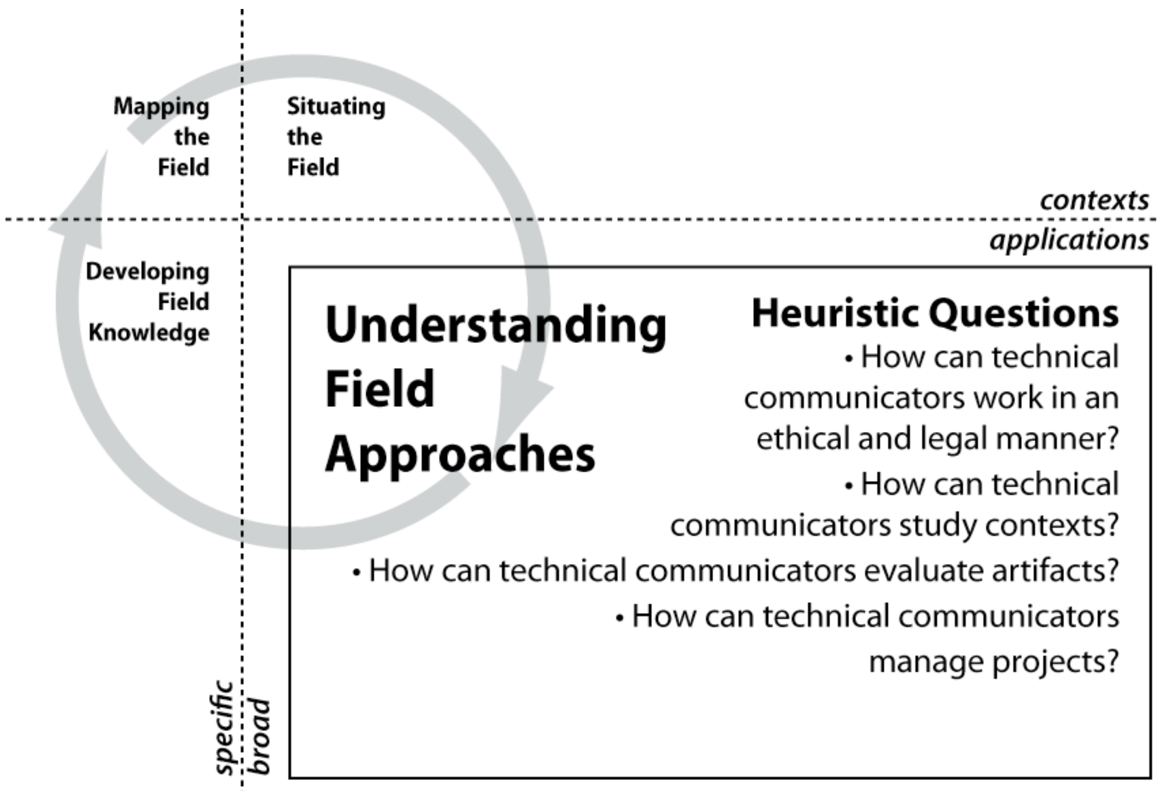

Figure 3. Heuristic Questions for Understanding Field Approaches

J. Blake Scott tackles one of the toughest and oldest issues that disciplines face when they begin to step back to consider the broader implications of their applications: “How Can Technical Communicators Work in an Ethical and Legal Manner?” Scott describes the need for carefully considering both ethics and law, but points out that while legal responsibilities are often relatively straightforward, the related issue of ethics can be much more difficult to sort out because it often involves stakeholders with competing interests, ill-defined communication situations, and unfamiliar events or concerns. In exploring these complicated issues, Scott develops a heuristic that will help you engage with stakeholders, identifying their key issues and negotiating solutions that address the needs—legal and ethical—of everyone involved.

Looking at the connections between broad issues and applications and actions often requires us to stop and re-examine key concepts or terms that we have been using without much thought. For Clay Spinuzzi, the concept of “context” represents just such a term: deceptively simple but hiding an enormously complicated and powerful set of assumptions about how we should look at the world around us. Rather than innocently assume we already know the answers to “How Can Technical Communicators Study Contexts?” Spinuzzi shows us the missteps we can take if we are not careful in defining not only what context means but how we can study context, use context to think strategically about our work, and communicate about context to each other. His heuristics provide several different ways to study and represent contexts for technical communication projects.

Barbara Mirel’s “How Can Technical Communicators Evaluate Artifacts?” looks at the related issue of effectively connecting the details of contexts to documents that were developed in (and in response to) those contexts. As technical communicators develop and work with texts in complicated situations, they need to also understand how to assess the success of those texts, measuring and then revising them (and their own work practices) in light of careful thinking about how people actually use texts. Mirel's heuristics can help your individual working methods to evolve over time and to improve in your ability to respond to the needs of contexts.

As you might guess from the earlier chapters in this section (and book), technical communication increasingly involves not just single, concrete documents—a user manual, a product testing lab report, a video tutorial—but often much larger projects involving tens, hundreds, or even thousands of individual texts of different types, worked on and deployed by nearly as many professionals and users. R. Stanley Dicks' "How Can Technical Communicators Manage Projects?" describes some standard project management approaches (including time and personnel management), modifying them to fit the particular needs of technical communication endeavors. Dicks' heuristics can help you cope with the complicated management demands of projects ranging from short, information-dense, research-based reports to sprawling initiatives involving scores of resources and staff members.

Chapter 9: How Can Technical Communicators Work in an Ethical and Legal Manner?

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Summary

Because technical communicators help shape meaning as authors, they need to be familiar with the laws and ethical norms (including organizational and professional ones) that can affect their work and the various relationships (with employers, users, etc.) to which it attends. Because ethical deliberation is a *process*, technical communicators also need to know how to not only identify relevant principles and laws to consider but also to position themselves in relations of power across communicative situations, engage with other stakeholders in an open search for the best course, and negotiate competing perspectives and obligations to arrive at a commitment to action. This chapter will take you through examples of and provide you with a heuristic for this process.

Two Technical Communication Projects at BioInfo

The management team at BioInfo, an e-learning company based in Baltimore, was thrilled but also concerned after landing a big pharmaceutical company as a new client.[1] A relatively new start-up company without much venture capital backing, BioInfo had survived project by project, creating online courses about biomedicine for smaller biotechnology companies. Sometimes these courses were generic, catalogue courses, and sometimes they were customized to highlight the client's research and products for investors (existing or prospective), health care professionals, and other audiences. Teams comprised of scientists, technical communicators (trained in instructional design, among other things), programmers, and project managers developed the courses, which were typically modular (i.e., made up of separate but related segments that could be combined and arranged in various ways), designed for the Web, and designed to serve both marketing and educational purposes. While most of the content for custom courses was provided and "owned" by the client, the content for generic courses (and generic versions of custom courses) was typically compiled by BioInfo from existing research.

Over the past year, BioInfo designed materials for Vaccitech, a private biotechnology company specializing in the development of vaccines and other medicines for infectious diseases. As it was working to secure FDA approval for its new oral (under the tongue) flu vaccine "FluEase," the company asked BioInfo to produce new material about the product and research behind it to be placed on the investor portion of its website, alongside initial product sales forecasts. This material would also include more general information about the science and type of research on which the FluEase research drew. Vaccitech provided BioInfo with access to its FluEase research findings and a draft description of the general science, apparently strewn together from several undocumented sources. Having created the content about the promise of FluEase and the research about it, the BioInfo manager and technical communicators assigned to the project found themselves in an ethical quandary when Vaccitech asked them to revise this content in a couple of ways. First, Vaccitech wanted the BioInfo writers to remove references that FluEase was only found to be safe and effective for people between 5 and 49 years of age (although trials were ongoing for children ages 2-5). Because those outside of this age range comprise a large portion of flu victims and potential consumers for vaccines, this omission could create the impression of a larger market for FluEase. Second, Vaccitech wanted to add a section exaggerating the development stage of a new version of FluEase that would not require refrigeration for storage. BioInfo's team was concerned that these requested changes would mislead investors and other audiences as well as damage the e-learning company's reputation for proving scientifically accurate content. Unfortunately, this would not be the only communication-related ethical dilemma that BioInfo would face.

After Vaccitech secured FDA approval for FluEase, it attracted the interest of several big pharmaceutical companies and began a partnership with one—MegaPharm—for the production, distribution, and marketing of the new vaccine. For BioInfo, this meant developing expanded educational materials aimed at physicians, distributors, and others and new tutorials for the in-house training of the pharmaceutical company's sales force. Some of this content might later be adapted for marketing and instructional materials aimed at consumers as well. In fact, MegaPharm indicated that it might hire BioInfo to do further work for a direct-to-consumer marketing campaign and product labels and instructions if it was pleased with the first round of materials. Because gaining MegaPharm as a customer gave BioInfo an inroad into the lucrative pharmaceutical market, the stakes were high for this project. In addition, because the materials created for pharmaceutical training would be even more modular, BioInfo saw the opportunity to refine and secure property rights for its knowledge management software in order to sell it to other e-learning companies.

MegaPharm provided BioInfo with most of the information to include in the educational material and training modules; unlike Vaccitech, however, it did not provide all of the scientific research findings to support this information. This led to a problem when MegaPharm wanted both sets of content to promote the increased efficacy of standard flu shots when used along with FluEase; beyond receiving no supporting evidence from MegaPharm, BioInfo had research from Vaccitech appearing to contradict this claim.

The BioInfo team faced another ethical dilemma when MegaPharm insisted on including images of patients who look younger than 5 and older than 49 years old, even though FluEase was only approved for ages 5-49. And yet a third ethical challenge was posed by MegaPharm's directive that the physician- and distributor-directed material emphasize FluEase's ease of use and de-emphasize its storage requirements. The BioInfo team was even more unsure how to negotiate the ethical issues involved in the MegaPharm project, partly because of its limited access to research and partly because of the high stakes of accommodating client and users. The team realized that pleasing this client and thereby positioning BioInfo for the larger pharmaceutical market was the ticket to the company's financial stability.

This scenario, to which we will later return, raises a number of ethical and legal challenges faced by technical communicators of different stripes, challenges ranging from respecting intellectual property to protecting users from harm. By ethics, I mean deliberation about how to determine and act on what is good, right, just, beneficial, desirable, or commendable (see Dombrowski 2000, 7). Sometimes ethical and legal issues overlap, as with the Society of Technical Communication's (STC's) principles of providing truthful and accurate communication and respecting the confidentiality of a client's business-sensitive information.

In what follows, this chapter will review some of what others have written about ethical and legal concerns for technical communicators before detailing an approach, borrowed largely from James Porter (1998), that treats ethics as a situated process of negotiation for developing what the ancient Greeks called *phronesis*, or practical wisdom. Often, as the BioInfo scenario illustrates, this process requires stakeholders to weigh conflicting values that come out of interpersonal, organization, professional, disciplinary, and larger socio-cultural spheres of influence. Further, this process should involve, in the words of Porter (1998), "some careful deliberation, some marshalling of option and alternatives, some care in determining the conditions of one's rhetorical setting, and some respect for the variances of human action" (157). Although technical communicators need to know specific values, norms, conventions, and laws related to their work and the relationships to which it attends, the most important thing they can learn about this topic is *how* to engage in ethical negotiation, including how to position themselves in the power dynamics across situations (where power is understood as ability to act effectively, influence outcomes, and achieve goals), how to discover the relevant principles and laws to consider, how to engage others in an open search for the best course, and how to arrive at a contingent commitment to action. Along with a discussion of the process for determining ethical and legal action, the chapter will provide a heuristic for guiding students through this process before returning to the opening set of scenarios to illustrate the heuristic at work.

The *Process* of Ethical Inquiry and Deliberation

Despite or perhaps because of the field's pragmatic emphasis on efficiency and effectiveness, ethics has become a significant concern for many researchers and practitioners of technical communication. Articles about ethics frequently appear in academic and trade journals, and the Association of Teachers of Technical Writing and Society for Technical Communication have developed codes of ethics to guide their members. All major technical communication textbooks now have sections addressing ethical and legal issues. Several ethics-focused textbooks, such as those by Lori Allen and Dan Voss (1997), Paul Dombrowski (2000), and Mike Markel (2001) have been published for use in advanced technical communication courses, including courses dedicated solely to ethics.

Why consider ethics as *part* of technical communication, you might ask? Answering this question first entails defining technical communication and the role of the technical communicator. Jennifer Darryl Slack, David Miller, and Jeffrey Doak (1993) argue for viewing the technical communicator as an active contributor to the meaning-making process as texts circulate across their contexts of production and use. They argue against relegating the technical communicator to the merely instrumental role of transmitter or sender of a fixed message determined by a technical expert such as an engineer, and they even argue that the technical communicator does more than translate an essentially static message to different audiences. Instead, the technical communicator is a full-fledged author who contributes to the meaning-making along with other producers and users, and who operates within and in constrained by channels of power, such as organizational pressures and cultural protocols. This view also attributes more agency to technical communication, which becomes less a transparent medium for transferring or even translating information than a means through which various actors negotiate and renegotiate meaning. When we position the technical communicator as an agent of meaning within specific power relations, we can also recognize, as Porter does, that technical communication necessarily entails ethical decisions about how to shape the parameters of meaning-making and to what possible effects; "whenever you write," Porter (1998) explains, "you take a position and you establish a value vis-à-vis existing systems [of power]" (50). In this way, too, then, the study of technical communication should involve the study of ethics or ethical decision-making.

In their discussions of ethics, technical communication researchers have drawn on various philosophical traditions, including those that emphasize duties and obligations (e.g., Kantian ethics), respect for difference and care of others (e.g., feminist ethics of care), impacts or consequences (e.g., utilitarianism), and the communicator's character (e.g., Aristotelian ethics). Although these and other approaches focus on different aspects of communicative acts, most emphasize the interpersonal or social relationships of those involved; according to Vincent Ruggiero (1997), respect for persons is a crucial value in most ethical systems, the core value behind numerous more specific obligations to others. Most legal concerns for technical communicators are also based on relationships and the obligations that accompany them. As Ruggiero (1997) explains, respect for persons is "not merely a theoretical construct but a practical standard for the treatment of others" (72). This leads us to another common element of the field's various takes on ethics—that it is a situated, "practical art" (Markel 2001, 20; Bowdon 1999), a recognition illustrated by the widespread reliance on "real-world" scenarios and projects to teach it. Yet another common element in approaches to ethics is the recognition that ethical principles come from various spheres of influence, including personal beliefs (which themselves come from various sources), organizational goals and values, professional and disciplinary standards, and larger socio-cultural value systems. Sometimes the spheres are in conflict, as in the potential conflict between the professional values of the BioInfo communicators and their organization's goal of financial stability. Taken together, these common takes on ethics endorse a definition something like the relational, situational, power-laden negotiation of principles derived from various value systems with the goal of arriving at the best course of action.

This definition doesn't quite capture legal concerns, which often overlap but can also diverge from ethical ones. Like ethics, the law has been formed out of various value systems and spheres of influence and is relational and at least somewhat context dependent. Most ethical codes, including that of the STC, include legal mandates, such as meeting the terms of contracts. Further, some ethical principles, such as the technical communicator's duty to instruct and warn, are also legal ones. At the same time, the law is typically more codified and binding than ethical codes, though this doesn't mean ethical principles can't be binding and that the law is always defined or fixed. Intellectual property (IP) law regarding electronic texts, for example, is still very much in flux; emerging laws must negotiate the new forms of communication that new media make possible and the competing interests of respecting the property of communicators and enabling the free dissemination of knowledge for the public good. Although technical communicators can seek help in clarifying their specific obligations under the law (indeed, some companies have staff specifically trained in legal issues), they still have a responsibility to know the basic types of relevant laws—including fiduciary duty (i.e., duty tied to legal financial relationships), the duty to instruct and warn, and respecting the intellectual property and privacy of others—and where to learn the details about them. Tyanna Herrington's *A Legal Primer for the Digital Age* (2003) is probably the best single resource for such details.

Although the definition of ethics above is a good starting point, its assumptions and enactment require further explanation. Through this elaboration, we can also compare an approach to developing *phronesis* to other approaches discussed by technical communication professionals. In addition to the recognition that technical communication is always embedded in and regulated by power relations, the approach advocated here assumes that technical communication is trans-situational, that is, occurring across multiple, interlinked contexts. We can conceptualize these contexts along the life cycle of a text's production, distribution, interpretation and use, and continuing adaptation, and we can also imagine these contexts as overlapping zones of activity (see Scott 2004). Take, for example, an online software manual developed by a team of technical communicators. The text might be initially developed in an organizational context by a team of technical communicators working across company departments with programmers and marketing specialists, but also tested on possible users in a testing lab before being revised. It might then be distributed and accessed by various types of users, from novice to expert, through specific Web technologies, and then interpreted, used, and adapted by these different users groups in their specific situations or settings of use (e.g., at home, work). Meaning is made from the text *across* these contexts, from the authors' intentions to users' interpretations and adaptations. As they circulate across such contexts of use, technical texts are continually taken up and transformed, promoting certain values and enabling certain effects for those involved. Considering the longer life cycle of technical communication moves us away from approaches to ethics that focus mainly on one part of a text's articulation, such as the writer's initial creation or qualities of the text itself. Cezar Ornatowski (1999) explains that the older STC code for communicators took this latter approach, focusing on such principles as the precise use of language and visuals and the "simple, direct expression of ideas" (142).

Along with moving and being transformed across multiple contexts, technical communication is, as Porter emphasizes, inter-networked, and not only because it often moves across the Internet and World Wide Web. By inter-networked, I mean created and performed across a network of communicative needs, interpersonal and social relations, and concrete settings or environments of use. Such an assumption expands the ethical "actors" of technical communication beyond the writers and their primary audiences to include various secondary audiences and other stakeholders impacted by the communication, larger discourse communities and social groups to which communicators belong, organizations or institutions that sponsor and regulate communication, and the technologies and media through which the communication is delivered. By discourse communities, I mean groups of people bound by a common interest who share and regulate specialized kinds of knowledge and ways of communicating (Anson and

Forsberg 1990, 202). Considering these various actors and their often conflicting value systems complicates approaches that focus on the technical communicator's personal sense of ethics or one common set of professional or social values. If our values are adopted from the various and sometimes competing sets of beliefs that circulate in our communities, then even a personal sense of ethics is already linked to larger socio-cultural value systems (see Crowley and Hawhee 2004, 25).

Given that technical communication is constructed and re-constructed across multiple contexts by various actors, its ethical dimension is not fixed, absolute, or determined before and outside of these communicative contexts. Although Markel (2001) advocates an approach to ethics in which various stakeholders collaboratively deliberate about the most ethical course of action (127), he also suggests that this deliberation should be separate from and prior to determining what the communicative action should look like when implemented (21). Deciding the most ethical course of action, Markel argues, is more difficult than implementing it. In contrast, the approach to ethics offered in this chapter does not separate the ethical scene from the communicative one; indeed, ethical deliberation is a communicative process, and ethical issues are raised *through* the enactment of technical communication.

Rejecting a universal, fixed, and absolute system of ethics does not require abandoning a binding commitment to a specific ethical stance; the ethical approach advocated in this chapter is not completely relativistic and does not avoid judgment about what is best, right, just, or desirable. To explain this position, I have turned to the classical Greek concept of *nomos*, a term that can refer to norm, convention, custom, and law, all standards of conduct that are socially constructed, accepted, and regulated by specific groups or communities (Scott 1995). Although *nomoi* are not universal or fixed, the connection between norms and the law through this term suggests that *nomoi* can be binding, at least for a time. According to classics researcher Martin Ostwald (1969), the concept of *nomos* "signifies an 'order' and implies that this order is, or ought to be, generally regarded as valid and binding by the members of the group[s] in which it prevails" (54). In most cases, technical communicators will need to consider with others the relative importance of different types of *nomoi*—such as organizational goals, professional codes of conduct, business conventions, civic laws and regulations, and socio-cultural traditions and belief systems—as they relate to specific sets of communication contexts. Some of these, including laws and professional codes, might be more codified than others, but even these must usually be adapted to the specifics of the situations at hand.

In his discussion of the term *nomoi*, Porter (1998) defines it both as "the policies, conventions, and practices governing social relations" and to "the processes of negotiating and constructing conventions" (30). This notion of *nomos* as a *process* leads us to a similar conception of ethics as the process of arriving at and implementing the best course and, in a larger sense, the process of developing *phronesis* or practical wisdom. As Porter (1998) explains, *phronesis* can refer to the "art of considering divergent norms, principles, and conventions in light of particular circumstances that require action" (29). Dale Sullivan (1990) adds that, beyond this consideration, *phronesis* refers to the "uses to which products are put" and thereby bridges deliberation and action (378). Beyond calling for a *phronesis*-building process, Porter (1993) begins to discuss what this process entails, stating:

> Ethics is not a set of answers but a mode of questioning and manner of positioning. That questioning certainly involves principles—but it always involves mediating between competing principles and judging those principles in light of particular circumstances. Ethics is decision making—but it is decision

> making that involves question and critique. It is informed, critical, and pluralistic decision making" (218).

Others, too, have outlined a process of ethical decision-making. Ruggerio (1997), for example, outlines the steps of studying the situation, identifying relevant criteria, determining alternative courses of action, and deciding which one to take. Like Ruggerio's, most discussions do not lay out specific tactics for enacting such steps, however.

In what follows, I outline several tactics, grounded in *nomoi*, for ethical deliberation and decision-making developed by Porter and others, illustrating them with the document development process of user-centered design. User-centered design, sometimes called user-participatory design, is an approach to making a text more usable and better suited to its audience by inviting members of this audience to be active participants in its development, from the planning stage onward (see Johnson 1998, 32). Although it is more common for technical communicators to test a document's usability with the target audience after the document has been created, user-centered design requires a more "sustained dialogue between user and designer," one that places even more value on users' perspectives and knowledges (Salvo 2001, 289). Because of this more sustained relationship, user-centered design can illustrate some of the tactics of ethics-as-*phronesis*, which include 1) studying the specifics of situations across which technical texts are produced, distributed, and used, 2) mapping your position relative to others to whom you have responsibilities or obligations, 3) engaging in sustained dialogue with other stakeholders (including targeted users, when possible) about the best course of action, a dialogue that respects the unique perspectives, needs, and concerns of stakeholders, and 4) collaboratively arriving at a commitment to specific action.

The first tactic relates to Ruggerio's call to study the specifics of a situation, though it expands this to include the multiple situations across which a technical text circulates. One way to do this is to visually represent the multiple scenes of a text's production, reception, and use. Patricia Sullivan and Porter (1997) propose drawing maps that show the relationships and flows of power among the actors, or stakeholders, in a particular communication situation. This first involves asking who will encounter, use, and be affected or impacted by the texts we create. Herrington (2003), in her "axis of power" test, similarly calls on technical communicators to position themselves in relations of power and the responsibilities they entail (10). Maps of communication relationships can also include other kinds of "actors" or influences on the communication, such as organizations, technologies, laws, and the texts themselves; indeed, doing so can help us remember that the various parts of communicative locales are more than just backgrounds for communication. Let's say, for example, that you are part of a team developing a technical proposal for a construction project. Your map would include the relationships among your team members, supervisors, and audiences assessing and then using the proposal. Your map would need to show your competing obligations to these various stakeholders, such as your duty to your employer and any legal obligations to the owners of the project derived from the terms of your proposal (e.g., cost, deadlines). Or, let's say you were asked to write instructions for assembling and building an air canon for a mechanical engineering lab on campus. In accounting for the contexts of production and use, you'd need to consider your specific legal responsibilities to ensure the safety of users and, if applicable, to respect the intellectual property of any existing instructions from which you planned to borrow. Although such maps can be a useful way for technical communicators to position ourselves, they should be recognized as the limited views of one stakeholder and viewed as snapshots of larger, ongoing processes.

As Herrington suggests, the point of this positioning is to become better attuned to the obligations and responsibilities (including legal ones) inherent in relations of power as texts are taken up and transformed. Some technical communication researchers foreground this *nomos* around power relations: that those with more power and expertise, in our case technical communicators with rhetorical power and expertise, also have greater responsibility to wield this power for the good of others (see Allen and Voss 1997, 9). Markel (2001) puts it this way, pointing to principle of due care: "the more powerful party is responsible both for providing special assistance and protection and for refraining from harmful acts that exploit the power difference" (160). In a user-centered design process, being attentive to the power dynamics of relationships can help the technical communicators ensure that users are positioned to share their contextual knowledge in the text development process and that safety and efficacy concerns around their contexts of use are fully addressed. Such positioning can also foreground any constraints on and risks to our responses to ethical dilemmas. In the opening scenario, such constraints include the technical communicator's position within the company, the company's contractual obligation to the client, and the company's need for financial resources.

Beyond becoming more aware of our position(s) in shifting relations of power, we can work toward *phronesis* by approaching ethics as an open process of mutual inquiry. By open, I mean without predetermined or fixed procedures for valuation. Instead, participants mutually constitute how to arrive at the best course as well as what that course will be. Porter (1998) also advocates for such procedural openness, arguing that specific procedural moves must be developed and adjusted on the spot in light of the specific contexts, communities, and *nomoi* involved (135).

Like user-centered design, this approach to ethics entails engaging in a sustained dialogue with others about the best, most ethical course of action. Allen and Voss (1997) propose a process called "value analysis" in which those deliberating define the various stakeholders' interests and values, rank conflicting values in order of importance, and then base a collective decision on the most important values (see 20-21). Although they propose making this decision based on which path of action does the greatest good for as many stakeholders as possible (a utilitarian principle based on weighing the overall costs versus benefits), Allen and Voss seem to assume that this will be a relatively straightforward exercise and don't consider the possibility that some stakeholders will or should have a greater voice in making such a determination. Some stakeholders might have more at stake than others; poorly designed instructional materials, for example, might have the most negative impact on users needing them to perform an action safely and effectively. Like other researchers advocating a consensus-building model of ethical deliberation, Allen and Voss do not focus on difficult questions about who has or should have more power to shape decisions, about who wins or loses from a particular decision, and how technical communicators should weigh competing obligations.

Although the *phronesis*-building approach proposed by this chapter seeks a shared commitment to a particular course of action, it does not arrive at this end by ignoring or squelching difference, but by acknowledging and embracing it, viewing it as a source of ethical invention. The goal is not to efficiently move beyond stakeholders' different perspectives, experiences, and values but to incorporate them into the communication's design, preferably through the direct participation of the stakeholders themselves. Underpinned by this ethical imperative, user-centered design assumes that incorporating the unique and different perspectives of users, preferably a cross-section of prospective audience members, will improve the technical text.

Drawing on the feminist ethic of care developed by Nel Noddings and others, the approach advocated here moves beyond a respect for difference to a stance and practice of “caring” for and being responsive to others. As Porter (1998) points out, an ethic of care requires one to “actively work for the welfare of others,” to take “positive action” for and with others (93). It requires us to ask whose needs our work addresses and how our positioning as technical communicators calls us to learn about and be responsive to these needs. To some extent, this ethic is embedded in the technical communicator’s role as user advocate and in the stance of user-centered design. As Robert Johnson (1998) explains, the goal of user-centered design is to arm users with deeper knowledge about how technology works so that they can perform tasks and solve problems in a sustainable way (28). He contrasts this goal with that of user-friendly design, which seeks to make tasks easy for users but can leave them unable to transfer “how-to” knowledge or troubleshoot when things go wrong.

Another difference between user-centered and user-friendly design is that the latter also involves the abstract consideration of users rather than their direct participation as co-designers and co-decision makers (Johnson 1998, 32). The concrete engagement of users throughout the document development process is the core tactic of user-centered design, and it’s also a tactic associated with the stance of caring. Porter (1998) explains that the feminist ethic of care was developed in response to more abstract ethical approaches based on rights (154), and Melody Bowdon (1999) similarly emphasizes a feminist ethic of action “that values connection over abstract ethical principles and that grounds decision-making in local, collaborative, and dialogic deliberation rather than universal rules or principles" (16). A *phronesis*-oriented process of ethical deliberation, like user-centered design, strives for deliberation with, and not just on the behalf of, other stakeholders. To the extent possible, the stakeholders of our texts should be invited to the table to deliberate about any ethical dilemmas connected to them. Beyond inviting others to engage in an open dialogue, we should take care in shaping how this dialogue actually functions. Michele Simmons (2007) encourages us to take a close look at who participates in decision-forming discussions, and in what roles, as well as when and how frequently they participate (129). In the case of user-centered design, users are invited to provide input and share in decision-making from the initial problem-defining stage onward.

Linda Flower (1997) has collaborated with others to develop more specific procedural strategies for ethical inquiry and deliberation in what she calls a "community problem-solving dialogue". Such a dialogue is situationally specific, reciprocal, and has a goal of creating new solutions (ethical or otherwise) out of rivaling ideas. To accomplish this, Flower (1997, 110), suggests the following three steps: 1) getting the "story behind the story," which, in the case of ethical inquiry, involves asking stakeholders to identify and interpret any ethical problems based on their unique situated knowledges and values; 2) seeking rival interpretations and opinions about an ethical and/or legal problem in order to challenge "first or favored" ones (2002, 258) and; 3) assessing different options and their possible outcomes as a way to "construct and test more diversely informed" judgments and actions (2002, 255). User-centered design basically follows these steps, though usually in a more iterative or back-and-forth manner. Rather than treating rivaling perspectives, opinions, and options as "noise" to be avoided or muffed, Michael Salvo (2001) argues, user-centered design values them as useful material for the ongoing development and improvement of a technical text (289). This is why it is important for technical communicators conducting such user-centered design tactics as focus groups to facilitate open rather than leading or limited responses.

To extend Flower's procedural strategies, a *phronesis*-based approach to ethics involves arriving at a flexible judgment (i.e., one that can be adapted to changing circumstances) about the best course and commitment to enacting it. This can be the most difficult part of ethical deliberation, especially when rivaling options can't be reconciled, but it is a crucial part of developing and enacting *phronesis*. Participants may, indeed, need to weigh various values, obligations, and consequences against one another, but the criteria for doing so should not be predetermined or fixed across contexts, except, perhaps, when a clear legal directive applies. My own justice-based preference is to give the most weight to the values and voices of those most directly affected by the ethical decision, especially when they are in positions of relatively lesser power. However you collectively arrive at a contingent judgment, you will likely, as Markel advises, need to consider what courses of action are actually possible given the power dynamics and other constraints involved. The result of this collective decision-making might be, as Flower suggests, the construction of new, more diversely informed ethical judgments and forms of technical communication (2002, 254).

Guiding Questions

The following questions are offered as a set of invention tools for moving through the process of ethical deliberation discussed above. They are not exhaustive and not meant to be followed in a lock-step manner. Depending on the ethical issue and contexts out of which it arises, some may be more useful than others. Finally, some will need to be adapted to changing circumstances within and across specific contexts.

Embedded in some questions are specific *nomoi* about which technical communicators should be aware. Other technical communication researchers—particularly Porter, Dombrowki, Markel, and Herrington—discuss various types of ethical and legal principles in more detail and should be consulted in a fuller study of ethics. Some researchers have also developed categories of *nomoi* that might be useful in assessing the ethics of specific situations. Markel (2001), for example, discusses a utility-justice-rights-care model that considers four types of ethical principles (128), and Ruggerio (1997) categorizes principles as obligations, consequences, or ideals (i.e., notions of excellence) (73-74). Most of the questions below focus on obligations that arise out of different types of relationships.

Positioning across Situations

- What are the contexts in which the technical communication will take place, in which the text will be created, distributed, encountered, used, and transformed? How might the text be taken up in unintended ways? Think through the text's possible life cycle.
- Who is involved in the communicative acts across these contexts? Who is likely to be affected or impacted by this communication? What do they have at stake, how do they stand to benefit or lose?
- What are the inter-personal and social relationships among these various stakeholders? Who is linked to whom and how? How is power distributed across these relationships? How might these relationships and flows of power shift as communicative acts and contexts shift?
- What, if any, agreements do stakeholders have with one another, and what rights and obligations might arise from such agreements? (adapted from Herrington 2003, 131)

- How would you describe the discourse communities of the various stakeholders? What other spheres—including organizational, professional, and cultural—shape stakeholders' viewpoints and their relative positioning and power?
- What additional "actors"—including organizational or institutional structures, technologies, and communicative settings or "environments"—shape the communicator's relationships and constraints?

Ethical Inquiry and Deliberation

- How can you ensure the robust participation of other stakeholders? How could you engage them as partners in a mutually defined and reciprocally beneficial process of inquiry?
- How can you and other participants decide on how to proceed, and by what criteria? What roles, opportunities to provide input, and decision-making power will the various participants have?
- How can you strive to ensure that stakeholders' perspectives, knowledges, needs, values, and responses get voiced and incorporated into ethical problem solving?
- How can you encourage the expression and consideration of rival explanations of any ethical problems?
- How can you encourage the full and critical examination of different options for addressing the problem, how these options might be enacted, and what consequences they might have?
- How can you determine when values and positions are in conflict?

Obligations to and Consequences for Users or Audiences

- What should you know about users or audiences, including both primary and secondary ones? What is the best way to get this information?
- How might you enlist users, and which users might you enlist, as co-designers of your communication?
- What obligation do you have to ensure the accessibility, clarity (i.e., understandability), accuracy, and completeness of your verbal and visual communication?
- What obligation do you have to accommodate users' needs and capabilities, including those of users with disabilities and users from different cultural backgrounds? When the needs of different users are in conflict, how will you decide which needs to accommodate? How can you ensure a fair distribution of benefits among users?
- What obligation do you have to ensure that no harm comes to users from your communication?
- If you are writing technical instructions, what are your legal obligations to describe the limits of use, provide clear and accurate instructions on all aspects of use, prominently warn about hazards that could arise from use, and tailor the communication to the audience's background and needs?[2]
- What ethical and legal obligations are tied to your role as a user advocate? How might you ensure that your communication empowers users to understand its subject matter and mobilize this knowledge in a transferable, sustainable way?

Obligations to Client

- What obligation do you have to offer quality services in an equitable manner?

- What obligation do you have to respect the privacy of client information and communication?
- What obligation do you have to abide by the terms of contracts with clients?

Obligations to Employer

- What are your legal and ethical obligations to act for your employer's benefit and promote its interests?
- What obligation do you have to follow any code of conduct of your employer?
- What obligation do you have to abide by any contract with your employer, including a nondisclosure agreement?
- What obligation do you have to respect and protect the confidentiality of company information, including trade secrets and work made for hire?
- What obligation do you have to secure intellectual property protections for your employer, including copyright, trademark, and patent registration?[3]

Professional and More General Obligations and Ideals

- What obligations and ideals are tied to your professional status as a technical communicator?
- To reference the Society for Technical Communication (STC) code of ethics, what obligations do you have to observe relevant laws and obligations, to communicate truthfully and accurately, to respect the confidentiality of others' business-sensitive information, and to fulfill contractual obligations in a timely manner?[4]
- What, if any, professional quality or regulatory standards should your text meet?

- What obligation do you have to safeguard public interests, such as human rights and environmental concerns?
- What obligation do you have to get permission to use copyright-protected words, images, and multimedia in your communication? To stay within the bounds of "fair use" of this material (which does not cover use for commercial gain)?
- What obligation do you have to get permission to use the code or design of Web texts? To not mislead users (through framing, linking, or use of meta-tags) about the scope and content of your Web texts?

Arriving at Flexible or Contingent Judgment and Commitment to Action

- How can you determine when values are in conflict? How will you and the other participants negotiate competing values about what is best, right, just, and/or desirable?
- How will you arrive at a contingent judgment about the most ethical course of action?
- Which of the considered actions are most possible given the contextual constraints, such as your positioning in power relationships? Whose approval might you need to carry out the action?

Developing Phronesis *(i.e., practical wisdom)*

- What can you learn from comparing your self-positioning to that of other stakeholders? About other aspects of these stakeholders' knowledges, interpretations, and values? From their forms of deliberation and their decision-making criteria?
- What can you learn about the negotiation of multiple and differing values and principles? About mutually developing a new set of shared *nomoi* and discourses?

- What can you learn about how to adjust ethical inquiry and decision-making across related contexts?

Ethical Deliberation in Action

In order to illustrate how you might apply some of these questions, let us now return to the opening scenario, positioning you as one of the technical communicators working for BioInfo. For both texts—the investor material for Vaccitech and the training/marketing material for MegaPharm—and their related contexts and ethical challenges, you work along with other technical communicators and programmers, under the direction of a project manager and, ultimately, the company's management. You also work for the client, of course—in the first case a small company with which you have an established business relationship, and in the second with a larger, newer client whose relationship can help you build inroads into a profitable client base. Although we can think of your client as your most immediate audience, your communication is primarily aimed at the users or audiences that your client is trying to reach and influence. Finally, your communication will likely link you to others who are impacted by how it is taken up and acted upon.

Ethical Inquiry about First (Vaccitech) Project

One ethical challenge presented by the first module about FluEase and the science behind it is what to do with the general science material provided by the client. You'll need to first determine whether the material—specifically its form of expression, whether verbal, visual, etc.—is copyright protected or already in the public domain. If the former, you'll need to get permission to use the material and give credit to the copyright holder. In some situations, technical communicators can consider whether the legal doctrine of “fair use” enables them to disseminate a limited portion of copyrighted material for educational purposes (as long as it doesn’t impede the profit-making goals of the copyright holder); in this case, though, fair use does not apply given that the material would be developed, in part, for commercial gain. Although it might be tempting to limit your role to transmitter and accept the information given to you as is, such a stance could abdicate your responsibility as a co-creator of knowledge and meaning.

The second set of ethical challenges from the Vaccitech project—around the client’s request that you omit information in order to suggest a wider market for FluEase and overstate the development of a newer version of the product—is more slightly more complicated, as it involves additional stakeholders with competing interests and additional professional, organizational, and legal obligations tied to your relationships with these stakeholders. Your primary audience, you will remember, are the investors who will use the information on Vaccitech’s website to assess and make decisions about investing in the company. To these users and others website readers who encounter your text, you have an obligation to present fully accurate information and protect them from harm, in this case possible financial harm from a misguided investment. This ethical obligation could have legal and regulatory ramifications, as misleading information could cause investors to take legal action against Vaccitech and prompt FDA officials to further scrutinize Vaccitech’s FluEase application. If you adopt an ethic of care and assume the role of user advocate, you also have the ethical obligation to make needed information accessible to users and empower them to take productive action. Given the power and knowledge differential between you and your primary audience (i.e., the investors aren’t able to shape the text and likely don't have the scientific expertise of Vaccitech or your company), your ethical obligation to accommodate their needs is even stronger.

Other *nomoi* to consider revolve around your roles as service provider and employer, as you have the obligation to protect the interests of both. The STC code of conduct urges technical communicators to offer quality services that meet contractual obligations to the client, but you must consider the responsibility to promote the welfare of your employer as well. In this case, you don't want your company's reputation to be damaged among its own potential clients and investors because of a misleading and harmful text that you produced.

The forms of engagement and deliberation in which you engage will likely be mostly out of your control because of your access to the audience and role in the company. Although it might not be possible to enact a user-centered design approach in this case, you could attempt to get input from members of the investment community at some point in the text development process, perhaps by asking them what they expect from this type of material and how they interpret the information you produced. To do this, you would likely need to secure the cooperation of Vaccitech since you would be sharing their copyright-protected material before they published it.

Ethical Inquiry about Second (MegaPharm) Project

The MegPharm project—which calls for expanded educational/marketing and training materials —presents an even more complex web of stakeholders, relationships, contexts, and ethical/legal issues. You will need to consider and negotiate a wider range of sometimes conflicting *nomoi* around scientific conventions, professional ideals, legal obligations, and business obligations and goals. You will need to think through a longer trajectory or life cycle of your texts and their transformations, functions, and effects, particularly since the modules you create could be adapted for or used in marketing and instructional texts targeting consumers. You will need to consider the higher stakes of your decisions for your company, the client, and the various audiences or sets of users.

As in the Vaccitech project, one of the ethical challenges central to this one revolves around providing accurate and honest information, a principle that is a professional, cultural, and legal ideal and obligation. Again, you will need to deliberate about and determine, ideally with others, whether you have an obligation to users to verify the clients' claims about the product—in this case its efficacy related to the other option of the flu shot—and, if the client refuses to provide verifying evidence, whether to resist including the claims. This is perhaps a more straightforward issue of accuracy, but the other two directives of MegaPharm blur the line of ethical communication a bit more.

The first—using possibly misleading images of patients apparently outside the approved age range for the project—could possibly be justified given that the content would also verbally specify this approved age range and that the ages associated with the images are open to users' subjective interpretations, to some extent. Yet the accuracy and honesty of visual communication is a requirement of the profession and, in some cases, the law. Like other pharmaceutical companies, your client could face regulatory sanctions for using misleading images, especially if they appear in direct-to-consumer marketing. In addition, the courts have found makers of instructions liable for misleading or unclear graphics (Helyar 1992, 130-131). Technical communication researchers such as Nancy Allen (1996) have emphasized that the selection, emphasis, and design of visuals—from illustrations to graphs to tables—help shape readers' meaning making and therefore should be held to standards of accuracy and accessibility much like verbal communication. They have explained that questions of ethics apply not just to what information is included, but *how* it is included and presented. This is especially important given that not all users will focus on all or the same parts of a text to form their interpretations. Allen (1996) further invokes the notion of the technical communicator as user advocate to argue for a higher ethical standard: "visual rhetorics need to include more than a kind of functional utility; visual rhetorics need to aid communicators as they weigh the ramifications of their choices in terms of personal values, community ethical standards, and content accuracy" (99).

The other, related accuracy question foregrounded by the MegaPharm project is what to do about the client's desire to emphasize some information about the project more than other, perhaps equally important information in order to make FluEase more appealing to physicians and distributors, who will have to be concerned with the storage requirement of refrigeration. Although the module would include the storage requirement, this information would not be as accessible and memorable as the information about ease of use for patients.

The challenges posed by the MegaPharm project require you to consider your obligations to and the possible consequences for your primary audiences of physicians, distributors, and the client's sales force, consequences that, in turn, prompt consideration of additional users—namely consumers—and their contexts of use. Beyond possible financial impacts on these audiences, your communication choices could have health and safety impacts; physicians and distributors could improperly store the medicine, physicians could recommend that patients receive an unnecessary combination of flu shots and FluEase, and physicians, later fueled by consumer demand, could administer FluEase to patients outside the approved age range. Thus, your obligation to protect others from harm may be even greater than in the Vaccitech project. This obligation to some of these users, especially consumers, might also be greater given their relative lack of knowledge about and access to the full information about FluEase. Your team and your client are in a greater position of power, and thus you have a greater responsibility to protect those who are not.

As in the Vaccitech project, you may not be in a position to enact substantial user-design strategies and tactics; your pharmaceutical client may not allow you to directly engage prospective users while the content is being developed. You will therefore need to negotiate the competing principles of respecting your contractual responsibility to your client and its property and creating the most accurate, accessible, responsive, and empowering texts possible. Perhaps you could persuade MegaPharm that conducting focus groups with or otherwise engaging users would benefit everyone by leading to a better product. You might at least make suggestions about including the perspectives and concerns of other stakeholders and raise questions about the ethical and legal obligations and effects of not doing so.

Finally, in this project as in the last one, you should also engage others in your company and consider your obligation as an employee to work for your company's benefit. In this case, too, the MegaPharm project presents a higher-stake dilemma given the future business opportunities to which it could lead. But the higher profile of this project and the texts you will create for it also likely poses a higher risk of damaging your company's reputation if your texts lead to harmful consequences or depart from legal and other commonly accepted *nomoi*.

Toward *Phronesis*

Fully appreciating the ethical dimension of technical communication requires first adopting a robust view of the technical communicator as a co-creator of knowledge rather than just a straightforward transmitter or translator of it. What we present and how we present it shapes, in part, the meaning-making of others and therefore implicates us in our texts' uses and their effects across a trajectory of contexts and web of inter-networked relations. We, as technical communicators, would do well to familiarize ourselves with specific *nomoi*—socially constructed, dynamic, and provisionally binding codes of action—relevant to the ethics and legality of our work. Such *nomoi* are tied, in many cases, to our relationships with and obligations to others, whether co-workers, employers, clients, various primary and secondary users or audiences, professional discourse communities, and other groups.

As this chapter defines it, ethics is more than a set of *nomoi*; it is a process, more specifically the relational, context-dependent, power-laden negotiation of, judgment about, and commitment to enact the best course. More important than knowing specific *nomoi* ahead of time is learning *how* to identify and negotiate the sometimes competing *nomoi* inherent in our relationships with others, how to identify and negotiate the perspectives, values, knowledges, and forms of deliberation that other stakeholders bring to an ethical challenge. To some extent, we can discern such *nomoi* and ways of negotiating them from texts about laws and social codes (e.g., the STC code of ethics), but we also attempt to mutually discover them through the direct engagement of others. This chapter proposes that the *process* of ethics involves the self-conscious positioning of our roles and power in relation to others, open inquiry and deliberation with others (to the extent possible, given our positioning), and the mutual arrival at a contingent judgment and commitment to action. That is, what technical communicators most need to know about the ethics and legality of our work is how to develop and arrive at *phronesis*, or practical wisdom.

Discussion Questions

1. Would you negotiate the ethics of the MegaPharm scenario differently if you were an executive decision-maker instead of a technical communicator? Why or why not? If you were applying an ethic of care, how might a negotiation of competing obligations differ between the two roles?
2. Can you recall a time when one or more of your personally held principles clashed with a value held by an organization or business in which you worked? What was at stake, and for whom? How did you negotiate this conflict and determine what to do?
3. Find a set of poorly designed and written instructions. What are the possible ethical and legal problems with the text, and what is the technical communicator's role in attending to these?
4. Identify ethical and legal principle or advice on the website of the professional association in your field (if necessary, ask one of your professors for help). How does this information compare to the STC code of ethics? What could be added?
5. What types of ethical principles are embedded in the student code of conduct at your university? Should these be followed to the same degree in all student situations? Why or why not?

Notes

[1] The scenario discussed in this chapter is fictional. Any resemblance to actual companies, products, or situations is unintended and coincidental.

[2] See Helyar (1992) and chapter nine of Markel (2001) for more on the legal duty to instruct and warn.

[3] See chapter eleven of Markel (2001) and chapter five of Allen and Voss (1997) for more about intellectual property laws and principles.

[4] See the full code on the Web at http://www.stc.org/pFiles/pdf/EthicalPrinciples.pdf.

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Chapter 10: How Can Technical Communicators Study Contexts?

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Summary

"Context" is one of those vague terms we use to explain why something - a text, a tool, an interface - works differently in different conditions, circumstances, practices, or activities. But what *is* context, and how do we study it? More specifically, how can we figure out how texts are deployed in and changed by ongoing activities, and how do we communicate these analyses to interested parties?

In this chapter, I first review the state of context studies in technical communication, showing how context has been defined and studied. Then I describe a set of techniques for studying and describing workplace contexts. I then show how technical communicators can choose a focus for their study; collect data through observations, interviews, artifacts, and electronic systems monitoring; and analyze those data through event, ecology, and sociotechnical graphs. I illustrate the techniques and concepts through an extended example. Finally, I discuss how to communicate the results of the study to participants and employers.

Introduction: Context Is Not a Pumpkin

Bruno Latour, a philosopher of science, once observed that whenever someone spoke about “context,” they would make a certain gesture with their arms, sort of a circle that started at the clavicle and ended at the solar plexus. Context, he concluded, must be about the size and shape of a pumpkin (quoted in Lave 1996, p.22).

Of course, Latour was joking. But his point was that when we talk about “context,” it often just amounts - literally - to hand waving. We tend to think of “context” as whatever surrounds or circles the thing we want to study. Without a firm definition of context, a bounded understanding, there’s not a lot of commonality connecting these different interpretations of context. And unfortunately that means that there’s not a lot of guidance for studying or understanding context. After all, we can’t study *everything*. At the same time, we can’t just pick out arbitrary parts of the environment or activity to focus on – if we do, we end up missing some important influences, and we have a very hard time comparing them.

So in this chapter, I discuss how we can study *the relationships among people and their activities*. In particular, I focus on comparing how similar people, doing similar work, can be compared to understand certain kinds of similarities and differences in their work. For the purposes of this chapter, we can call the differences *context*.

Context has been a recurring issue for technical communicators because documents' success has a lot to do with how they are interpreted and used locally. When technical communicators emphasize audience analysis, designing for work conditions, or using appropriate visuals, they are focusing on this question of how to tailor texts to work optimally under local conditions. That is, texts have to work ecologically within a given activity; there's no such thing as a perfect document that works well under all conditions.

So the *problem* of context is not too hard for technical communicators to spot. But *solutions* are more difficult: without points of comparison, how do we tell what aspects of a text we must tailor to local conditions, and how? Technical communicators need points of comparison, and they need methods that will allow them to make such comparisons methodically - and cooperatively with the people who will actually have to use these documents.

To see how this works, let's start with a study I conducted with Bill Hart-Davidson and Mark Zachry, a study of three grant proposal writers at diverse organizations (Hart-Davidson, Spinuzzi, & Zachry 2007). We were interested in understanding the similarities and differences in proposal writing across the three participants. "Colette" was Communications Manager and Proposal Manager at a research corporation that for over 45 years has focused on applying basic research to technological challenges in space, including the development of satellites, sensors, and reconnaissance data visualization hardware. "Emily" was a special projects director at a nonprofit organization dedicated to improving web accessibility for people with disabilities. Finally, "Dave" was an academic at a large public research institution and assistant director of a research center in the humanities and social sciences. The three shared a particular technical writing activity - grant proposal writing - but worked in different "contexts": different industries, organizations, disciplines, tools, ways of doing things, grant agencies, and so forth.

How, we wondered, do we understand what these technical communicators contribute to their organizations' work? How can we be sensitive to their contexts while examining the similarities in their work?

Literature Review: What We Know about Contexts

If we're going to study context - if, for instance, we're going to understand the similarities and differences in how Colette, Emily, and Dave work - we need to specify what we mean by context. After all, anything *could* be part of the context - room temperature, the color of the walls, magnetic fields, childhood trauma, shoe size, humidity, genetic proclivity, recent headlines, and so on. It's simply not possible - or useful - to catalog everything that might impact a particular incident. Where would you stop?

Instead, we must *bound the case*, as qualitative researchers say (Yin 2003; Creswell 2006). We must narrow the range of things we examine - the range of data we collect. In technical communication, we have tended to systematically analyze people's activities and goals and their tools for accomplishing these, especially the texts that they use. So, for this chapter, let's define context this way:

> *Context*: The set of observable differences in actors' material relationships within two or more instances of the same activity

where

- *Set*: Listed collection.
- *Observable*: Evident in actual data: seen through direct observations, reported in interviews, shown in texts and artifacts produced or used by people in the activity.
- *Differences*: Identifiable systemic variations between patterns of data, such as different sequences, different texts and artifacts, different combinations of texts and artifacts, different reported motivations or outcomes. To paraphrase Gregory Bateson, information is a difference that makes a difference (1979, p.64).
- *Actors*: People who are involved in the activity.
- *Material relationships*: The ways that actors establish concrete patterns of interaction with each other and with other texts and artifacts.
- *Instances of the same activity*: Implementations of an ongoing, repeated set of actions with a specific objective. (For instance, people in different organizations, cultures, and locations might say that they are "writing proposals" or "teaching" or "planning a project.")

If we use this definition, we can get away from the handwaving that so often characterizes discussions of context, and instead focus on things that we can actually see, record, and systematically compare. Since we're technical communicators, we'll investigate context - these observable differences - in two senses: communication and mediation (see Spinuzzi, Hart-Davidson, and Zachry 2006). We could probably examine nearly any text as communicative *and* as mediational; these are two different aspects of texts.

Communication

The first aspect of context is *communication*: communication processes, events, and technologies. What kinds of information do people hand off, to whom, in what sequence? What differences exist in how people enact the same sort of communication?

By “communication” I mean the ways that people exchange their information, thoughts, writing, and speech with each other. When we examine how people communicate, we tend to follow these material exchanges; we follow the information. Much of our work can be understood as chains of communicative events in which people exchange artifacts in a regular series and combine them in relatively predictable ways (Hart-Davidson 2002, 2003). Writing scholars have examined, for instance, how tax documents are handed from one worker to the next (Devitt 1991); how people use a series of textual genres to structure team meetings (Yates & Orlikowski 2002); and how patent offices rely on a stream of sequenced textual genres (Bazerman 1994). In all these cases, the emphasis is on how people try to communicate by exchanging texts, and the focus is on how they act on information in predictable sequences. The chain of communication is a chain of custody of a particular piece of information.

Mediation

The second aspect of context that we'll study is *mediation*, which allows us to examine parts of people's activity that are neither serial, nor explicit, nor necessarily even interpersonal. Think of the sorts of texts we *don't* typically share: shopping lists (Russell 1997; Witte 1992), checklists (Spinuzzi 2002), annotations (Spinuzzi 2003b, c; Spinuzzi & Zachry 2000; Swarts 2004; Wolfe 2002), comments in computer programs (Spinuzzi 2003a), and computer interfaces themselves (Johnson-Eilola 2005). The texts can guide and constrain others' activities in ways that don't represent communication between individuals: for instance, people often write checklists and stack documents for themselves, helping them to chunk, categorize and structure their own work (Spinuzzi 2002a). People bring many different texts to bear on a particular activity all at the same time, resulting in an ecology of resources that is qualitatively and quantitatively different from a single text (Freedman & Smart 1997; Nardi & O'Day 1999; Spinuzzi 2003a; Zachry 2000).

In technical communication, we tend to talk about *genres*, types of texts that evolve in order to meet particular needs. These genres can be quite informal (e.g., shopping lists, stacks) or relatively rigid (e.g., recommendation reports, reference documentation), but in either case they work because our participants have seen them before, recognize them, and know how to apply them to a particular activity. That is, these genres serve to mediate the work of the participants.

Both the communicative aspect and the mediational aspect are valuable for examining how texts enable work in different contexts. They become even more useful when we *coordinate* them, as we'll see below.

Heuristic: Studying Context through Communication and Mediation

So, instead of just handwaving, we're going to use a systematic approach to delineating specific differences and similarities across different participants, organizations, and activities. You can follow these steps very formally, as in formal qualitative research, or informally, by using these heuristics to organize your impressions from quick walkthroughs and discussions with your audience.

1. Choosing a Case

First, we start by determining what to study. If we're looking at context (as defined above, the set of observable differences in the material relationships of two or more instances of the same activity), the case has to meet these criteria:

1. *The same activity*. Those in the activity - not just you - must define it as the "same." For instance, in the grant writing study, very different writers in very different organizations identified their work as grant proposal writing. If you study people who identify different activities—say, grantwriting, software documentation, and marketing—the comparison is more likely to be about disciplinary differences than context. So you'll need to study people who identify their activity as the same.
2. *Two or more instances*. Compare at least two instances for differences: two groups, two departments, two companies or communities or locations. The term "context" doesn't make sense without comparisons.
3. *Observable differences*. Collect the same material data across all instances. Don't mix and match, collecting just interviews at location A and just observations at location B, because you won't be able to compare the data directly for patterns. Don't rely solely on

self-reporting, such as general interviews, because people often forget or misremember what they do and why they do it.

More pragmatically, as you choose a case, you'll need to make sure that you can

- *obtain access* to the sites. Make sure that the participants and the person in authority of each site have given you written permission to conduct your study - don't just drop in and start talking to people!
- *collect the same data* at each site. Establish a written agreement in advance about what data you will collect and how you will collect it.

Now that you've established the case and the sites, it's time to figure out what data to collect.

2. Collecting the data

To investigate context, we must collect a set of observable differences in actors' material relations at our sites. That means collecting empirical data - measurable evidence that we can get from our research sites using systematic techniques. For our purposes, we'll focus on evidence related to our two dimensions of communication and mediation. Table 1 lists some formal data collection techniques and some studies in which they have been used. (Remember, you might use very informal versions of these if you're developing quick impressions rather than a formal study.)

Technique	**Description**	**Sources**	**Advantages**
Observations	The researcher visits the participants, observes them as they work, and takes notes.	(Winsor 1996; Spinuzzi 2003b, 2008; Doheny-Farina & Lee 1985; Swarts 2007; Slattery 2007)	Direct observation; can see participants' work, including things that don't make it into their interviews.

Interviews	The researcher talks with participants about their work. Interviews are typically recorded and can be structured (a set list of questions), semi-structured (a general list of questions, but the interviewer can also follow up on interesting issues), or unstructured (conducted during an observation).	(Beyer & Holtzblatt 1998; Smart 2002; Winsor 1996)	Direct interpretation; participants can explain why they do things and how these fit into their other activities.
Artifacts	The researcher collects artifacts that are used or generated by participants, such as drafts and notes.	(Orlikowski and Yates 1993; Smart 2002; Winsor 1996)	Structural features; in aggregate, can show development over time.
System monitoring	The participant consents to installing software on her/his computer that collects system events, such as when the participant opens files, views websites, or sends email.	(Hart-Davidson, Spinuzzi, & Zachry 2007)	Like observation, but collects more data and more accurately (although it is narrower in the range of data that can be collected).
Diaries	The participant periodically fills out forms describing what s/he is doing.	(Hart-Davidson 2003; Sun 2006)	Happens during the participant's natural work; maintains focus on specific questions; can happen without the researcher present.
Pictures	The researcher asks the participant to draw pictures or cartoons that describe their experiences.	(Prior & Shipka 2003; Zuboff 1988).	Helps people to talk about experiences and feelings nonlinearly; can unearth tacit knowledge and associations.

Participatory design techniques	Participants and researchers collaborate in developing ways that describe solutions to participants' problems.	(Muller and Kuhn 1993; Spinuzzi 2005)	Unearths tacit knowledge; allows participants to be active rather than passive.

Table 1. Data collection techniques.

When selecting data collection techniques, it's important to

- *Select a combination of techniques*. Don't rely on just one technique, because each one has strengths and weaknesses. Instead, mix and match these so you can *triangulate* among them, comparing different kinds of data to give yourself a better idea of what is going on. For instance, I typically pair observations and interviews so that when I observe something they do, I can ask them about it later.
- *Select a technique that you can reasonably implement*. For instance, you may not be able to observe participants working in high-risk environments because you might distract them; you might not be able to get participants to agree to install data logging software on their machines. Select techniques that will work with the constraints of the case, and make sure they're acceptable to participants before you begin the study.

Once you collect the data, you can *analyze* them for patterns

3. Analyzing the data

Now that you've collected your data, you need to systematically analyze them to see what they mean. Below, I discuss three models for analyzing your data. But if you're after quick impressions, you can develop informal versions of these models to "eyeball" the data; you should still be able to sort out some differences in context.

Be warned: You'll see differences in *individuals* at each site as well as aggregate differences *between* different sites. That can make the analysis more complicated, but the tools below will help you to map out these differences along the two aspects mentioned earlier: communication and mediation.

Analysis entails boiling down the data so that we can make systematic comparisons without being overwhelmed by extraneous detail. We'll use three analytical tools: Communication Event Models, Genre Ecology Models, and Sociotechnical Graphs. These models are basically diagrams that let you picture the data you've collected so that you can systematically look for patterns of similarity and difference. These three models let you visualize different aspects of the context - the differences that similar people encounter when engaging in similar activities.

Model	**Focus of analysis**
Communicative Event Models (CEMs)	Common sequence of events What texts and people are commonly involved in these
Genre Ecology Models (GEMs)	Common sets of resources used for regulating one's own work and others' work What texts are required across the activity and how they relate to each other
Sociotechnical graphs (STGs)	How communication and mediation are coordinated What events and resources are commonly *associated* (AND) What events and resources can be *substituted* (OR) while still maintaining the activity

Table 2. The three analytical models.

Communication Event Models: Analyzing Chains of Communicative Events

One way to represent the communicative "handoffs" is through Communication Event Models (CEMs) (Hart-Davidson 2002, 2003). CEMs provide a simplified, easily comparable description of event sequences, a description that can help us detect patterns in people's work, compare patterns, and see sequential divergences. Any given action represents a choice that someone made in response to their context. In the CEM, these choices are essentially portrayed as strings of verbs and objects. If we were to apply CEMs to longer segments of work, we should be able to formally detect consistent patterns, identify larger units of interaction, and consistently explore places where sequences diverge across workers or conditions. But even in informal observations, we can sketch out common sequences that people follow.

In a CEM, you record communicative events (events in which actors exchange information by exchanging texts, speech, or other signs). Based on the kind of work, you define symbols for kinds of frequently occurring events (such as face-to-face meetings, email, and phone calls). See Figure 1. Once you put together enough strings of events, you'll start to detect patterns in how people communicate - in individual work, across people at the same site, and across different sites.

Genre Ecology Models: Analyzing Ecologies of Mediational Resources

Now let's pull back to see the whole ecology of resources and highlight some material actions that are not necessarily communicative. One way is to look at how people change their own behavior and capabilities by using their tools. When you write a shopping list, or use a to-do list, or stack your paperwork in the order that you need to process it, you're using texts in this way - and chances are, you're using texts that you won't share with anyone else. They're not communicative, they're mediational.

Such texts are *genres*: relatively stable responses to recurrent situations (Spinuzzi 2003c). When we talk about a shopping list, for instance, we have a basic idea of what it might look like, based on what it's supposed to accomplish and on how similar texts have looked in the past. In your analysis, you'll look for

- text types that participants identify as types ("This is my to-do list"; "This is an inquiry email.")
- text types that are repeatedly used at the same site to accomplish the same things

And in a Genre Ecology Model (GEM), you map these texts, drawing lines betweens the ones that are used together.

In information-oriented work, such as proposal writing, genres mediate work in combinations; the mediation is *compound* (Haas 1999; Spinuzzi 2002). That is, people mediate their own work by using several texts at the same time. If you print out your emails so that you can write notes on them, or write to-do lists on your calendar, or put sticky notes on your computer monitor, or otherwise use texts in combination so that you can do things you wouldn't be able to do otherwise, then you know what I mean.

A GEM pictures this web of different genres. It's a variation of a network diagram in which the nodes are texts connected with lines that show when people use texts together. Rather than a sequence of handoffs, the GEM depicts a set of mediational resources that people can pair, combine, and substitute for each other. Some of these resources are the same ones depicted in the CEM (figure 1), but here they are seen in their mediational rather than sequential aspect.

The GEM answers two different questions.

- In a particular episode, it answers the question: “What genres are brought to bear during the episode but are not highlighted because they are not being used transactionally?”

- But in the aggregate – for instance, when comparing several different Communication Event Models – it can also answer the question: "How did alternate genres get used to perform the same activity? Given x conditions, what genres are people likely to use to perform y type of activity?"

Just as a purely sequential understanding of text use has its drawbacks, so does a purely mediational understanding. By itself, the GEM tends toward description without direction. That's not enough. We need to be able to coordinate the aspects of communication and mediation.

Sociotechnical Graphs: Analyzing the Coordination of Communication and Mediation

So far, we've mapped out our two dimensions of communication (via CEMs) and mediation (via GEMs). With the next model, the sociotechnical graph (STG), we'll coordinate these two dimensions to produce comparisons - differences and similarities - across sites. STGs have two dimensions: we can call them the AND and OR dimensions (cf. Latour, Mauguin, and Tiel 1992). These allow us to systematically compare different accounts such as diaries, interviews, and our own field observations.

- **AND**. The AND dimension is that of *association*: Which elements must be associated to form a coherent claim? What sorts of communicative transactions occur in a particular work activity, and what resources support them?
- **OR**. The OR dimension is that of *substitution*: of the elements assembled, which can be substituted with others? How do alternate genres get used to perform the same activity? Given *x* conditions, what genres are people likely to use to perform *y* type of activity? (This is, of course, where the differences come in - the observable context.)

That is, STGs are basically matrices: tables that allow us to take the analyses from CEMs and GEMs and coordinate them, giving us a better understanding of the similarities and differences in how people conduct similar activities. They let us see what genres are associated and used across participants to accomplish a communicative event, and what genres can substitute for each other in some of these events. Think of an STG as a dashboard that lets you detect these associative (AND) and substitutional (OR) differences - differences in *context*. And as I'll discuss at the end of the chapter, these diagrams are good not just for analyzing your data, but also for presenting your analysis to others.

Extended Example: Grant Proposal Writing

So now that we've established the data collection and heuristics, let's get back to the case that Hart-Davidson, Zachry, and I studied: grant proposal writers in three different organizations. These grant writers were all engaged in the same basic activity - grant writing - but in very different organizations and industries. In this study, we were interested in how to examine the technical communicator's contribution to the project team. So we zeroed in on the particular focus: how the participants understood their work activity, used and coordinated resources, and how their communications related to that activity and each other. Remember, you can apply these techniques informally, but in this example we use them in a more formal study.

Data Collection

We collected the data with the following techniques. These techniques allowed us to record the communicative patterns and resources that participants used to sustain their proposal writing activity:

- **Diary studies**: Participants kept diaries of their communicative events and the artifacts they used during these events. Diary entries included information about the nature of events, when and where they occurred, and also about the substance of the events and users perceptions of their purpose.
- **Recorded work sessions**: Participants recorded episodes of proposing activity completed on their workplace computers using a commercial software application called Morae. The resulting logs offer a comprehensive recording of all system events that took place in their computing environment during a work session.
- **Post-observational interviewing**: We conducted semi-structured interviews with participants to triangulate analysis of the diaries and recorded work sessions. The interviews added to the data in the diaries and recorded activity logs information about users affect, decision-making, and level of satisfaction—dimensions that are impossible to capture completely with the two other recording methods.
- **Site visits and artifact documentation**: We visited the work sites to document and collect artifacts such as drafts, email, and memory aids. We did this for three reasons:
    1. to determine how complete the diary records were, making sure that informal genres and brief oral and written exchanges that may be crucial are were not being overlooked;
    2. to make sure that the self-initiated recording of work practices did not leave out important, but tacit, work habits;
    3. to discover how the work records and interview responses gathered from participants meshed with broader organizational strategies and issues related to workplace culture.

The data collection methods described above created a rich event-based log of project activity for each participating team. But then we had to analyze these data logs to make sense of what participants were doing and what differences existed among them.

Data Analysis

To analyze the data, we constructed visualizations of these logs. Communication Event Models allowed us to examine whether writing processes were proceeding efficiently, that is, with the fewest number and most effective types of communication needed to complete a task or achieve a certain goal. Genre Ecology Models allowed us to examine and track the many texts that were simultaneously deployed to mediate and create conditions for successful work. Finally, Sociotechnical Graphs let us relate the other two models, allowing us to systematically infer, test, and compare the activities across the narrative accounts in the diaries, interviews, recorded work sessions, and artifacts.

Communication Event Models

First, we created CEMs so we could see sequences in communicative events. In Figure 1, we mapped out the communicative events that were described in a participant's diary and confirmed through interviews and system event logs.

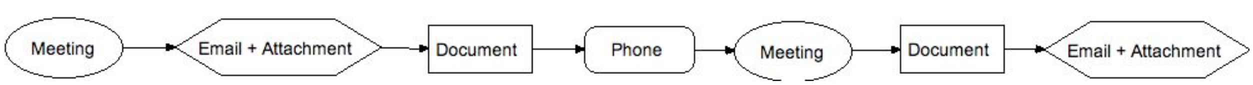

Figure 1. A Communicative Event Model, showing communicative events in one worker's diary. (Based on Hart-Davidson, Spinuzzi, and Zachry 2007, p.116.)

Here, Figure 1 depicts several communicative events. The horizontal strings of events were coordinated with others - that is, done in conjunction with others in the individual's team. The vertical events were conducted by the individual alone out of the team. The icons represent different communicative media: face-to-face meetings, email, documents, and combinations. As you can see, this individual's diary described several communicative events over the period of a week. By constructing CEMs for each participant, we were able to detect common events and patterns, but we were also able to observe material differences in actors' material relationships across the activities - in other words, we were able to detect contextual differences in how they communicated.

Genre Ecology Models

Next, we used GEMs to see how people were using and linking together their genres. As figure 2 shows, one worker in our study used multiple genres in his work on different projects. Some of these genres were densely connected, showing that they were frequently used in combination with several other genres. At a glance, we can see the genres and how they're coordinated - and we can compare similar GEMs from other sites to see systemic differences in how people use genres at the different sites.

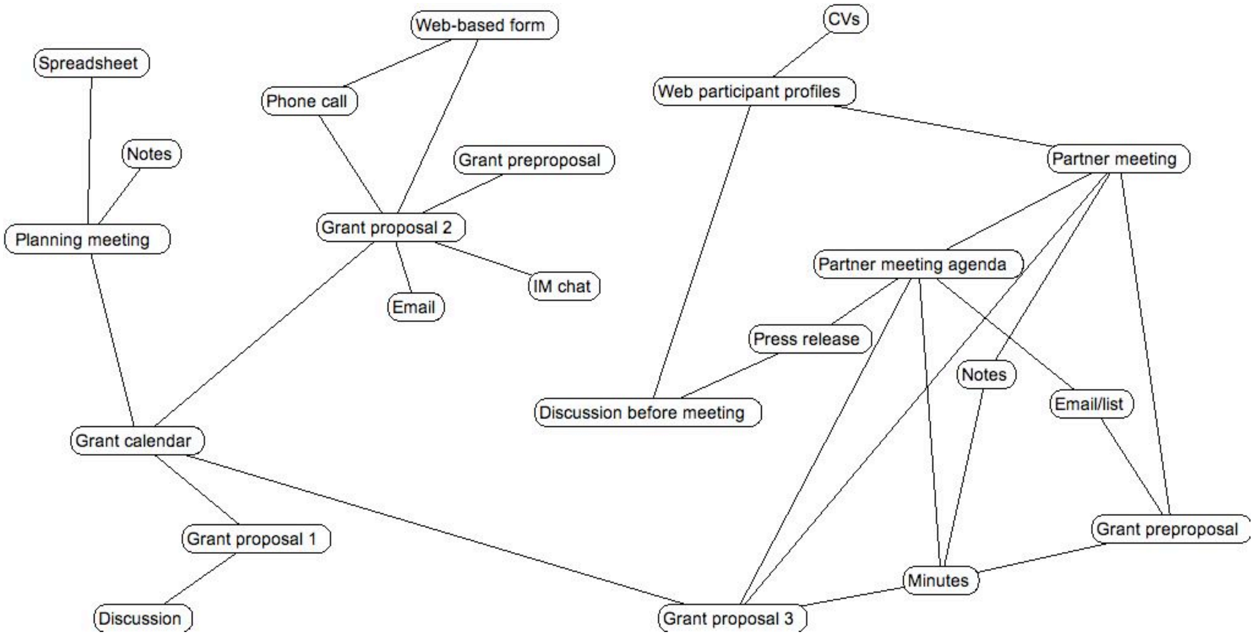

Figure 2. A Genre Ecology Model, showing how genres were connected through mediation. (Based on Hart-Davidson, Spinuzzi and Zachry 2007, p.117.)

Once again, we were able to construct GEMs for each participant, mapping out the genres they used, how those genres were coordinated, and how they differed across projects and as well as across participants. In this way, we were able to identify a stable core of genres (such as grant proposals and calendars) as well as differences in genre use and ways that genres substituted for each other in different instances. Again, we were able to observe material differences, this time in terms of how participants mediated and structured their work across sites.

Sociotechnical Graphs

Finally, we constructed an STG to coordinate what we know about communication and mediation. Figure 3 shows an STG based on the same data set as the CEM and GEM in figures 1 and 2. Notice that it allows us to talk about the communicative resources (genres) recorded during data collection, across participants (vertical axis), for each communicative event. The

STG allows us to systematically spot differences as well as similarities in how activities are accomplished. For instance, we can see that when the different participants held meetings, they all involved proposal drafts, but each participant used different genres in addition. By coordinating our two views, the STG allows us to zero in on the material differences, the *context* (in the sense I've defined it) across the sites.

Worker	Project	Event	Genres (Text Types)
Emily 4/25/2006 11:00am	General	Organization-K Weekly Grant Meeting	status meeting; table of grant opportunities; proposals
Emily 4/27/2006 6:00am	XYZ Foundation Proposal	Writing "the sell"	Proposal
Emily 4/28/2006 5:45am	XYZ Foundation Proposal	Fine tune "the issue" /"the sell"	Proposal
Karen 4/26/2006 11:00am	ABC Center of Excellence	Site visit by selection/review members	PowerPoint charts summarizing proposal with Q&A; Copies of ABC proposal; Copies of slides; Notes on recommended improvements
Karen 4/27/2006 7:30am	ABC Center of Excellence	Mod. Charts (2) for final submittal to review team	PowerPoint charts; Proposal (harvested graphics) softcopy; review leader's suggested chart content/requirements/ specs/etc.; notes taken at site visit meeting
Karen 4/28/2006 10:30am	DEF Organization	Meet with PI/Co-PI	Draft response, proposal solicitation docs; DEF Organization + GHI Organization websites
Kim 2/21/2006 12:20pm	SPG (Strategic Partnership Grant)	Worked on writing 3 page preposal	Proposal; email; IM chat
Kim 2/22/2006 8:00am	SPG	redrafted proposal	Proposal; Discussion
Kim 2/22/2006 11:48am	SPG	Revised Proposal	Proposal; Email; Discussion
Kim 2/24/2006 8:00am	JKL	Meeting preparation	Agenda; proposal; workshop proposal; notes; press release; email; website; minutes
Kim 2/24/2006 1:30pm	JKL	SLC partner meeting	Notes; workshop proposal; lists; calendar

Figure 3. A Sociotechnical Graph, showing how participants defined communicative events and what genres helped to mediate them. (Based on Hart-Davidson, Spinuzzi and Zachry 2007, p.116.)

So what did these models tell us? In terms of context, the three sites presented some real and significant differences. But we also found a core of similarities that characterized proposal writing. These went beyond the proposal itself: as you can see from the models, the writers also had to conduct and attend meetings, take notes, map out events on calendars, and so forth. By looking at the similarities, we could characterize proposal writing in more detail and learn more about how to support that general activity. And by looking at differences, we learned more about how people had to adapt to the unique aspects of their worksites - how they had to deal with their local contexts.

Conclusion

Throughout this chapter, I've discussed a set of heuristics for *investigating* context. But now it's time to talk about *communicating* those findings. The beauty of these heuristics is that participants tend to understand CEMs and GEMs:

One of the most positive outcomes of our pilot study was the favorable reaction we received when we showed participants what their work looked like. They reacted with surprise, often, and delight. Generally, they were pleased to see someone (finally) recognizing the complexity of grant-seeking activity. Many thought they could use visualizations of routine work for purposes internal to their organizations such as training as well. (Hart-Davidson, Spinuzzi, and Zachry 2007, p.119).

In this particular study, we were interested in communicating context so that our participants could understand their own work in comparison with their counterparts at other organizations - an understanding that would let them examine and borrow from each others' best practices while still retaining their most successful local innovations. Because the data could be used to compare at individual, group, and organizational levels, participants could make all sorts of different comparisons and decide for themselves what they wanted to adopt or change. We found that CEMs and GEMs took a moment to explain, but our admittedly anecdotal experience is that participants had little trouble understanding their own CEMs and GEMs. They had lived this work, and although they typically have lacked the visual vocabulary to map it out, they recognize that work when they see it laid out in these formats. And they were generally able to make sense of comparisons across participants and sites.

STGs are a bit more information-dense, but they also can be used to communicate the contextual differences across participants and sites. We are in the early stages of using STGs to communicate with participants, but we believe that they can also be used to explain the sweep of differences in genre use for particular communicative events across participants and sites. They can visualize their contexts - and they can understand a little bit about related contexts.

Discussion Questions

1. "Context" has a specific definition in this chapter. How is it different from how you usually think about context?
2. Think of some task that you often perform - at work, while studying, in a campus organization, etc. Sketch out a CEM showing the different texts that you have to receive, produce, alter, and hand off during this task. Compare your sketch with that of others in your class. What differences do you see? What similarities?
3. Take the same task and sketch a GEM showing the different texts that support it. What are some of the hidden "helper" genres that make this task successful? How does your diagram differ from others'?

4. Go to a place with a repeated activity, such as the checkout counter of a library, a coffee shop, a restaurant, or the front of a city bus. Take notes about what happens, especially in terms of what texts are used and who uses them. Using your notes, sketch out a CEM that represents the repeated activity. Summarize the "script" that people use when they perform this activity. What are the similarities and differences between people? Compare with someone else's CEM. What are the similarities and differences across contexts?
5. Using your notes from 4, draw a GEM showing the texts people use in this activity. What are some of the more unusual texts that you saw? Compare with someone else's GEM. What are the similarities and differences across contexts?
6. Using the CEM and GEM from questions 4 and 5 above, create an STG. What is the minimum set of associated texts needed to perform this activity (AND)? What are some of the substitutions you and your classmates saw (OR)?
7. This chapter claims that an STG can help you compare contexts. What can you tell about the different contexts in Figure 3? What is the same? Do you think that a proposal writer would have trouble moving from one organization to another? Why or why not?

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Chapter 11: How Can Technical Communicators Evaluate Artifacts?

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Summary

This chapter focuses on skills, principles, and approaches to evaluating artifacts in the software and web application worlds. It highlights the expertise in rhetoric that technical communicators distinctively bring to these usability evaluations. Rhetorical expertise combined with other skills help assure that evaluations focus on the dynamics of human-computer *communication* necessary for usable and useful applications and documentation.

This chapter also discusses principles of usability evaluations and the strategic choices technical communicators need to make to select usability methods, scope, units of analysis, and data analyses most appropriate for an evaluation situation. It presents a toolkit of methodologies for conducting evaluations as well as collecting and analyzing data. It discusses strategically combinations of these methodologies for particular goals and circumstances. Factors shaping these combinations include prevailing constraints, targeted audiences, the presence or absence of prior assessments, stakeholder priorities, users' workflows and tasks, and standards of excellence.

Effective usability evaluations also include reporting outcomes and recommending improvements. Choosing optimal content and organizational patterns in reports help assure that readers will be convinced and improvements made to artifacts.

Introduction

"If you build it they will come." The creative spirit behind this expression of innovation can become a technical communicator's worst nightmare if the innovation is built with little regard for the intended "they." Whether the "build it" refers to documentation, diverse types of user interfaces or conventional print materials, inadequate attention to audience, need, context, and purpose will quickly undermine even the most promising initiatives. Large mismatches will occur between the artifact and intended users. This less-than-ideal situation characterizes the following case of Collins, a technical communicator in a small biomedical venture software firm.

Case: Evaluating Bioconcept

In her company, Collins is the go-to person for all things related to writing and usability. She creates effective user manuals based on initial documentation that developers draft to accompany their products. She also evaluates the usability of newly developed web applications through user performance testing. When testing applications, she assesses the user manual and participants' uses of it as part of the overall evaluation of the newly created tools.

The company in which Collins works develops web-based applications aimed at facilitating life scientists and biomedical researchers in exploratory analysis. Specifically, these applications facilitate researchers in exploring molecular level data and biological relationships to find patterns and interactions that may suggest networks of genetic influences on a complex disease or other little understood physiological process. The firm initially attracted venture capital because of its advances in technologies that merge, integrate, validate, and store huge amounts of diverse, multi-scale systems biology data drawn from public sources. The data include details on genes and proteins across species and include such details as properties, interactions, biological pathway memberships, associated concepts semantically mined from the research literature, and other literature metadata. The company adds value to these data by further deriving such information as indirect relationships between proteins or test statistics showing that certain traits characterize groups of genes at a significant level. All combined, the data provide scientists with a rich repository that they can query and analyze with the help of the firm's applications.

Collins learns today that she is to evaluate a new application, Bioconcept, which its developers believe is ready for assessment. Kit, a biostatistician, and Max, a developer, have collaboratively developed this web-based application. It aims to help scientists find groups of similar and complementary traits that significantly characterize certain molecules and molecular interactions. From these traits scientists can infer molecular influences on physiological processes or diseases. The application will give scientists a quick means to uncover sets of potentially influential genes for further study and experimentation.

Collins is familiar with Bioconcept from discussions about it at biweekly company meetings. Yet she works in marketing not development and has not been privy to the intricacies of design and development choices leading to this now ready alpha version of the application. As an alpha version, Bioconcept is farther along in development than a prototype – committed, for example, to certain architectures, functionality, data formats, and user interface features - but it is not yet far enough along to be pilot tested in the field. When software is ready for piloting in the field, it is referred to as a beta version.

Kit and Max are excited about Bioconcept, believing it exceeds anything comparable in the market. Its database has a much greater breadth of concepts than any other tool, and it includes data test statistics derived from innovative algorithms for significance testing. The application offers 15 high level concept categories – each with hundreds of sub-categories –

mapped to over three million genes. Scientists can access all these data, and they need resulting displays of the multidimensional data that are intelligible and that are organized to match their needs, purposes and analysis practices. Without this match scientists often quickly lose their train of thought. They also frequently become disoriented in their progressive workflow, a workflow that involves, for example cumulatively filtering to only certain concepts, identifying overlapping genes among many related concepts, and saving them to recall later as they currently shift to new perspectives.

Kit and Max meet with Collins to walk through the software and the initial documentation they have prepared. They want her to evaluate both items for user-centeredness. Tacitly their eagerness conveys that they expect their software to effectively support users' needs and performances even though it has not been subjected to either needs assessments or iterative prototyping evaluations.

From the walkthrough and Collins's own subsequent interactions with Bioconcept and its documentation, she sees that neither artifact is ready for user performance testing. Neither accords with a good number of common usability standards. If she tests these artifacts with users at this inadequate level of baseline usability the testing will uncover only the problems already obvious to her. Most likely users will not be able to progress far enough to reveal additional shortcomings because these baseline usability problems will obstruct them.

As an alternate methodology Collins decides to run a usability inspection first. She employs inspection instruments that she and her colleagues have previously adapted to the biological domains of the company's discovery-based applications and manuals. The instruments consist of a well-accepted set of usability standards (also called "heuristics") against which to judge interfaces and manuals. The heuristics have been long established in the technical communications and human-computer interactions fields and are adapted in this instrument to the practices of exploratory analysis in the life sciences. Collins strategizes that after doing the usability inspection and fixing of problems revealed by it, she might be able to conduct task-based user performance evaluations. More details on these heuristics are provided in a later section.

As expected from the usability inspection, Collins finds and reports numerous problems. Max fixes them. In parallel, Collins works on turning the developer-generated documentation into a more user-friendly manual. At the end of these revision activities Max gives Collins the newly-fixed alpha version of the software. Unfortunately, she sees that she must reassess her plan to next run a user performance evaluation. Even with improvements, Bioconcept is not ready for any type of hands-on formative user testing - neither task-driven, scenario-based, feature-specific, nor free form performance testing. The underlying problem is that development and design choices have been made largely on the basis of creating a proof-of-concept – one that would prove the efficacy of advancing statistical concept enrichment methods and the feasibility of incorporating and relating huge volumes of diverse data. The tool overlooks many design choices necessary for supporting and augmenting scientists' actual ways of knowing and thinking in life sciences analysis of complex molecular relationships for discovery purposes.

Similarly, despite Collins's revisions of the manual, she finds that it also is not ready for user performance testing. It better accords with format and style conventions but does not frame procedures with an analysis context and purpose tuned to the user experience. Collins knows generally what life science analysts need for complex task performances. But she has not spent time with the subject matter specialists from early on to know the contexts and purposes of their tasks for this specific application. In Collins's professional judgment these shortcomings are all potential showstoppers for user performance. Some problems will require deep functionality additions and changes as well as interface modifications, many of which will not be quick fixes.

Collins now faces a difficult decision. Should she use her finite resources for usability evaluations to test user performance on this version; or should she first run a different inspection – one that is task-based (a cognitive walkthrough) – coupled perhaps with an example of a single user's performance? If she chooses the latter, she could use findings to make recommendations for additional, deeper improvements in the software and manual before investing in a larger user performance test. We leave Collins to deliberate about this decision and will return to her later to see what she decides. To frame our understanding of this decision, we now turn to a discussion about various usability evaluation skills and methods.

Chapter objectives

Usability evaluation is a broad activity. A single chapter cannot explore all its aspects for the various types of artifacts that as technical communicators may assess. Instead this chapter focuses only on one family of artifacts, those produced in software and web application industries. These industries are home to thousands of technical communicators like Collins. In these industries technical communicators may assess help systems, user documentation, tutorials and training materials, and user interfaces for websites, virtual realities, mobiles, games, tablets, software and web applications. In doing so, technical communicators implicitly evaluate aspects of a system's core functionality and architecture relevant to usability and usefulness problems. This chapter presents different usability evaluation circumstances and discusses approaches to take to conduct usability evaluations and communicate findings appropriate for given sitatuions.

Literature Review

In assessing artifacts, usability evaluators should assess both usefulness and usability. Usefulness is a measure of whether intended audiences value an artifact as meaningful and pragmatically useful to their actual workflows and tasks. Usability measures and assesses whether the artifact is operationally easy to understand, use, access, learn, and navigate. Both usefulness and usability are critical to user-centered artifacts sensitive to audience, context, problem, and purpose. If domain specialists cannot work through "their inquiries according to situational and professional demands, even the easiest-to-use application is not useful and, ultimately, not usable" (Mirel, 2004, 33).

The question of who should conduct usability testing and with what skill sets is often debated. Usability has many disciplinary homes, and other specialists besides technical communicators are well-trained in conducting evaluations. For example, usability evaluation is part of the training in information science, human-computer interaction programs, industrial design, performance technology and the learning sciences. These disciplines all offer courses related to usability at the undergraduate, Master's degree and doctoral levels. In the technical communication research literature, strong cases have been made for technical communicators to assume this role because of their distinct skills (Cooke and Mings, 2005). What are these distinct skills? Perhaps the most striking distinctiveness is rhetoric. A review of important literature explains why.

Johnson et al (2007) note regrettably that usability over the decades has not as it should have been driven by rhetoric. Rather usability has been "regarded as a scientific activity—an activity guided by strategic methods and often quantitative measurement systems—that attempts to create verifiable and replicable results" (323). From this perspective, usability as an applied science connects cognitive/socio-cognitive science on the human side to requirements engineering on the software/systems side. As an applied science, usability functions to formalize people's "human" approaches to digital knowledge work into specifications for software requirements, procedural steps, and use cases. However, when formalizing is not entirely possible – as it is not. when people's work is complex, open-ended, or emergent - this scientific view of usability is insufficient.

If development teams do not realize the insufficiency of this view, the artifact will have many shortcomings in ease of use and usefulness. As Sullivan argues, the applied science aspects of usability also need to be coupled with deeply grounded rhetorical analysis (Johnson et al, 2007). She argues that how audiences dynamically access, browse, interpret, understand and act on information that flows from user interfaces or help systems are mediated through language. People find and construct meanings through language – be it visual, tabular, or verbal representations. These representations inescapably have rhetorical dimensions.

The meanings that users construct from the informational language/ representations flowing from an interface or page depend on contexts, conventions, and purposes of both the composers and the audiences. Consequently, assessing how e-representations are received, taken up, applied and valued by intended audiences requires rhetorical expertise. Indicating the value that this rhetorical skill has had, Anscheutz and Rosenbaum (2002) present several case histories in industry that illustrate common moves technical communicators have made to expand workplace roles and responsibilities to become leads in usability testing, user-centered system design, quality assurance, and user interface design and development .

In addition to rhetorical skills, usability evaluators need to have a toolkit of methodologies from which to design and carry out evaluation projects for various situations. A large body of research, best practices, and guidelines exists that details diverse methodologies and protocols – both qualitative and quantitative, formative and summative (Rubin et al, 2008; Krug, 2005; Barnum,2002; Blakeslee and Fleisher, 2007; Dumas and Redish, 1993; Redish et al, 2002; Blandford et al, 2008; Sutcliffe et al, 2000; Cockton, 2008; De Jong and Rynks, 2006; De Jong and Shellens, 2000; Rosenbaum 2008; Ummelen, 1997; Spyridakis et al, 2005; Kushiniruk and Patel, 2004). Familiarity with this literature is important to guide the formulation of evaluation goals and methods and to assure that they fit a given multi-factored usability situation. The implications of various situational factors for goals and methods also are discussed in the research literature (e.g. Barnum, 2002; Dumas and Redish, 1993; Cockton, 2008). For example, the stage of artifact development is an important determinant of optimal methods for evaluation as are types and complexity of tasks afforded by the artifact and diversity of its target users.

A caveat is necessary at this point. Ideally, usability evaluations are performed after many other user-centered activities for artifact design and development have already taken place. For example, context-based audience and needs assessments should occur and influence design before usability testing. Additionally, project management structures should be in place to assure that needs assessments and their influence on prototype designs are built into the front-end of the development cycle from the start. These activities are addressed in Chapters __ and __, respectively, in this volume. If these activities do not occur before a usability evaluation, problems uncovered by evaluations are likely to relate to deep conceptual, architectural, and communication issues that otherwise would have surfaced in needs assessments and user experience studies. Uncovering such problems later in the development cycle makes it harder to remedy them and often adds high costs and time to production. As Scotch and Parmanto (2007) show, if, during performance testing inadequate baseline usability exists in an artifact due to an absence of early assessments, users become blocked in task performance and cannot conduct the full range of tasks required for evaluation. The evaluation, consequently, will not be able to uncover deeper problems that are likely to be detrimental to users' task flows in their actual analyses.

As part of their toolkit of methods, usability specialists can consider conducting various modes of usability inspection (Nielsen, 1993) – cognitive walkthroughs, heuristic evaluations (as in Collins's case), or expert reviews – as well as conducting interviews and surveys, analysis of usage logs, and formative and summative user performance testing. In regard to inspections, such as the heuristic evaluation (HE) that Collins conducted, methods typically help evaluators find and identify low hanging problems (Nielsen, 1994). As in Collins's case, evaluators apply established usability standards to interfaces and/or documentation to find problems and rank the severity of the problems. Heuristic evaluation instruments are often generic, and adapting them to domains targeted by an application generates more meaningful and consequential results (Cockton et al, 2007;Mirel and Wright, 2008; Cockton and Woolrych, 2001). Whether generic or adapted, however, research shows that HEs alone do not achieve adequate usability even if they are adapted to a domain (Nielsen, 1994). Rather they need to be combined with other evaluation methods, such as task-based evaluations and user performance testing.

If usability evaluations focus on user performance instead of inspection, evaluations are either formative or summative. Formative testing occurs early and often, and it generates findings that can progressively improve an artifact during development. In formative testing, qualitative methods are often used because, at this formative point, too little is known about factors contributing to usefulness for a given class of tasks and workflows to have valid constructs available for quantitative analysis. Formative scenario-based testing and qualitative analysis help define such constructs and standards of excellence These constructs and metrics often then become the criteria by which an artifact is assessed subsequently during summative testing.

Summative testing occurs at the end of development and validates an application to determine that it effectively and efficiently addresses audience, purpose, context, and tasks and that it meets standard usability criteria. It is typically quantitative. Along this continuum of exploration to confirmation, mixed methodologies are often used. This chapter does not describe summative performance testing because the precision with which its quantitative methods need to be applied are covered better in other sources. These other sources include, for example, Sauro and Lewis, 2009: Spyridakis, 1992; Evans et al, 2004; Kirakowski, 2005; Cohen, 2008; Saraiya et al, 2005; Gray and Salzman, 1998; Hughes, 1994.

Whether an evaluation is formative or summative, the evaluator needs to determine the appropriate unit of analysis for the user performance test. In evaluations of early yet fully functional prototypes, evaluators often run user performance tests in the field, thereby identifying contextually-embedded demands for usefulness. Evaluators gather data as users perform their actual software-supported work in naturalistic work settings (Mirel, 2004). In this testing, the unit of analysis is the problem-driven interactions that users perform in their actual practices. Evaluators often triangulate these data with the following: log data (automatically generated records of users' interactions with a program/web site when they are not being observed); user interviews, diaries; and/or other self-reports (Jarrett et al, 2009; Ivory and Hearst, 2001; Scotch and Parmanto, 2007; Spyridakis et al, 2007).

Another orientation to very early prototype testing is to focus on specific software features of concern (Snyder, 2003). In this case, the unit of analysis is different. Evaluators run quick, iterative cycles of prototype development, testing, and revision – called Rapid Iterative Testing and Evaluation (RITE). RITE tests usability in more controlled environments than the field and is more concerned with program-defined, low level actions that the tasks and workflows that users reveal in field testing. Evaluators test just a handful of users (five or so), observing them as they interact with the prototype to conduct pre-defined tasks related to just the feature of concern (Medlock, Wixon, McGee, & Welsh 2005). In this testing, the unit of analysis is users' low level operations of a specific feature or function in a predefined task context. This testing method is optimal when team members are experts in usability and when the targeted user tasks are well-structured. In these cases, usability experts are able to translate findings into redesigns and improvements quickly and collaboratively set priorities and implementation choices with developers and other stakeholders (Rosenbaum, 2008).

Sometimes due to organizational circumstances, as in Collins's case, evaluators do not have the benefit of having early field studies and iterative prototype testing, and they consequently need to test for usefulness and usability together in a user performance test. For this situation, as in any controlled-environment testing of user-prototype interactions, success depends on setting the scope and unit of analysis effectively and on writing appropriate tasks and/or scenarios. To combine the evaluation of usefulness and usability, for example, tasks and scenarios need to generate (a) findings on usability issues of concern (e.g. smoothness of flow of interactions with features and functionality, error management) and (b) findings on fitness to purpose (adequate task support for the actual reasoning and domain knowledge that users apply in their work). A good deal of research exists to guide informed decisions about test design and methodology for user performance testing in controlled environments, as cited previously. Research in the literature also addresses various issues distinct to certain media (e.g. mobile, virtual reality, speech recognition), cross-cultural systems, degree of task complexity, domains (e.g. health, finance), demographic segments, and accessibility issues.

In the field and in controlled settings user performance evaluations need to include appropriate sampling methods and sample sizes (Koerber and McMichael, 2008). For formative and largely qualitative evaluations, samples of users can be recruited through convenience or purposive sampling methods. Convenience sampling, i.e. selecting users based on availability alone, is not sufficient when users need to bring specific knowledge and/or experience levels to the tasks or scenario. A better method for this situation is purposive sampling, which involves selecting users based on set criteria for user traits. Typically, 20 users are a good sample size and acceptable for qualitative evaluation (Miles and Huberman, 1994).

To run a formative user performance evaluation, conventional approaches include at least two usability evaluators observing user performance sessions upon consent from users. They ask users to think out loud as they conduct pre-defined tasks or scenarios. Usability specialists train users briefly in think aloud processes before testing (Boren and Ramey, 2000). In the test users' software interactions and think-alouds often are video- and audio-recorded by audio and video screen capture software. Evaluators also decide on whether or not to set time limits on the performance of a task, based on whether such constraints are consonant with their evaluation goal.

Evaluators observe each user session without intervening and take notes to guide later analysis of the raw data. At the end of each user session, they often ask users to fill out standard satisfaction surveys (Brooke, 1996; Kirakowski, 1996; Kirakowski and Cierlik, 1998). Satisfaction surveys– their reliability, metrics, significance of outcomes - have their own art and science, and usability evaluators should be familiar with the literature about them (Sauro and

Kindlund, 2005; Lewis, 2002; Sauro and Lewis, 2009; Bangor et al, 2008; Brooke, 1996). Evaluators debrief after each session, sharing their perceptions and highlights.

To analyze the formative user performance and satisfaction data evaluators typically follow standard qualitative methods. They characterize patterns, exceptions and themes in users' performance behaviors, knowledge, and affective reactions (Krippendorff, 2004; Barton, 2002; Cresswell and Clark, 2006; Blakeslee and Fleisher, 2008). To start, they holistically view the video- and audio-recordings of user sessions several times. Then for each user session they tag various uses of artifact functions and features and user behaviors for important traits and indicators of performance efficiencies and effectiveness. These may include, for example: Types of information seeking behaviors (e.g. access, monitor, search, browse, extract, chain, analyze (Makri et al, 2008)); demonstrated program-related problems, impasses, and errors; error recovery instances; categories of interactivity (e.g. selection, filtering, navigating within a screen, navigating across screens, backtracking); elapsed time on certain tasks; and task boundaries. Screen capture analysis systems and content analysis tools can expedite these analyses.

Evaluators also transcribe the think-alouds and interview responses and analyze them to abstract patterns shared across user cases, exceptions, and themes characterizing expressed and acquired knowledge, modes of reasoning, affective reactions, and patterns and exceptions during performance and post hoc interviews. Unlike qualitative methodologies that aim primarily to build grounded theory, these qualitative analyses may have theory-building outcomes but they also give high priority to action. This action includes theoretically grounded rationales, recommendations, and user-oriented specifications for enacting design modifications and improvements.

As the research literature suggests, large amounts of data are gathered and analyzed to generate assessments and to recommend improvements. It is no small feat to turn findings from evaluations into communications and recommendations that prompt developers and other stakeholders to set the right priorities for improvements and to construct truly effective improvements. Evaluation specialists agree that writing high quality reports "with recommendations that are taken seriously by the product team" is a core aspect of usability testing (Brady, 2004, 67). Unfortunately, this aspect of an evaluator's role is under-researched. Few studies cite results about the best ways to compose effective formative evaluation reports and recommendations to direct evolving improvements and priorities for greater usefulness and usability.

Standards and guidelines for writing effective summative reports are better established and disseminated than for formative evaluation reports (Industry Usability Reporting Project, 2001). One well-delineated report format for summative testing, supplemented with examples, can be found at the National Institute of Standards and Technology (NIST) website (http://zing.ncsl.nist.gov/cifter/ TheCD/Cif/ Readme.html).

For formative evaluation reporting, despite a relative paucity of research articles, investigators have gained some important insights. For example, to uncover strategies for structuring reports, researchers have qualitatively analyzed formative reports and recommendations composed by 17 teams of experienced usability professionals. Findings reveal 15 organizing patterns characterizing these reports' section structures. Generalizing, the researchers argue that some or all of the following elements should be included in reports (Theofanos and Quesenbery, 2005):

Title page	Overall test environment	Metrics
Executive summary	Participants	Quotes, screenshots, video
Teaching about usability	Tasks and scenarios	Conclusions

Business and test goals	Results and recommendations	Next steps
Method and methodology	Detail of recommendations	Appendices

As an overarching composition principle, researchers highlight the need for rhetorical effectiveness – something that should be second nature to technical communicators (Theofanos and Quesenbery, 2007). For example, research stresses that writing choices should be shaped by the business context, its conventions, constraints, and priorities. Rhetorically, choices in reporting also should be shaped by the writer's relationships with the intended primary and secondary readers, their prior knowledge, their likely assumptions/ misconceptions, and the questions that the evaluation strived to answer. Finally, rhetorical choices in reporting depend on the current phase of the development cycle, the type of artifact being evaluated, and the buy-in likely from the audiences.

Researchers also suggest content strategies. These strategies include: Presenting recommended improvements in the form of screen mockups with call outs, including screen shots that depict the problem, and providing quotations from users as a means to bring the audience "in touch with users... and building awareness of user needs" (Theofanos and Quesenbery, 2005, 34). Another means for eliciting a positive response from audiences composed of developers or managers is to include usability successes as well as problems. Researchers who study usability evaluation find that it is important to categorize problems by the user experience issues to which they relate. For well-structured work, many such categorical schemes are available in the research literature (Fu et al, 2002). For complex tasks, Blandford et al (2008) and Sutcliffe et al (2000) provide a number of problem categories and descriptions that achieve this effect well with diverse readers – developers, managers and users. In addition, problems and associated recommendations should have severity rankings and provide the criteria for each level of ranking in clear writing. Wilson and Coyle (2001) present criteria for severity rankings as follows:

Level 1—Catastrophic error causing irrevocable loss of data or damage to the hardware or software. The problem could result in large-scale failures that prevent people from doing their work. Performance is so bad that the system cannot accomplish business goals**.**

Level 2—Severe problem causing possible loss of data. User has no workaround to the problem. Performance is so poor that the system is universally regarded as 'pitiful'.

Level 3—Moderate problem causing no permanent loss of data, but wasted time. There is a workaround to the problem. Internal inconsistencies result in increased learning or error rates. An important function or feature does not work as expected.

Level 4—Minor but irritating problem. Generally, it causes loss of data but the problem slows users down slightly, minimal violations of guidelines that affect appearance or perception, and mistake that are recoverable.

Level 5 —Minimal error. The problem is rare and causes no data loss or major loss of time. Minor cosmetic or consistency issue.

Finally in report writing, researchers stress the importance of including a statement about having assured the "privacy, confidentiality and anonymity of participants" (Le Peuple and Lister, 2007).

From this wide-ranging research literature on artifact evaluations findings can help technical communicators conduct usability and usefulness studies and assessments. To complement these findings and further guide usability and usefulness evaluations, technical communicators can benefit from reflecting on and applying a set of heuristic questions to the assessments they undertake, as described in the next sections.

Heuristic

A good deal goes into preparing for and conducting usability evaluations. As the review of the research literature suggests, evaluators can introduce a systematic order to these deliberations by considering and addressing three main heuristic questions, as follows.

What distinct value and skills does this usability situation demand?

The distinct importance of rhetorical expertise as a critical usability skill is discussed in the Literature Review. Other skills are relevant to evaluating artifacts, as well. They include:

- Knowledge and skills of universal usability (accessibility for different disabilities)
- Knowledge of niche-based communication media, e.g. visualizations
- Awareness of standard resources and set-ups for usability laboratories.
- Awareness of software packages/technologies that can facilitate data collection and analysis (e.g. software for screen capture, usage log analysis, content analysis).
- Knowledge and skills in the subject matter and domain in which she works,
- A working knowledge of human cognition and reasoning, from novice through expert, including cognitive psychology, socio-cognition, social interactionism and constructivsm, distributed cognition, and actor-network theory.
- An understanding of the technical logic and technological efforts required for development in areas related to providing various support to users.
- A working knowledge of the relationship between user needs and goals, on the one hand, and design and development choices for user interfaces, manuals, and software design, on the other hand.

Every usability situation calls for different combinations of skills and knowledge and emphases in. Evaluating artifacts effectively is not simply a matter of having distinct skills and knowledge. It is depends on optimally putting them together for the demands of a situation.

What evaluation methods/test designs are best for the goals and circumstances?

This heuristic question is an umbrella for a set of interrelated sub-questions. All of the sub-questions guide evaluators to better match methods and evaluation designs to specific goals and conditions of a usability situation. The sub-questions in Table 1 guide evaluators toward considering and devising strategies for this match:

Question	Considerations and strategies
Why evaluate?	State and convincingly support why a usability evaluation is in order.
What is expected?	Know what developers think needs to be evaluated and fixed - and what she as an expert thinks needs to be fixed. Ideally, these will be in sync; practically they often are not (Howard, 2008). Know, as well, the assumptions and other obstacles that may lead stakeholders to misconceive the meanings and purposes of usability as well as their perceptions about evaluations that are feasible and problems that can be uncovered through specific evaluation methods.
Under what constraints?	Be clear about the resources, time, effort, and expertise that are available for usability evaluations, all of which constrain the choices of evaluation goals and methods. Also, identify how much and what is already known about usability issues relevant to this application and what evaluations have produced this knowledge. For example: What needs assessments have been completed to guide application development thus far and who conducted them? What are the quality and substance of the user-oriented results of the needs assessments? What development processes are followed, and where do usability assessments figure into the development processes?
Who are the users?	Make it clear to oneself and stakeholders who one is defining as the targeted primary, secondary, and tertiary audiences of the application and manual. Be clear how the target audiences affect the scope of one's evaluation. It is not uncommon for audience definitions and their ranked importance to be unclear. Therefore, one will need to explicitly negotiate with stakeholders to reach a consensus about target audiences before the evaluation. For example, biostaticians may experience tasks with the program differently from laboratory scientists.
How will the artifact help users?	Construct evaluation goals and methods attuned to the goals of each audience – their tasks and flows of tasks and the support and enhancements the artifact should provide for them. Set one's scope wide enough to include tasks for which users will want to control interactivity and tasks for which users may want more program control.

Table 1. Heuristic sub-questions for matching evaluation goals and methods to circumstances

What reports choices communicate convincingly and assure improvements?

The research literature on report writing discussed earlier suggests important reflections and choices related to this third heuristic question. Making choices about high level section headings, for example, provides a good first cut in determining the scope and content of the report and necessary connections with primary and secondary audiences. Good candidates for high level headings are detailed earlier in the Literature Review.

High level section headings alone, however, do not suffice for shaping the orientation a report evokes in readers toward a user experience perspective. This orientation depends as well on choices about content, emphasis, and sub-headings within many of the major headings, e.g. business and test goals, screen shots and video. Of all these major headings, arguably the most important one is the Results and Recommendation section. Within this section, certain choices in naming and focusing sub-divisions work better than others for co-constructing with readers a user experience perspective on reported problems and improvements. For example, naming subsections by program operations, functions or features will conjure system- rather than user-orientations in readers. User-centered names for sub-sections are needed but even these names vary in their effectiveness in evoking a user perspective. The user-oriented problem names that Sutcliffe et al or Blandford et al employ to discuss usability will more likely evoke users' experiences than such standard usability labels as ease of use and ease of access do. The reason is that standard usability labels have become so ubiquitous in development circles – often without developers' concomitant awareness of user experiences – that these technical readers often gloss over the user-based subsection names and look straightaway for implicated program features. Consequently, these readers miss the coherence and completeness users need to experience to interact with an artifact usably and usefully; and subsequent development efforts may repeat the same ill-conceived design choices in other artifacts.

User experience names for sub-section synthesized from Sutcliffe et al and Blandford et al, may avoid this premature leap to implicated program features. As a summary of these names show (see Table 2), they highlight the context of user experiences, which report writers can then further narrate, diagram or otherwise represent within each subsection:

Missing functionality for conceptual reasoning and user tasks
Inadequate or partial functions that falls short of user needs and expectation
Viscous support, i.e. too many actions, high costs for small moves, difficult to specify the action sequence pertaining to a domain-based purpose/task
Visual attention not matched to user needs, i.e. inability to detect what needs to be detected, defaults that do not draw the eye to selectively important items or relationships for a task
Clarity of "what do I see and what can I do with it?"
Clarity of "What did that do?" feedback
Clarity of "How do I get to what I want to do?"
Clarity of "Where have I been and what do I know?"
Imprecision in seeing and/or doing, i.e. difficult to carry out actions or discriminations

Figure 2. Categories of usefulness and usability problems: Names for subsections

To show these three heuristic questions as they apply in realistic situations, we now return to the case involving Collins and the evaluation of Bioconcept.

Extended Case: A Return to Evaluating Bioconcept

As we have seen, Collins's case typifies an evaluation situation in which usability has not been addressed until the end of the development cycle. In alternate cases, when development teams are sensitive to user-centeredness and the whole team incorporates ongoing usability assessments into the development cycle the start, formative user performance tests are readily forthcoming on prototypes or alpha versions. In these cases, evaluators commonly follow the testing methods described in the Literature Review.

Preview and Framing

In returning to Collin's case as an example of artifact evaluation, it helps to frame the discussion with insights revealed by the case. These insights relate to the three heuristic questions that guide evaluations of artifacts. They include the following:

- If project management does not include early needs assessments and iterative testing, a less-than-ideal evaluation situation may ensue.
- Heuristic evaluations and other quick inspection methods are a start but they are not sufficient in themselves.
- In software and manuals, giving access to huge volumes of information is not sufficient for users' analytical purposes. Presentations must accord with users' *flows* of analysis. The right content in the right verbal and visual forms need to be presented with effective explanations; and the right level of user-controlled interactivity must be included and communicated. These are, in part, rhetorical choices.
- A combination of feature-based and scenario-based testing should take place over the course of a product's development to assure attention to usability *and* usefulness.
- Choices of methods in qualitative evaluations must be justified for validity and be presented as such to stakeholders clearly and persuasively. In practice, trade-offs will occur due to competing constraints and goals. Justifications for decisions in trade-offs might extend beyond the current testing situation, such as showing that qualitative choices early on will benefit later summative testing by generating metrics for the testing.
- Usability-oriented decisions demand effective communications to diverse stakeholders.
- Data on usability problems, severity, and proposed alternate designs are vital to support recommendations to stakeholders.

At the end of the previous case narrative, Collins was left deciding about her next steps for evaluating Bioconcept and its manual. To review, the events leading to this decision had a strong rhetorical underpinning and thus called for Collins to apply this communication-oriented expertise. The necessary expertise and skills required for the situation are the subjects of the first heuristic question. Specifically, Collins was concerned about the software communicating content and interactivity fit to scientists' analysis purposes. She did not simply focus on the software having certain information and features available regardless of design for purpose and context. Rather she took a perspective centered on users' holistic interactive experiences with the artifact. Based on research findings and her own past experiences she believed that evaluations that focused only on separate components of this experience instead of the whole ended up assessing effects of just those formalizable aspects of users' experiences, for example the low level action of selecting a data item or clicking an interface widget for an operational step. These operations are important to conduct easily but they are not akin to users' own conceptions of the core aspects of their goal-driven tasks.

For example, Collins knows that for scientists a core aspect of analysis that Bioconcept supports is "comparison." But the manipulations, view setups, and knowledge that scientists need for drawing comparisons are notoriously hard to pre-formalize. They subjectively depend on scientists' goals, prior domain knowledge, and own selectively important combinations of traits or criteria for a given problem. Enabling scientists to achieve their analytical workflows with completeness, coherence, and relevance in accord with their notions of their work and analytical practices tasks is a communication act and is rhetorical at base.

At this decision point, Collins is hesitant to conduct user performance testing prematurely because she wants the testing to evaluate support matched to scientists' practices. It is this rhetorical focus that technical communicators need to apply to evaluate artifacts and subsequently achieve greater usefulness and usability.

Factors affecting Collins's decision about next steps to take are tied to many of the sub-questions detailed earlier in the second heuristic question. At that decision juncture, the factors to consider about next-step goals and methods are interrelated and do not present themselves neatly. Trade-offs are inevitable. For time's sake, for instance, Collins may need to target fewer user interface or documentation problems, excluding some that she believes should be addressed but are not as high a priority to the overall enterprise. Strategically deciding on acceptable trade-offs and choosing goals and methods accordingly require giving justifications and rationales to immediate team and stakeholders. Sharing and discussing these justifications and rationales are important. Better outcomes for product evaluation and redesign result from coming to a shared understanding of why the evaluation is being conducted at this point; why it is being conducted as it is; and when in the future issues that have been put off at present will be evaluated.

Collins initially chose heuristic evaluations to identify obvious problems that needed fixes. Following standard practices of having several raters, Collins brought in three colleagues who had conducted heuristic evaluations with her on other similar tools. Table 3 shows an excerpt from their evaluation of Bioconcept using the adapted HE instrument:

Heuristic (usability standard)	**Severity Rating 0 = no problem 5 = major problem**	**Comments about usability**
Clearly shows if there are no query results?	0 1 2 3 4 5 N/A	Shows a "0" but should have a sentence like "No results found for 'csf1r'" or something similar.
Is it easy to reformulate query if necessary?	0 1 2 3 4 5 N/A	Big problem, if you go back to the search screen from the explorer you lose your query and the search results.
Are the results transparent as to what results are	0 1 2 3 4 5 N/A	Could use a header that indicates what we're looking at. E.G: "45 biomedical

Heuristic (usability standard)	Severity Rating 0 = no problem 5 = major problem	Comments about usability
being shown and how to interpret it?		concepts found matching 'cancer'"
Is there ability to undo, redo, or go back to previous results (e.g. history tracking)?	0 1 2 3 4 5 N/A	No history tracking.
Are the mechanisms for interactivity clear?	0 1 2 3 4 5 N/A	Could use more labeling or tool tips
Can you access the necessary data to assure the validity of results? (i.e. the sources of the results)	0 1 2 3 4 5 N/A	Can't get to sources, e.g. can't click on MeSH term and get to MeSH.
Can results be saved?	0 1 2 3 4 5 N/A	No saving option

Table 3. Sample of problems found through the heuristic evaluation instrument.

When Collins reviewed the improvements based on the findings of heuristic evaluations she found other deeper problems – those related to mismatches with scientists' actual ways of knowing and thinking in their life sciences discovery-driven analysis of complex molecular relationships. For example, Collins knew enough about scientists' flows of analysis in general to know that during discovery-driven explorations, scientists try to identify genes that are similarly characterized by at least three traits - often more. But with Bioconcept users could at most see genes sharing two traits easily, which would likely be insufficient for their cumulative drive to gain novel insights.

The manual too (see Figure 1) had problems. It did not tie program operations to analysis-based task objectives. Nor did it explain the tool in a way that connected and resonated with scientists' exploratory intentions and standards of practice and validation. Explanations were scanty in the Bioconcept documentation, and those that were included were copied verbatim from an article that Kit and Max wrote for an audience of computer scientists, biostatisticians, and computational biologists, not life science researchers (see Figure 1a). Similarly, screen shots did not help users interpret displays in relation to a sample analytical task (see Figure 1b).

Gene Set Relation Mapping- Heatmap View

[Explanation]

The values used in creating the heatmap are defined by the counts of the enrichment concept pairs that a gene belongs to, and the genes and concepts are clustered using complete linkage hierarchical clustering with the Euclidean distance measure. Color of columns range from black (gene belongs to no enriched concepts) to bright red (genes belonging to the most enriched concepts.)

BioConcept provides a heatmap view of the your gene set and its enriched concepts. To view relationships by using a heatmap view:

[Procedure]

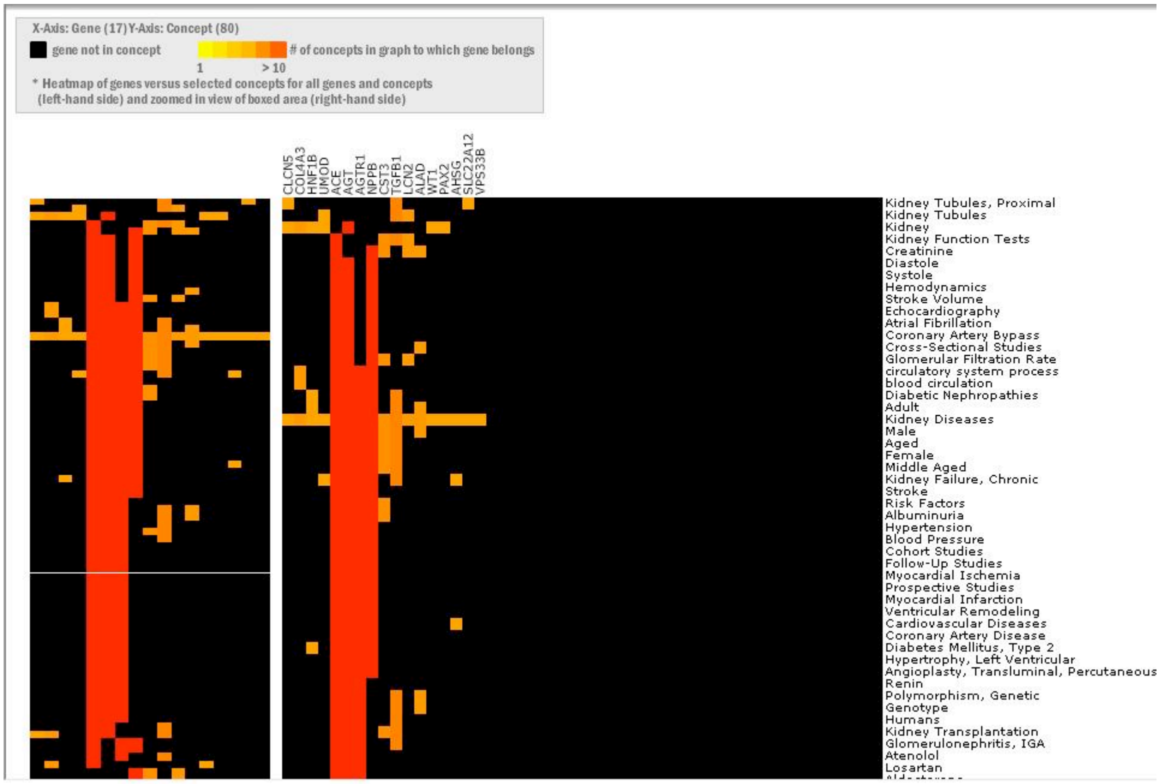
1. In the Concept Explorer window, select the concepts that you would like to view. You may click on the **Select All** link in the chart area if you would like quickly to select all of the enriched concepts.
2. Click on the **Draw Heatmap** button on the bottom of the Concept Explorer window.

Heatmap Viewer

Heatmap Characteristics	Meaning
X-axis	Your gene list
Y-axis	Enriched concepts
Color	Redness indicates number of enriched concepts that include a specific gene

Clicking *Draw Network Graph* button	Displays the Network Graph view
Clicking *NetBrowser* button	Opens a new window that displays a network of protein-protein interactions based on data found in the Mimi Molecular interaction database.
Clicking *Network View* button	Displays the Network Graph view. When in the Network Graph view, this button changes to HeatMap View which allows you to switch between both views.
Clicking *Explorer* button	Brings up Concept Explorer screen (click the X in the upper right hand corner of the Concept Explorer screen to return to the Network Graph View)
Clicking *Export Graph* button	Creates a PNG file format image of the screen in a separate window

1a. Explanations and procedures in the developer-composed documentation. This passage is taken verbatim from an article that is not aimed at the primary user audience. Procedures lack task-driven goals and outcomes as framing devices. Generic operations of widgets are provided instead.



1b.Heatmap view. The screen shot of the interactive visual presented in the documentation lacks labels and other explanations and cues to facilitate interpretations and applied meanings to an analysis objective.

Figure 1. Excerpts from the documentation.

Collins recognizes these problems even without putting the application and manual in front of users. Some of these already apparent problems are likely to require new functionality and interface modifications and will not be quick fixes. In trying to decide next steps she considers that if she were to conduct a user performance test on the artifacts before the already apparent problems are fixed some of these problems would likely block users from moving very far in their analysis. The evaluation consequently would fail to uncover additional serious problems.

On the other hand, Collins clearly knows that running the user performance evaluation now will positively keep production on schedule. Testing now also will turn up several problematic features involved in low level and well-structured tasks – those already apparent and others. Outcomes will lead to some recommendations for ease of use and comprehensibility improvements. But she will not be able to write into the test script many of the complicated tasks that were part of the flow of actions in scientists' analysis. The flaws that Collins can already diagnose in the software and manual put such tasks out of the scope of what users could perform. As a result, large mismatches between Bioconcept and users' complex analytical needs for discovery will remain, and many of them will undermine the usefulness of the subsequent beta version deployed to actual, early adopters. Very likely, these problems will come back to haunt the firm.

Beta version users will be frustrated and skeptical about the quality of the firm's software. These early adopters may be unwilling to commit their goodwill to future trials. Additionally, as Collins knows from prior experiences, needs for major improvements that surface during the beta stage are hard to make because time constraints are tighter, architecture and functionality are fairly fixed, and developers are committed to other projects. These "hard" improvements typically get tabled and projected out to Version 2, Yet if too flawed a Version 1 gets launched, users will not buy, use, or value it.

Collins again considers the implications of deciding to halt testing until further deep improvements are made. This option will necessitate the company investing unanticipated resources into a needs assessment and building in and/or modifying functionality and cues to support the task flows that needs assessments reveal as top priorities for facilitating cumulative, open-ended explorations for knowledge discovery. Once such improvements are made, Collins will be able to conduct scenario-based user performance evaluations that could cover the full scope of tasks that Bioconcept promises to support (Maxwell, 2008). Findings could lead to improvements for both usefulness *and* usability. Collins decides to pursue the second option.

This option will push back the production schedule – but still at an early enough point to make such adjustments without prohibitive costs or revenue losses.

Collins decides to pursue this option. The decision sets in motion additional responsibilities. She must now make a convincing case to management for reallocating resources and altering the production schedule.

Collins's persuasive memo to the management and development teams is different from the usability test reports addressed by the third heuristic question. The persuasive memo, nonetheless similarly serves its goals with audiences best by providing empirical support for the usability judgments that Collins makes. For this support, Collins may informally put the current alpha versions of Bioconcept and its manual in front of a scientific user. A trial user performance can identify successes, flaws, and limits to cite in the report that go beyond Collins's subjective expertise.

Ideally, management will concur. Then the tool and manual will be improved, and afterward Collins will finally conduct the user performance evaluation. After the testing she will report results in ways that effectively "talk" to stakeholders, addressing the issues implicit in the third heuristic strategy.

She will present usability successes and then decide on the structure of the problem sections. Because of her rhetorical orientation, she will organize sections by users' cognitive tasks, that is their demonstrated task-based reasoning and behaviors. For such a scientific analysis, this structure might include sections on users' comprehension of terms; their dependence on cues for staying oriented in a workflow; their understanding of relevant relationships based on specific workspace features, functions and content; their validation of relationships, and the data manipulations they need and expect to do for specific types of task-based goals and reasoning. Structuring the report by these higher order cognitive task experiences Collins reminds readers of the report that choices about design modifications directly impact users' performance and cognition. She will subdivide these cognitive task categories into types of usability and usefulness problems and discuss tool features and functions implicated in each problem (Molich et al, 2007).

For usefulness/fitness-to-purpose problems, she will be guided by the categories synthesized from Sutcliffe et al (2000) and Blandford et al (2008) mentioned earlier in the heuristic question related to writing reports (see Table2).

Collins also includes severity rankings, her recommended priorities for fixes, and suggested designs for fixes. Application problems have behavioral consequences on users' behaviors and reasoning, and readers must be aware of these consequences. She aims for recommendations and suggestions with enough detail to guide the actual implementation of modifications. Importantly, recommended fixes to problems should relate to the immediate causes of usability shortcomings but also take a big picture view. That is, her reports will show that recommended fixes and enhancements will not cause unintended consequences or introduce other problems elsewhere. If they do cause other problems, she will justify the need for the fixes regardless and show how unintended consequences can be remedied as part of an overall improvement. Negotiations of technical feasibility and desirability as well as marketing demands will be part of a discussion that Collins will have with other stakeholders when they meet to review the report. Her severity rankings and criteria will contribute to ultimate decisions about priorities for improvements.

Combined, these various structure and content strategies will add impact to her report. But evaluation reports in themselves cannot carry the weight of the usability influence that

Collins and others like her need to assert in their organization. This influence is ongoing, interpersonal, and instructive. As Collins's case shows, her report on the user performance testing will be one part of a larger flow of communications about the quality and usability of Bioconcept. From her earlier heuristic evaluation report through to her report to management persuading readers to reallocate resources for further improvements before user performance testing, she has been involved in negotiating with diverse stakeholders about improving Bioconcept with convincing evidence. These successful collaborations and shared respect before the usability team and other cross- disciplinary members of the product team and management are preludes to the effective reporting of usability evaluations.

Conclusions

This window into evaluation situations that you might encounter when evaluating software, web applications, and/or documentation reveals that strategic stances are part of the evaluation goals you set, the methods you implement, and the reporting that you do on findings and recommendations to diverse stakeholders.. Strategically, it is important to actively assume the role of usability evaluator and justify your value and suitability for the role to the product team, as needed. Additionally, knowing methods and having a toolkit of skills are necessary but not sufficient. It is vital to use them advantageously. You need to devise goals for evaluation that accord with the situation at hand and select - and possibly appropriately mix - methods. Strategic approaches to reporting are also important, including your choices for framing the content, structure and media of communications to stakeholders in ways that maximize the chances that top priority problems and enhancements will be acted upon effectively. Throughout this evaluation work, you will be establishing your role and identity in the organization as an irreplaceable usability expert whose skills and knowledge in technical communications and other related areas add value to the development and dissemination of products.

Discussion Questions

1. What are some important criteria for judging usefulness? What are some important criteria for judging usability? Where do usefulness and usability criteria overlap and which criteria are distinct for each?
2. Reflect on the following claim by answering 2a and 2b below`:

   Knowing how to evaluate an artifact so that it achieves the purpose of having audiences go along and act effectively on it is a communication and rhetorical art.

   a. Explain what aspects of usefulness and usability, respectively, are rightfully considered communication and rhetorical acts and why.

   b. Define what aspects of usefulness and usability are not communication and rhetorical acts and why.
3. Go to the search pages of your university's library for searching the library collection and databases. Evaluate it using the extract from the Heuristic Evaluation instrument included in this chapter.

   a. Compare your ratings and comments with 3-4 of your classmates. On what do you agree and disagree?

   b. What criteria were you each using to determine "level of severity?" With these 3-4 classmates, try come to agreement in defining severity level criteria.
4. Imagine that you could define any constraints you want as the prevailing conditions of Collins's situation except for changing the state of readiness of the tool and

documentation. Define the situational constraints that you envision and identify the evaluation decisions within these constraints you would make if you were Collins. Give convincing justifications for your decisions.

5. About which of the usability methods mentioned or described above in this chapter do you want to find out more? Why? What would you most like to find out?

6. For what aspects of the evaluation situations and approaches described in this chapter do you feel most prepared? For what aspects do you feel least prepared? Give detailed explanations for your perceptions of your preparedness.

7. Write or diagram all the aspects of a digital workflow or game session about which you know a great deal. Include remembering earlier moves and/or returning to them, keeping track of progress, seeing cues or being able to set them for optimal next moves, moving data or objects around to set up the workspace as desired, combining (aggregating) or otherwise transforming data to further your knowledge and/or intentions. What support from a website or software would a user need if he or she were to do the whole flow fluently?

8. In Collin's case, if you were writing the report on the user performance testing that she ultimately will conduct only to the product team, what elements and content would you include and why? If you were writing to only the Director and marketing group, what elements and content would you include and why? If you were writing to everyone what elements and content would you include and why?

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Chapter 12: How Can Technical Communicators Manage Projects?

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Summary

Technical communicators need to know how to manage projects using both traditional, "waterfall" project management methods and newer, less time-consuming and more user-oriented methods/models such as agile development, iterative design, and extreme programming and documentation.

The most logical heuristic for project management is a flowchart that includes the universal characteristics of any communication project regardless of the method/model employed. That chart includes the project phases of planning, research and information gathering, composition/invention, reviewing and/or testing against quality criteria, revision, production, and dissemination. While technical communicators might not perform all phases on all projects, they need to be aware of which ones they are omitting and the possible repercussions of doing so. This chapter will discuss the various methods/models and how each of the phases is envisioned and implemented within them.

Highly related to project management is the concept of time management, which is necessary for communicators to understand and use if they are going to succeed at managing their projects and meeting their deadlines. In some organizations, project and time management technologies are combined and carried out simultaneously. Communicators should learn and use the technologies that others in the organization use to manage both their time and their projects.

Introduction

Scenario

Ann Ross is a technical communicator who works for a financial services company that develops stock and securities management software and point-of-sale hardware/software systems. She is currently working on three different projects: (1) a project to develop online help for a Web-based portfolio management program that will be the company's first Web-delivered program, (2) a user's guide for a small point-of-sale system that is in the first draft stage and that will be delivered as hard copy with the product and as a pdf file online, and (3) a set of marketing materials for a large point-of-sale system aimed at department and chain stores where dozens of machines will be configured in a network at each store.

Ann needs to have some systematic method of working on each of her three projects. In order to describe how Ann handles her multiple projects, we will first review some of the more important literature about project management for technical communicators. We will then look at the methods used by communicators to manage projects such as Ann's, including planning, research and information gathering, composition/invention, reviewing and/or testing against quality criteria, revision, production, and dissemination. We will look first at the more traditional project management methods and then at some more current, alternative methods intended to make projects more efficient and more likely to meet the needs of audiences. We will also examine the tools and technologies technical communicators use for product management, before concluding with a more detailed look at how Ann works through her three projects.

Literature Review

The two most important books on technical communication project management are JoAnn Hackos's *Managing Your Documentation Projects*, published in 1994, and the expanded and revised version, entitled *Information Development*, published in 2007. These books offer a complete, overall explanations for how technical communicators can manage their projects to achieve consistently high-quality results. Critics might argue that the system that Hackos describes is so complex that very few organizations would ever agree to follow it. My experience, however, is that there are organizations that do nearly everything that Hackos advocates, and that, more importantly, organizations that do very few of her steps usually produce inferior information products. Only two other books have been completely devoted to technical communication management issues, *Publication Management Essays for Professional Communicators*, edited by Allen and Deming, has a section on project management with chapters that in some cases are somewhat dated, but they nonetheless offer sound overall advice. My book, *Management Principles and Practices for Technical Communicators*, does treat some aspects of project management, especially as related to estimations (127-137) and to personnel management on projects (23-110), but it is largely aimed at covering other management practices.

For an area that is as critically important to technical communication as project management is, it is surprising that there are not more articles in the literature dedicated to the subject. The articles tend to be either descriptive, describing current project management practices, or prescriptive, offering methods to follow, or, in some cases, both. One classic is Hackos's article (Hackos, 1997) explaining the process-maturity model, a method for assessing the maturity of an organization's project management and quality assurance methods for developing information products. Hackos borrows from similar maturity models in the software literature to construct a five-level system that ranks organizations as Level 1 – Ad Hoc, Level 2 – Rudimentary, Level 3 – Organized and Repeatable, Level 4 – Managed and Sustainable, and

Level 5 – Optimizing. This model has helped organizations analyze how mature their own information process systems are and has helped technical communicators educate upper management about the need for more sophisticated project management systems for information development. Another important article is Carliner's survey and study of the management portfolios in large technical communication groups (Carliner, 2004). Carliner provides detailed analyses of current project and people management in the field. While not addressing project management directly, Whiteside's article (Whiteside, 2003) analyzes the skills that hiring managers consider most important for technical communicators, and project management ranks high on the list.

The Society for Technical Communication's annual conference proceedings contain a section on management each year, which usually includes some presentations on project management. Typical presentations might cover how to manage projects using a particular piece of project management software, how to manage relationships with other project team members, how to develop high-performance project teams, and other similar topics. However, the two-page limitations for entries in the proceedings abbreviate the presentations to the point that they are rarely helpful for someone who did not attend the session.

Works on Specific Aspects of Project Management

Most of the other books and articles about technical communication project management treat one particular aspect of it, such as estimation or audience/task analysis or agile development methods. For example, working remotely with virtual teams, including international teams, is treated in Duarte and Snyder's *Mastering Virtual Teams: Strategies, Tools, and Techniques that*

Succeed. Larbi and Springfield approach virtual teams from the point of view of the writers working on them.

Estimation

Some technical communicators do not worry about estimation; they are simply assigned to a project that has already had its communication resources designated. This can be a problem if the designator was someone outside of technical communication who does not understand the time and resources necessary to develop quality documents. Other communicators spend considerable time and effort making estimates for projects. In the case of technical communications companies and consultants, good estimates are critical for staying in business. Hackos (1994, 153-195; 2007, 436-442) has extensive discussions of estimating, including methods for estimating various media such as paper, online, training, and video; as does Dicks (2004, 127-137) who offers a formula for doing estimates for both paper and electronic deliverables. David L. Smith's chapter (1994) is based strictly on performing estimates for paper pages, but it nonetheless has some solid estimation concepts. Judith J. K. Polson (1988) discusses the importance of preparing good estimates and provides a formula to help visualize the complex relationships among quality, functions, resources, and time on a project. Peter Zvalo (1999) discusses the differences between fixed cost (where a project is done for one, total price) and hourly charges (where communicators' work is billed by the number of hours worked times a cost per hour).

Task Analysis

In the research phase of their projects, technical communicators must find out who their audience will be and what tasks that audience will need to accomplish using the information being developed for the project. Hackos and Redish's *User and Task Analysis for Interface*

Design (1998) provides full methodology for analyzing audiences and their tasks. The authors repeatedly stress the importance of working directly with end users of products under development to find out how they will use the product and what designs will optimize that use. In a similar vein, Houser (2001) argues that technical communicators should create and maintain databases of user characteristics and usability information. Such databases will help them to plan their projects in the future while ensuring that the projects address user needs. Deborah Mayhew in *The Usability Engineering Lifecycle* (1999) provides extensive instruction on how to develop user profiles and to analyze the tasks that those users perform. Todd Warfel (2006) has developed a task analysis grid that designers and communicators use to aid in analyzing audiences and their tasks.

Alternative Methods

The most traditional project management system is called the "waterfall" system because a diagram of its steps, with time allotted to one milestone and then to another and another and so on, resembles a sloping, downhill, left-to-right waterfall. Because the "waterfall" system can lead to lengthy development times and to products that do not suitably meet the needs of customers, practitioners have developed project management methodologies that are aimed at reducing design and development time while also assuring that products do indeed meet customer needs. Three of the most commonly practiced alternatives are user-centered design (sometimes called iterative design, because it is based on determining user needs, designing to those needs, testing the design against those needs, redesigning based on the test results, testing again, etc., until the user needs are met), extreme programming (wherein programmers or technical communicators work in pairs to develop materials that are determined by user "stories," (testing what they develop with users, revising, testing again, etc., until the products meet the user requirements as expressed in the stories), and agile development (wherein project team members work in close proximity, meet daily, and concentrate their efforts on small parts of larger products, also testing them iteratively against user "stories"). Lewis and Gould's 1985 article issued a challenge to developers to make their designs more user oriented and their methods more involved with frequent testing, redesign, testing, etc. to better meet the needs of customers. Nielsen, Rubin, Dumas and Redish, and Barnum have all provided books that treat usability testing and user-centered design. Extreme Programming has been exhaustively described in a series of books in the "XP Series" published by Addison-Wesley led by Beck and Andres's *Extreme Programming Explained: Embrace Change* (2nd Edition) (2004). Nuckols and Canna explain how they have adapted extreme programming to result in "extreme documentation." Agile development was started by a manifesto published on the Web (http://agilemanifesto.org/) and has been championed by the Agile Alliance at http://www.agilealliance.com.

Heuristic

The "standard" project phases for technical communication work include planning, research and information gathering, composition/invention, reviewing and/or testing against quality criteria, revision, production, and dissemination. Depending on the nature of one's work environment and the nature of a specific project, those phases may be performed by a single communicator or by a team. It is important for a technical communicator to know how to perform each of the phases, even if their current work environment does not immediately require it.

Quality Process Requirements

It is important to conduct activities that add quality to information products while they are under development. Such activities include the planning at the beginning, determining the types of documents or structures of topics that will be used, meeting with customers or effectively gathering information about them, conducting expert review of drafts during development and performing some kind of validation assessment to ensure that the information products are accurate, doing some kind of usability assessment to determine that the documents work with their audience, performing copyediting of the finished products, and, if necessary, performing production assessments to ensure high quality printing or appropriate uploading of files to servers.

Planning

Hackos (2007) recommends that 30 percent of a technical communication project should be spent on planning and design, before the first word is written or the first image is created. In mature organizations, communicators devote significant time to learning the organization's goals for a project, studying the users and the tasks they will be performing with the product or service under development, and designing information products that meet the goals both of the internal organization and the external audience(s). The communicators must also determine which media to use to disseminate those information products given the contexts in which the products will be used.

In this stage, the communicator examines any available documents that explain the product and what it will include. In hardware projects such documents usually include engineering specifications and drawings. In software projects they usually include a requirements document that describes how the program will work and that may contain proposed screens and interfaces. The communicator also analyzes the tasks that users will complete and endeavors to design an information product that will allow users to perform their desired tasks best with the product or service as it is described in the specifications and requirements.

Technical communicators can take one of two main approaches to planning and structuring information products: the document-based approach or the topic-based approach. The document approach assumes that traditional documents will be delivered, whether on paper or online. Such conventional documents might include installation guides, getting started guides, user guides, instruction manuals, training manuals, procedures manuals, maintenance manuals, etc. Sometimes the delivery of manuals is dictated by conventions in the industry or within the particular organization, and technical communicators may have little say in what information products they will produce, even if those products may not be the best solution. Communicators attempt to structure their documents so that they match as well as possible with the tasks that the user needs to complete, although they frequently receive considerable pressure from engineers, programmers, and scientists to create documents that describe the system and each of its parts thoroughly.

Another approach to designing information products is to use topics. The topic-based approach requires that the communicator make a list of every task and sub-task that a user will need to perform, envisions the conceptual background information that users will need to know to be able to perform the tasks, and obtains or creates any reference materials (tables, charts, drawings) that users will need to perform the tasks. Each task, sub-task, piece of conceptual information, and reference item becomes a topic. The communicator develops an entire list of the topics, and, just as with documents, imposes an organizing structure on them that will suit user needs for various purposes. One of the advantages of the topics approach is that the topics can be rearranged to create various types of documents. Once all of the topics are created and put into a database, different front ends can be designed to show the topics in different orders for use in different types of documents or in different media. For example, a training document typically calls to a linear path through increasingly more complex information, and a communicator can create a manual that gets the topics in such an order. On the other hand, a reference document requires that topics be arranged in a way that makes access easy but where they do not have any linear or hierarchical relationship to one another. So, the communicator perhaps arranges the topics alphabetically, or according to which part of a system they relate to, or bunched with the larger tasks that they are part of. Such databases of topics make possible what is called single sourcing, where topics are developed once and then used in multiple types of information products.

The planning stage typically concludes with the publication of a documentation plan or information plan that includes a discussion of the project's goals, the audience and their tasks and information needs, the proposed information products that will be developed, outlines or topics lists for those products, initial estimates of the time and resources that will be required, and milestone dates by which drafts will be sent for review and the final document(s) will be completed. Even if they are not required technical communicators should always develop documentation plans and disseminate them to everyone associated with a project. In mature organizations, such planning is always done and the plans must be approved and signed off on by all of the appropriate internal groups.

Research and Information Gathering

In this stage technical communicator research users and their tasks and put together as much information as possible to inform themselves and their coworkers as to what types of information products to deliver and how the information within those products should be structured. The sources for the information will likely be varied. As mentioned in the prior section, there may be specifications or requirements documents. There may be marketing survey information or focus group videos or transcripts. There may be information from customer support people about which aspects of the product or of similar products most often vex customers. Communicators should try to interact with customers directly to get information about how they will use the product or service to complete their tasks. This can be in the form of field visits, sitting in on training classes, accompanying installation or maintenance teams on site visits, sending out questionnaires, doing some telephone interviews with users, doing an online survey, etc. Other methods might include getting users to help participate in the design process by inviting them to join a blog or a wiki devoted to the information development effort.

It is important for communicators to seek information actively rather than to wait passively to be handed the information. Developers report that they wonder what value communicators add when the developers have to write up technical descriptions and the communicators simply “wordsmith” them or “pretty them up.” Communicators should gather information aggressively and should not rely totally on subject-matter experts (or SMEs, as they are often called) to supply everything.

Once the communicators have enough information gathered, they can continue the planning process, ensure that their original plans were appropriate or modify them, further fill out the structures they intend to use for their documents or topics lists, and prepare to begin developing their information materials.

Composition/Invention

This is what most people think of as technical communication. This stage is so associated with technical communication that even many communicators believe they should bypass planning and information gathering and immediately begin drafting documents. They may also receive pressure from co-workers to start writing and stop doing so much planning and researching. Despite these pressures to begin developing information immediately, bypassing the important planning stages leads to information products that are not effective with their intended audiences and often leads to high development costs because documents or topics have to be written and rewritten over and over as the lack of an overall information design means that the optimum structure for the information must be discovered through trial and error as it is being developed. More likely, the optimum structure will not be discovered and inferior information will be delivered.

Once the planning and information gathering have been adequately completed, actual writing of the documents can begin. It is a good idea to develop a detailed schedule of deliverables for reviews, whether those are internal reviews with one's boss or the information team or larger reviews with the entire project team. Writing a 200-page document without having anyone look at any of its parts, or developing 200 topics without having anyone review any of them is likely to lead to extensive rework. Further, the tendency to procrastinate and then have to work considerable overtime is mitigated by having numerous smaller deliverables due with short intervals between them.

Project Management Record Keeping

Project management is often associated with record keeping, such as tracking hours worked, milestones met, money spent, etc. While some of that activity begins during the planning stages of a project, it begins in earnest during the composition stage, which is also the stage that many people associate with true project management. It is at this stage that communicators break the work down into smaller deliverables (which might include chapters, or sub-chapters, or topics), establish due dates for all of the deliverables, and track their progress against those dates. This is also the stage where communicators are concerned with keeping records of the hours they spend on each information product and on the project overall. Mature organizations develop standard methods for reporting time spent and progress made. Many technical communication managers require a weekly report that briefly describes progress made, problems encountered, and the hours worked on each type of deliverable. It is important for an organization to track and to know how many hours it took to do everything so that they can do better estimates in the future when similar information products must be developed.

The "default" completion of the composition/invention stage for technical communication involves delivering a first draft for review to the development team and to other interested parties, which might include customer support, sales and marketing, and, in some cases, legal. It is important for technical communicators to define in their documentation plans what will be included and will not be included in the first draft of a document. In some organizations it is expected that the draft will be complete while in others it is permissible to have some gaps in the information. In some cases, it is expected that all graphics will be included, while in others it is permissible to include only rough hand sketches or simply labels. With publication software making formatting and layout "easy," many people expect the first draft to look like a finished document.

Reviewing and Testing Against Quality Criteria

Most technical communication work involves what is often called egoless writing. While there may be a technical communicator who is ostensibly in charge of the document, many other people contribute to, review, criticize, and affect the final form that the document takes. Technical communicators must learn not to own documents in the same way they owned academic writing or personal writing. In fact, in most technical communication work, the communicator will not be identified at all, so the writing is, truly egoless (Weiss).

Reviews are generally carried out in one of two ways: individual reviews and table-top reviews. Individual reviews, the more common of the two, involve the communicator sending to the reviewers a paper version of the document, or, if it is an electronic document, the files or a link to the files. Frequently, a transmittal sheet accompanies the document, reminding reviewers of the deadline date for returning the draft and pointing out any special concerns about missing information or incomplete sections that reviewers should focus on. Reviewers mark up the paper copy or add comments to the electronic files with corrections of factual errors, additions for missing information, copyediting, style suggestions, and anything else that they believe would improve the document.

The second type of review, the table-top review, involves all interested parties meeting and going through the document, page by page or screen by screen. This is most efficient when reviewers have previously received the draft and had time to do individual reviews prior to the meeting. Sometimes, however, there is not enough time to do so, which means that the review team reads through the document incrementally during the table-top session. The technical communicator takes notes on suggested changes for use later when making the revisions.

The first draft of a document is often the first place that includes an overall picture of the product or service that is being developed or the communication that is being put together. For many of the reviewers, it will be their first overall view of the project's intended output. In some cases, serious disagreements can break out about the direction of the product, service, or communication. Communicators and the team members work together to compromise and to arrive at a final configuration that will work as well as possible from the varying perspectives of the team members.

Revision

At the conclusion of the review process, the technical communicator is left with a pile of marked up paper documents or one or more electronic files with reviewers' comments. The paper documents require that the communicator conduct what amounts to an individual table-top review, going page by page through all of the documents at once (my record was twelve review copies). The communicator creates a master copy to which he/she marks up all of the suggested changes from reviewers, making special note of those places where reviewers' comments are unclear and require further elaboration or where two or more reviewers' comments conflict. Those incidences will require that the communicator get clarifications and resolve conflicts with the reviewers. In the case of electronic documents, some publishing systems support comments from multiple reviewers, such that there is only one electronic file and each reviewer goes in and adds his/her comments. This has the advantage that the reviewers see each other's comments and can perhaps solve any conflicts during the review process. However, these systems tend to become unwieldy when more than a handful of reviewers use them.

The communicator takes the master paper document or electronic file and goes through making the suggested changes, adding any new information that has been developed while the document was out for review. The document then, typically, goes out for at least one more review cycle. While the default number of review cycles may be two, many types of documents, such as grant applications, proposals, sales materials, policy statements, and government filings may require multiple reviews over a period of weeks and even months.

With the last review communicators often perform some kind of checking or testing to help ensure the quality of the documents. Many organizations employ quality checklists against which an editor, peer reviewer (another technical communicator), and/or supervisor goes over the documents to verify that they meet organization standards for technical accuracy, organization, grammar and spelling, page layout, style, consistency, any industry standards that must be met, and any other criteria important to their audience and their industry. For hardware and software, some form of verification testing is usually performed, wherein the communicator, an editor, or perhaps a designated testing expert goes through the document and performs every task in order, to ensure that the document is accurate and contributes to the safe, effective use of the hardware or software.

Another form of testing, usability testing, is sometimes performed also. Here, the document is tested with an audience of users or people who are as similar as possible to the audience to see if they can successfully and efficiently perform the tasks with the product that users are most likely to want to perform, and to assess their attitudes toward the product. Usability testing is better done earlier in the process when there is still time to make significant changes if major problems are uncovered, but because it is difficult to test with a less than complete product, the testing is often done around the same time that verification is done, sometimes in conjunction with the verification testing.

At some point, either because a deadline date has approached and no further changes can be made, or when everyone on the review team agrees that the document is ready for release, the technical communicator creates the final copy and prepares it for production.

Production

Production is the process of preparing the final information product for use by its intended audience. Production can be as simple as saving a file in some screen-readable format (such as pdf) and posting it to a Web server, or as complex as having multiple sets of documents printed, copied to CDs or DVDs, and posted online in multiple formats. The process can take a few minutes or several months. Especially for more complex projects requiring creation of several documents and several media, production must be treated like a project in itself, with milestone dates for tasks such as delivery of files to printers, shipment of printed materials to suppliers, linking of help files with associated programs, and mounting of files on servers.

Other tasks often done during the production stage include indexing and translation/localization, which should also be treated themselves as projects within the larger project. While final indexing of a paper document cannot, obviously, be done until the document and page numbers are final, many of the tasks for creating an index can and should be done earlier, such as coming up with the terms to be used, inserting synonyms users are likely to know with cross references to the terms used for the product or service, inserting index entries directly into the document file (if the publishing software being used allows), and deciding which entries for a term are the most important. Translation and localization refer to both translating documents into a language and making sure it will work with the versions of the language for which it is intended (for example, South American Spanish versus European Spanish). While translation cannot be completed until the document is complete, tasks associated with it can be done earlier, such as providing the translator with a glossary, sending drafts so the translator can estimate the time required and send a sample translation back for checking, and writing with a minimal vocabulary to make translation easier.

For paper documents production requires printing. This can be as simple as making copies on a copy machine or printing multiple copies on a laser or inkjet printer. It can also involve working closely with a printer, specifying cover paper weight, text paper weight and type (clay, rag, cotton, and other materials are added to paper to give it different textures), binding type, and all of the other aspects of printed documents. Some large organizations have a separate production group that takes care of all of the production activities, while many smaller organizations must either hire outside firms or do the production themselves. With improvements in production technology, including inexpensive color laser printers, technical communicators can now perform production tasks that once could be done only by expensive printing presses, and many organizations have taken advantage of the technologies to drastically lower their production costs. They can achieve even greater cost savings by moving from printing to dissemination via various electronic media, as discussed in the next section.

Dissemination

In the dissemination stage, documents are delivered to their intended audiences. In some organizations technical communicators are involved with ensuring that printed documents are delivered to the factory or warehouse from which they will be shipped and may also be required to copy help, document, and Web site files to servers so that customers can access them.

Agile Project Management Models

Performing all of the tasks outlined above in the traditional project management model can require considerable time and effort. This traditional model is often called the “waterfall” model because a diagram of its steps, with time allotted to one milestone and then to another and another and so on, resembles a sloping, downhill, left-to-right waterfall. The waterfall method is well understood and comfortable for many developers, but it is not the most efficient model, and following it can mean that organizations miss in designing products and services that are appropriate for their audiences. Hence, several alternative models for managing projects have been developed. Three such models are user-centered design, agile development, and extreme programming.

User-Centered Design. In user-centered design, rather than developing the engineering specifications or program requirements used for waterfall methods, developers create user cases, which means that they put together typical strings of tasks that users would need to employ in their “real world” work with the product. For example, a user wanting to employ a spreadsheet program to prepare an annual budget would have multiple tasks: filling in the columns for the months, listing the budget items in the left-hand columns, populating the fields with the actual budget amounts, inserting formulas at the ends of columns and rows to add up annual totals, saving the file, and printing the document. For each of those tasks, developers prepare a module, test it with users to make sure it works, redesign and test again if it does not work, and repeat the cycle until the task can be successfully completed by users with the required speed and efficiency. Due to its repeated development and testing cycles, this model is also often called iterative design.

Agile Development. In agile development, audience members and developers develop "stories" that are scenarios of user tasks to be performed and features needed to be able to perform those tasks. Such stories are similar to the user cases developed in user-centered design. The stories also describe how the processes will help the users achieve their desired results. The developers then design modules that lead to those desired results for each task, with constant customer interaction and testing to make sure that the design will meet their needs. The modules are developed in intensive, short work cycles. At Lulu.com, for example, agile developers, including the technical communicators, work in two-week cycles, so that each module is begun and completed in two weeks, or, in rare cases, longer if required (Fox). Agile teams work together intensely, preferably in the same physical space, and are largely self-managed. Agile development is also an iterative design method, and agile developers assume that each module they work on will undergo several rounds of development and testing. This may sound as if it would be difficult for technical communicators because they have to try to explain processes that are being developed rapidly. However, agile development teams work together very tightly and often include the communicators right from the beginning, which helps the communicators contribute to the overall design of the product and to better understand the philosophy behind the product and its operation, as they will have worked on each module straight through.

Extreme Programming. Extreme programming is similar to agile development in that it is based on user stories. The stories feed into the design in the planning process and again in the testing process, when test scenarios based on the stories are used as the criteria for determining whether or not the product has achieved customer approval. Again, iterative design is used, with constant cycles of development and testing until each part of the product meets the customer test scenarios successfully. An interesting aspect of extreme programming is that it calls for developers to work together in pairs, which ensures that if someone leaves there is still someone who understand what that person was working on. Similar to other agile development methods, extreme programming teams work closely together and there is great transparency; all team members can see one another's work at any time. Nuckols and Canna (2003) describe a process they call extreme documentation, and they detail numerous advantages for technical communicators using such a system over the more traditional waterfall methods. On their extreme project, they sat with the programmers, which they reported to improve communication and respect among the team members. They also worked with the same customer stories and acceptance tests as the programmers, and developed and tested documentation modules alongside the programmers' development of the software modules. The result was less time pressure as the project neared completion and a greater sense that what they had developed was "complete and accurate."

While most project work is still done using those traditional waterfall methods, the newer, more agile methods are being employed more often to reduce schedule durations and to get more usable products and services delivered more quickly. Technical communicators should know the steps for the traditional methods, but many will have to learn to manage products using alternative management models.

How Tools, Technology Are Used

Technical Communicators generally use several tools for product management. The four most important technologies are spreadsheets, project management software, Web-based collaborative and project management systems, and time management systems.

Project management involves tracking dates and budgets, and it is natural that spreadsheets are often used to do so. There are many project management-related spreadsheet templates available, both delivered with the spreadsheet software and available on the Web, ranging from free, simple templates to elaborate collections with sheets for nearly every conceivable project requirement. With projects that last a few months or less and that have budgets in the hundreds of thousands or less, spreadsheets can provide sufficient automation for project management.

With larger projects that have longer durations, dedicated project management software systems are often used. Microsoft Project is one of the most popular, but there are many alternatives, which range from free, fairly simple systems (see zoho.com, for example) to massive systems designed to manage large multi-year, multi-billion dollar projects such as shopping malls and power plants. Most communicators can do well enough using spreadsheets, but if the larger organization uses another system, the communicators should learn the system and use it for tracking their time and expenses, just as other developers do.

Increasingly, Web-based solutions are appearing for collaborating on projects and keeping track of schedules, budgeting, exchanging documents, communicating, and managing all other aspects of a project (see eproject.com, for example). With more and more work teams distributed geographically rather than centrally located, and with broadband speeds increasing, a Web-based management system works much more effectively than a system on a local network that cannot be accessed by those who are working at other locations. Web-based systems allow team members to be dispersed around a country and internationally. The systems provide messaging systems both for instant communication and for leaving messages and files for someone who is in another time zone and not working at the same hours.

Because most technical communication work is project-oriented, communicators work against a number of deadlines when drafts and final versions are due. A communicator who is working on several projects, not an uncommon scenario, may have dozens of dates to keep up with and deliverables to send out over the course of a few months. On top of the delivery dates, the communicator may have numerous other dates to track, including multiple meetings and appointments each week. Further, many communicators find it valuable to maintain lists of "To Do" items, tasks that they need to perform in the short term and over the longer term. The short-term tasks are usually associated with the immediate projects they are working on, while the longer term tasks are usually more conceptual and concern goals that will require protracted effort and cannot be completed in a few minutes or hours.

Keeping track of all of that data quickly becomes impossible without some kind of system, so most communicators use some type of time management system. There are several paper systems available for project management. Such systems can be maintained on paper, although for people with multiple projects and tasks, paper-only systems can become cumbersome. Franklin Covey (at franklincovey.com) and Daytimers (at daytimers.com) make the two best-selling systems, which include notebooks from pocket size to full-sized, 8-1/x11 three-ring binders, accompanied by tabs and forms that allow record keeping for almost any conceivable time and task. The Franklin Covey system is based on Steven Covey's famous book on time management, *The Seven Habits of Highly Successful People*. Another popular paper system is based on David Allen's *Getting Things Done*.

There are several types of more automated systems. Many email programs include the ability to track dates and to add “To Do” lists. Some, such as Microsoft’s Outlook, allow members of a development team to see and to access each others’ appointment calendars to make scheduling easier. There are also software add-ons for email programs, such as Franklin Covey’s PlanPlus, which runs with Outlook or independently in Windows. There is also a Getting Things Done Outlook add-in, based on the methods described in Allen’s book.

Some communicators prefer to use personal digital assistants or cell phones with appropriate software to keep track of their appointments and “To Do” items, so they will always have the information with them. Others prefer to keep their project management systems on their laptops. Some use multiple systems, with a main system on their desktop computer and daily printed sheets to go in a pocket notebook.

Technical communicators should develop a time management system that allows them to meet all of their deliverable dates and to be aware of their meetings, appointments, and action items. If their larger organization uses a standard method, they should strongly consider using the same method.

Extended Example

So, how will Ann Ross manage her three projects: a Web-based portfolio, the paper and online documents for the point-of-sale system, and the marketing materials?

She will do so by working her way through the stages we have discussed here, going from planning through dissemination.

For the Web-based portfolio, Ann is gathering information about the planned portfolio management program. She does so using several methods, including sitting in on programmer’s planning meetings, reading over the original requirements document specifying how the system will work (including rough sketches of its user interface), looking at existing portfolio management programs on which the online one will, in part, be based, and meeting with two customers who currently use her company's standalone portfolio management program delivered on a CD. When she has finished with her research, Ann will prepare an information plan specifying the overall structure for the help system including its main headings, a list of all of the topics that will be included, an estimate of the time it will take to prepare them, and the milestone dates by which she will deliver the topics to programmers and test personnel for their review. Once the programmers, testers, project manager, customer support manager, and marketing representatives on the project team sign off on her plan, she can begin work developing the topics.

For the small point-of-sale system aimed at establishments with one or two cash registers, Ann has gone through the planning stage where she sat in on Marketing's focus group with small-store owners and listened to their responses about how they used their point-of-sale systems and which tasks were most important and were used most often, where she read over the engineering and software specifications for the system, and where she regularly attended meetings with hardware engineers and software programmers to learn of their plans for the system. She developed her own plan, which was approved by all, and has now nearly finished the first draft of the system. She has a firm set of dates by which the first draft will be delivered, she will receive review copies back with corrections and comments, she will incorporate all of those and make further revisions based on the progress of the product development, deliver the second draft for review, receive "final" comments back, and then prepare an index and perform a final quality check before sending the final copy to go to the printer and saving it as a pdf file for online delivery. She also has dates for when she will send the final draft to translators in France and Germany, she will receive the first-draft translations, will have the drafts reviewed by employees fluent in those languages, will send the translations back for a second revision, and will receive the final translations for printing and conversion to pdf's for online delivery.

For the marketing materials, Ann went through the planning stage by reading through Marketing's description of the large department stores and chains that purchase multiple, networked point-of-sale systems and by attending joint marketing and engineering meetings when details of the system were being negotiated. After her plans for the materials were approved, she has sent them through several review cycles with the Marketing personnel, who, because of how much revenue such systems produce, want to get the materials just right. She had originally planned for only two reviews, but the extra review cycles caused by Marketing's lack of certainty have caused her to work overtime for the last three weeks to meet the final deadline date, which was not changed. She has dates by which she will deliver the materials to the printer, will go to the printer during the print run to do spot checks for quality, will receive the final printed copies, will do further spot checks to ensure quality, and will deliver the materials to Marketing for dissemination.

Even though the three projects involve three very different information artifacts—an online help system, a paper user's guide, and a set of marketing brochures and flyers—Ann has followed the same basic set of steps for each of the projects. She has had to perform planning and conduct very active research to gather raw data about the various systems. She has then had to impose some sort of structure on that raw data so that it moves from being raw data to information. She has then had to further structure that information and deliver it in various media so that it provides knowledge to its readers. In some cases, she has had to provide that knowledge in ways that lead to performance of tasks by those readers. Hence, she has gone through the process of gradually converting raw data into something that allows users to perform various tasks, following this conversion sequence:

Raw data→information→knowledge→performance.

She has used a consistent process to achieve that transformation, including steps for planning and conceptualizing, imposing structure based on audience needs, developing drafts and sending them to other team members for review, revising and sending again, preparing the materials for production, managing the production and, as necessary, translation processes, and delivering the completed online and hardcopy media. To get all three projects successfully completed, Ann has to manage her time effectively, switching from one project to another as information became available and as deadlines approached. Without a time management system that keeps a record of her To-Do list and the dates by which all of her deliverables are due, she would have no chance of getting everything done on time.

Conclusion

Estimates are that technical communicators spend only 20-30 percent of their time writing (Carliner qtd. In Hoffman). That means that they must spend much more time managing the other aspects of the projects on which they work. Those aspects include the steps we have followed: planning, research and information gathering, composition/invention, reviewing and/or testing against quality criteria, revision, production, and dissemination. Even if communicators are using alternative overall project management techniques such as agile development, they still go through all of the necessary steps. They do so perhaps in greatly compressed time periods and on much smaller modules, but to design and develop quality information artifacts, they will still have to perform the basics. While excellent writing and editing abilities are necessary skills for technical communicators, they are not sufficient. To be successful and to create quality, communicators must develop project management and time management skills that allow them to complete their projects successfully.

Discussion Questions

1. If the traditional, waterfall method for managing projects is so time-consuming, why do some organizations still use it?
2. In the planning stage, how does a technical communicator read and understand engineering specifications or programming requirements documents without being an expert in the field?
3. I thought that technical communicators wrote things, yet this chapter talks about all kinds of user analysis and planning and project tracking and testing and other activities. Can't you get a job where you just write?
4. If technical communicators do have to perform all of these tasks besides writing, what percentage of the average technical communicator's time is spent actually writing or editing? Are there technical communication jobs where they actually do little or no writing?
5. Why does a technical communicator need to know all of this? Isn't there project management software that handles it?
6. There is a lot of discussion here about reviewing and testing and revision. Don't technical communicators usually write a draft, have it reviewed once, make a few corrections, and then send it to production or straight for dissemination to the audience?

7. More and more organizations are publishing their information online. Shouldn't we be able to reduce the production stage to simply saving something as a pdf and posting it to a website?
8. Do I need to learn more about the agile development methods before I go out to try to find a job, or will organizations using such methods assume that they will train me?
9. How do social networking and media affect the nature of technical communicators' work and the methods they use to manage their projects? Using such networking, would they still have to go through all of the steps listed in the heuristic?
10. Following up on the Number 9 above, how would the heuristic apply specifically to a blog or a wiki, where development of information is not planned in any traditional way but rather is ongoing, iterative, and cumulative?

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Section Four:

Developing Field Knowledge

Introduction

The final section of the book completes the first turn on what will be an ever-cycling wheel. Throughout your career you will move back and forth between specific and broad issues facing technical communicators, between contexts for work and applications and approaches for doing work. In Section Four, you will see ways to focus on advancing knowledge about technical communication by bringing in perspectives from related fields, translating (and often challenging and revising) knowledge and skills from these other fields to help you solve novel and emerging problems in your own work (Figure 4). The questions addressed here provide you with a new set of concerns and tools for rethinking some of the approaches and concepts we started out with, helping you to make those approaches and concepts even more flexible and useful.

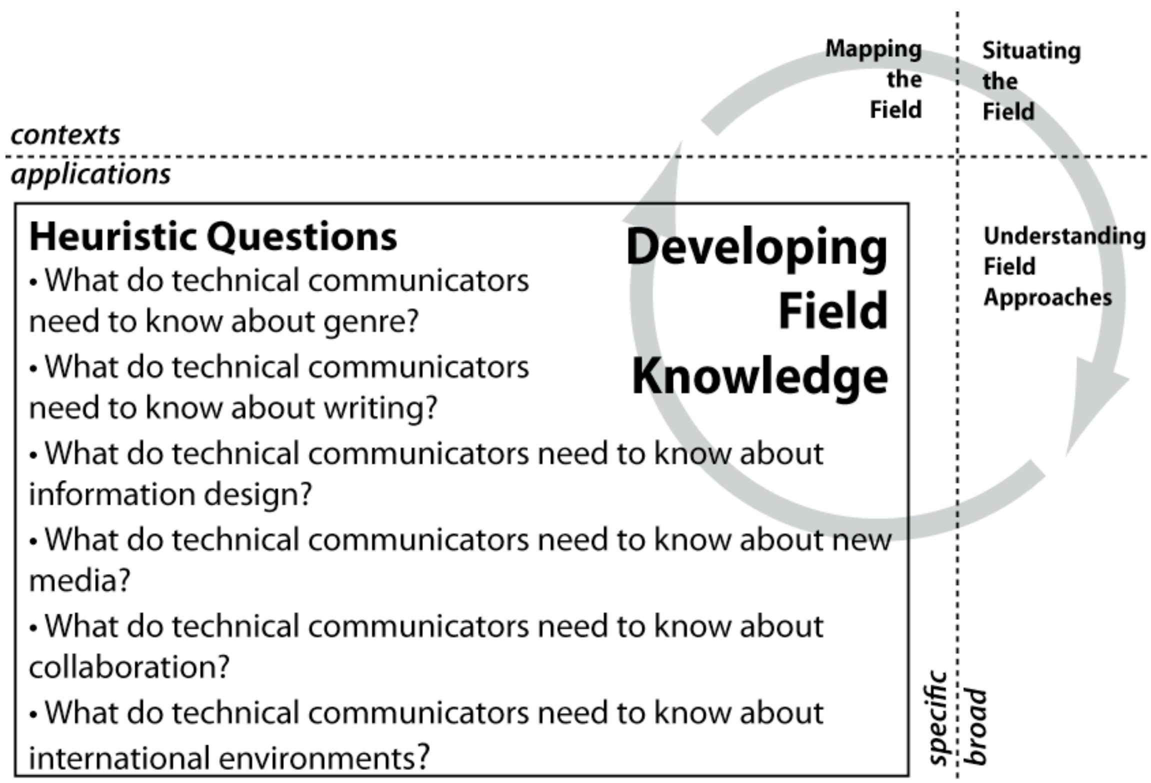

Figure 4. Heuristic Questions for Developing Field Knowledge

In "What Do Technical Communicators Need to Know About Genre?" Brent Henze begins with a very basic but often confusing question: What genre (or type of document) should a technical communicator develop to address a problem? As the genre specialists Henze draws on argue, this issue is more complicated than it seems because document types and formats change from one context to another, even though we often fail to realize it. Only the simplest problems and contexts allow you to take a type of document from one context and use it to easily solve a problem in another context. Successful technical communicators, Henze points out, need to examine genres in their original contexts, understand how they work there, then carefully revise those genres (often combining them with other genres) in ways that meet the needs of new problems and contexts.

In re-examining the issue of what format documents should take, you can also begin to see that technical communicators often do very different types of writing and communication from one project to the next or from one organizational context to the next. Ann M. Blakeslee and Gerald J. Savage's "What Do Technical Communicators Need to Know About Writing?" draws on extensive surveys of working technical communicators to illustrate the wide variety of types of writing that go on in the workplace. Blakeslee and Savage go beyond just describing the state of the field, however. They use this data to show ways you answer these questions for yourself in new work situations: What types of writing do I need to learn to do here in order to be successful? How do I learn how to do it?

Although the term "writing" may have once worked to describe what technical communicators do, in many cases "writing" has expanded from lines of words in sentences and paragraphs to the much larger and more general issue of information design. Karen Schriver's "What Do Technical Communicators Need to Know About Information Design?" explores empirical research on the design of both texts and graphics to construct complex documents that are usable for people in specific situations. Schriver's set of heuristics provides guidance on a necessarily broad range of issues: the needs of specific types of users, the arrangement of visual elements on a page or screen, the selection of type for different purposes, and the relationship of design elements to each other.

Anne Frances Wysocki's "What Do Technical Communicators Need to Know About New Media?" continues the exploration of complex texts, examining how the added dimension of new media both enriches and challenges the work of technical communicators. Wysocki describes the dramatic changes going on in media itself—as we move from static to interactive documents—that demand new approaches from technical communicators. Wysocki's set of heuristics not only deals with issues of learning new software and hardware, but moves on to more difficult but still crucial issues such as the ways that new media invite different responses and responsibilities from everyone involved.

As technical communication diversifies its strategies, structures, and media, the field also finds itself reaching out more explicitly, as complex projects begin to involve not only other technical communicators and managers but also team members in other fields who contribute their expertise. In "What Do Technical Communicators Need to Know About Collaboration?" Rebecca L. Burnett, L. Andrew Cooper, and Candice A. Welhausen discuss the challenges facing technical communicators who work in cross-disciplinary teams. In order to help you learn to navigate the multiple levels of complexity involved—complicated projects and team members with varying (and sometimes contradictory) priorities and vocabularies—Burnett, Cooper, and Welhausen provide a coherent set of strategies for working productively on team-based projects.

At the close of this section, Kirk St. Amant depicts an even broader world facing technical communicators: the international community, composed of both corporations that produce technical communication and people who use those products. As St. Amant's "What Do Technical Communicators Need to Know About International Environments?" reminds us, international technical communication relies on many of the same principles of rhetorical sensitivity to audience and context; at the same time, answering those questions effectively in an international setting often requires the ability to see things in new ways.

Chapter 13: What Do Technical Communicators Need to Know about Genre?

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Summary

Genres are patterned, situation-specific responses to recurring communication needs. Genres occur in situations where people need to perform a conventionalized communication task (or fulfill a conventionalized goal). A genre is simply the collection of more or less shared conventions of form, style, and language that have been used in similar situations, and by similar writers, in the past. Just as individual members of a language group depend upon every other member's familiarity with the language to facilitate group communication, writers and readers of documents depend upon shared textual conventions, applied in recognizably similar situations to accomplish conventional goals. Those shared conventions of text and situation are "genres."

Researchers view genre as both the product of repeated communication in recurring situations and an element in the production of those situations. Genres can serve as a kind of shortcut to achieving communication goals, but it is important for communicators to pay attention to both the stabilizing effects of genre (the regularity that it produces in the workplace) and the variety that is possible within and between genres. They can simplify the technical communicator's work by constraining the range of possibilities in a given communication situation, but genres can also encourage innovation by helping communicators to understand the goals of a text and envision a range of ways to achieve those goals.

An understanding of genre offers many benefits to the technical communicator. Genres can help technical communicators to diagnose needs and to produce documents that respond to

those needs in situationally appropriate ways. Since genres arise as successful responses to recurring situations, careful study of a workplace's genres can also help communicators to perceive how problems are solved and how work gets done in their workplace. Additionally, by understanding a workplace's existing genres, technical communicators can make more informed choices about the need to modify genres (or even to create new ones) in response to emerging workplace situations, technologies, or relationships.

The Practical Value of the Genre Concept

Faced by a new writing situation, how do you begin? If you're like most writers, you'd probably look for examples of the sort of document that you need to produce. If you're asked to write a business letter, you ask around the office for samples of letters written by others in your company, for these will model how members of that company tend to organize letters. If you're asked to write a technical manual for a product, you'd probably collect the technical manuals for similar products, then try to identify what characteristics of those samples are omnipresent, which are common but optional, which are specific to the product, and so forth. Even in cases where you discover variations across several examples, you might treat those variations as a set of options that exist within certain limits.

For example, if five different technical manuals use two different styles of illustration (say, line drawings and photographs), you might decide that either type of illustration is acceptable for the company's technical manuals—there's room for variability. However, if you observe that none of the samples you've found contain cartoon drawings, that observation might support the view that line drawings and photographs, but not cartoons, are acceptable forms of illustration in this company's technical manuals.

How does this inspection of samples relate to genre? Even if you don't have a fixed definition of genre in mind, you're implicitly making decisions about genre in just about every communication that you undertake. That's because genre is a fundamental social category of discourse—or, to put it another way, it's something that operates without our being aware of it. In this way, genre is much like language itself; we can apply the principles of language regardless of whether we're aware of them, though there are some advantages to training ourselves to be aware of them.

An understanding of genre offers us both diagnostic and productive benefits. First, awareness of genre can help you to diagnose communication more effectively by training you to think in terms of larger systems of communication, and of how communication operates on the social and cognitive levels. Secondly, awareness of genre can help you to produce communication more efficiently, yielding results that are better tuned to your purposes.

In the following sections, I introduce several important developments in modern genre theory, focusing on the principles of social action, typification, choice, change, competence, correlation of genres, genre systems, and flexibility and originality. Based upon these insights, I offer a set of heuristic questions that will help you to apply the principles of genre in practical workplace contexts.

The Rhetorical Genre Approach

The concept of genre has been around for thousands of years (Aristotle discussed genres in his Rhetoric). The most recognized usage of the term describes formal categories of literary or artistic texts: sonnets, problem plays, mystery novels, country love songs, and so forth. This "formal" approach to genre (that is, this approach that focuses on the "form" of a text) is useful for creating a taxonomy of text types, and even for understanding the relationship between different categories and subcategories of literary texts. (For instance, you could use it to explore the relationship between different kinds of novels: the detective novel, the political thriller, and the police procedural all might be considered as species of the genre of mystery novels.)

This formal approach can also be applied to nonliterary texts, of course. For example, in business writing, the genre of the business letter can be identified by a set of formal characteristics; it is generally a typed letter on company letterhead, using a friendly but formal style, and containing the following ordered elements: date, inside address, salutation, polite introduction, at least one paragraph of body text, conclusion, closing line, and signature. The genre of the business letter may also be broken down into several subgenres: good news letters, bad news letters, informational letters, cover letters, requests, and so forth. Each of these types of business letter may follow the generic form of the business letter, but also possess additional identifying characteristics or patterns. For instance, a bad news letter typically begins with a "buffer" paragraph, followed by a bad news paragraph, one or more paragraphs of reasons, an optional paragraph with alternatives, and a polite closing.

The formal approach to genre is useful as a strategy for categorizing text types, and even as a source of templates to follow when producing texts. However, the approach tends to be prescriptive, and it oversimplifies the writing situation, making it seem as if a "cookie-cutter" approach to communication is adequate. More importantly, it does little to help us understand how writing is used to achieve specific purposes.

In the past three decades, researchers of rhetoric and professional writing have retooled genre as a rhetorical concept. In its rhetorical formulation, genre is seen not as a text type but as what Carolyn Miller has called a "social action" (1984); or, to put it another way, genres are one of the things communicators use to fulfill a specific type of purpose within a particular, recognizable, and recurring situation. What's more, the purpose and situation in question are both "socially situated"—there is a shared community understanding rather than merely an individual definition of the purposes and situations of genres. The "community" in question might be pretty big (college students) or relatively small (sales staff at the Celltech Company); the point is that members of the community all recognize certain types of communication situation and agree upon what sort of speech or writing would count as an appropriate response to that situation.

Following Miller's evocative description of genre as social action, the research and theory of genre has blossomed. I won't describe all of this work here, since much of the work seeks to develop keener analytical and critical tools, as well as keener teaching perspectives, rather than to develop new communication practices. For present purposes, I will focus on the major insights relating to the practice of communication in workplace settings, especially for novices—people who are just learning about their profession, their discipline, or their work setting. And there is much to consider here.

Social action

First, let's consider what is meant by "social action" (and why it matters to view genre as a category of "social activity" rather than a category of textual form). All communication is social; we're always communicating with somebody when we write or speak. Even when we don't have a particular reader in mind, we're writing with at least a loose understanding that the thing we're writing will be read by someone, and that in order for it to be understood we need to relate our intentions to the intentions of the reader.

But admitting that all communication is social isn't the same thing as admitting that genres are social. We need to take one more step. Whereas "communication" encompasses just about any form of symbolic expression between two or more people, genres are what Miller and others describe as typified rhetorical action (24). By "typified," genre researchers mean that the participants in a community recognize patterns in their communication forms and the situations in which communication is necessary.

For example, if you're in a classroom setting and your instructor asks you to introduce yourself to the class, you are in a typical rhetorical situation—one that is recognized by you and the others in the room as a common situation in the classroom setting. Even before you say a word, you're already being acted upon by a genre—the genre of the "class introduction." How do you know what to say? You know because you've been in a similar situation before, either as a speaker or as a listener. Because the situation is familiar, you can also make some other assumptions about the situation. For instance, among all the many communication possibilities available to you, you can assume that you're being asked to produce a certain very specific type of response (a list of unembarrassing personal characteristics about yourself, beginning with your name, probably including your major, and lasting about 10 seconds). In this situation, you recognize that people would be surprised if you passed around a copy or your resume, or if you broke into song. Even if these responses communicated roughly the same information, they'd be surprising forms of response (to say the least) in this situation. That is, you recognize that your listeners would find your response unsuitable—as a communicative action, it falls outside the parameters of the genre.

But you also can count on something else. What is "typical" isn't only the form of your response, but also the situation itself. In planning your reply, you can count on the fact that your listeners will recognize the appropriateness of your response in this situation (assuming that you respond appropriately, that is!)

Typification

What is it that makes any situation typical? There has been a lot of attention to this question. After all, strictly speaking, every situation is unique—you've never before been in that same room with the same instructor, the same group of students, on the same day, at the start of the same class, introducing yourself to those people for the first time! If every situation is strictly unique, then no "response" is ever truly a response to a "recurring situation," right?

Here's where the notion of "typification" comes in. According to Miller and others who have developed this concept, typification is not an individual process of identifying objectively identical situations, but rather, a socio-cognitive process in which situations come to be treated as examples of a type. Every situation is (in reality) different; what makes them the same is that we see them as the same—and, further, that our method of doing so is shared by others in our social group! After all, if you think that you're being asked to give your name and describe your "public self" to your instructor and fellow students, but nobody else in the room perceives the situation in those terms, then you're simply speaking out of turn, not participating in a shared understanding of the situation (that is to say, not employing the correct genre). But if the members of the group are all roughly familiar with how this situation works, then collectively the group will "typify" the situation and its responses as part of a recognized genre.

Let's look at a workplace example. Suppose that you're hired as a technical communicator for Celltech, a cell phone manufacturer. As your first assignment, you're asked to write a "quick-start" sheet for unpacking the phone, installing the battery, hooking up the charger. You dutifully clear your desk, tinker around with the product until you're comfortable with how to perform the tasks, and then write up a list of the steps that you followed. You make some line drawings illustrating various steps, you arrange the text and illustrations on the page, you give the document a once-over, and then you submit the completed list to your boss: mission accomplished. The boss takes one look at the result and says, "That's not right—the procedure might work, but it's not a quick-start guide. You have too many steps, and it makes the product look too complicated. Plus, where did you get these pictures? That's why we have a graphics department."

What went wrong here isn't that your text failed; rather, the text was not recognized as an appropriate response within the specific rhetorical situation that you were responding to. After all, you weren't writing instructions in a vacuum; you were writing them in a specific context (Celltech), to be consumed by specific sets of readers (Celltech's customers, but, first, your supervisor and other members of the Celltech community).

How might you approach this situation differently? First you'd inform yourself about how quick-start sheets are written at Celltech. You'd learn the genre, along with the variations that tend to meet the needs of this specific circumstance, however idiosyncratic they may be. For example, after reviewing several other instruction sets, you might discover that all of these documents use photos instead of line drawings, positioned in the same way on the page; they all use more or less the same verbal style—formal but friendly, with all instructional steps numbered and written as imperative statements. (You judge that these are firm genre conventions in this writing situation.) But there are variations in other areas. The length of the instructions sometimes varies considerably from one product to another. The text under each numbered instruction is a lengthy description in some cases, but shorter (or altogether absent) in others.

Some products use two-color illustrations; others are printed in black and white. These variables, you judge, are less firm, indicating either that the communicator is free to play with these variables, or that there may be some underlying pattern corresponding to these differences—a pattern that you would need to figure out through further investigation.

In producing a quick-start guide for your company's product, you are not just writing a lone document. You are performing a well defined and recurring social act that is recognizable to the other members of the work community that you've just joined. In a very real way, it's the whole community that is producing these instructions (by regulating what counts as the "right way to do it," among all the other possible ways), not you as an individual communicator. But, by performing this social action, you're also identifying yourself as a participant in the group—someone who recognizes the recurrent situations that determine work in this setting, and who can make effective choices about how to respond to those situations in socially valid ways.

Genre and choice

The next major insight of recent work on genre has to do with the issue of choice. The formal view treats genres almost as if they were templates: do x, y, and z and you've written a business letter or an instruction set—call it the "Mad Libs" version of genre. Even the "genre as social action" view tends to suggest that writers engage in patterned, determinate acts; instead of the form predetermining what they write, it's the social situation—the social exigency—that determines the writers' actions.

Yet experience tells us that we generally have lots of options—what we write is not predetermined, and the work of a writer is the work of making effective choices. Many researchers of genre have sought to reconcile this contradiction by examining how genres actually operate in real-world workplace situations.

What they have found is that the power of genres is at once constraining and liberating. As Susan Katz puts it, "[genre conventions] constrain writers by limiting the form, style, language, and content that are appropriate in particular situations. Conversely, conventions enable by supplying templates, genres, and topics which can be useful to the writer at all stages of the writing process" (qtd. in Artemeva 2006a, 23). Genre is constraining because the genre situation imposes certain limits upon the writer's approach (if I'm writing a business letter, I can't generally do it in iambic pentameter; if I'm writing a sit-com episode, I generally can't kill off the protagonist at the end of the episode). But genre is enabling because it gives me a place to start, both topically and structurally, allowing me to be creative within the scope of the genre's limits. If I'm writing a business letter, I don't need to decide how the letter should be formatted or what voice to use; I can focus on the best ways to present my argument. If I'm writing a quick-start guide, I can depend upon some of the conventions and expectations that the genre already provides. With those decisions already made, I can focus on details like the optimal order of steps and how much to write about each step, within the limits that the genre affords.

Moreover, if I'm convinced that the standard approach isn't the best approach for some reason, I can still dream up unconventional approaches that may still qualify as examples of the genre in question. To adapt a metaphor from jazz music, the genre provides the theme and the structure, but allows the musician some room to play variations upon that theme, as long as those variations remain rooted in the theme and structure of the piece. As a writer, I may decide that some aspect of my rhetorical situation calls for a lighter tone, a less formal style, more elaborate explanation, or a different type of illustration than is typical of the genre. If I vary every aspect of my approach, I risk losing the familiarity that readers depend upon when they read texts in this genre. But if I make limited strategic changes, and if I do so with specific purposes in mind, then I can carry my readers with me. The familiar features and content, and the familiarity of the communication situation itself, will help them to interpret the unfamiliar bits properly.

Genre and change

This notion of choice also helps us also to understand how genres evolve in response to new circumstances. As Schreyer (1993) notes, genres aren't absolutely "stable" or fixed. Rather, they are "stabilized-for-now" (200), always subject to the pressures of changing situations, new writers and readers, and new content. Fortunately, it's pretty rare for every aspect of some communication situation in a given community to change all at once. But, as conditions change, as technology provides communicators with new tools, and as new people enter and become experts in a community, so too do the community's genres change.

The above description of variations in genres suggests one mechanism for this change: individual variations that are responses to individual situations, if repeated in similar situations, can become just as much identified with the genre as were the supposedly "fixed" conventions that they supplanted. As Berkenkotter and Huckin (1995) observe:

> As the world changes, both in material conditions and in actors' collective and individual perceptions of it, the types produced by typification must themselves undergo constant incremental change. Furthermore, individual actors have their own uniquely formed knowledge of the world; and socially induced perceptions of commonality do not eradicate subjective perceptions of difference. Genres, therefore, are always sites of contention between stability and change. They are

> inherently dynamic, constantly (if gradually) changing over time in response to the sociocognitive needs of individual users. (6)

Researchers of genre have studied how genres change over time and discovered many instances of this process at work. For instance, Charles Bazerman (1988) and Dwight Atkinson (1999), looking at the genre of the scientific research article in different periods, have discovered that several characteristics of this genre have changed, even though at no time did members of the communities in question ever declare the need for a change. The changes were incremental and situational, and they're only visible in retrospect: the discussion of "methods" becomes more prominent, the use of mathematical data increases, the voice shifts from first-person to third-person and from active to passive, and so on.

Why is this important? As a writer, you need to be adept at recognizing just what parts of the genre can be budged and which are relatively fixed. Going back to the example of the business letter: some elements (such as the date, the salutation, and the courteous, professional style) are comparatively fixed (or, in Schreyer's term, "stabilized-for-now"). If you wrote a business letter using slang or sentence fragments, your readers would doubt your competency as a member of the "social group" of professionals in the business environment—your text might be read as a failed attempt at a business letter. If you left out the salutation, readers might not even recognize your text as a business letter at all—in terms of its rhetorical situation, it would be unintelligible (and therefore it would fail to respond to the rhetorical situation at all).

Yet, other elements within the business letter genre are less fixed. For instance, most business letters span multiple paragraphs, but you could write a successful letter that consists of only one paragraph (or even a single sentence); it might be seen as unusual, but it wouldn't be rejected out of hand. Likewise, if you were writing to a business associate with whom you also have a personal relationship, you might opt for a more casual or more personal tone. Or if one of your intentions is to *encourage* a stronger personal connection with a business associate, you might strategically adopt elements of personal correspondence, stretching the "business letter" conventions to achieve an unconventional purpose. Whereas questions about a recipient's family members or private life would generally be outside the scope of the business letter genre (at least in current American business settings), the particular situation often calls for variations upon the usual theme. There are many conventions within a stable genre, but few absolute rules.

Genre and competence

This flexibility matters a great deal when it comes to expressing yourself as a competent user of a genre, for, as Artemeva (2006b) observes (reflecting upon insights from Bakhtin and Freedman and Medway), "the better our command of genres, the more flexibility and freedom we can apply in using genres and the more fully we can express our creativity in them. Thus, even when acting recurrently in a recurrent situation, one can still express one's individuality when using a fully mastered genre" (23). By knowing the boundaries (soft and hard), you can more comfortably stretch those boundaries when it's necessary to do so. Conversely, readers recognize that those writers who are the most versatile users of a genre are also the most competent. So, not only does your increasing competence enable you to use genres more flexibly, but your fluid and flexible use of genres—your ability to strike the right notes with the genre—is a sign of your competence in that social situation.

As a newcomer to a work environment, you will naturally want to demonstrate competence. The effective use of that workplace's genres is one important way to do so. Competence is more than technical skill, content knowledge, or error prevention; it is also a matter of awareness, good timing, and judgment. Novice users of workplace genres tend to make two types of error. First, they make missteps that are the product of an incomplete understanding of how the genre operates in its specific context (say, not understanding the difference between a situation calling for a memo and one calling for a letter). Second, even when they perform a genre properly, they tend to stick with the safest (that is to say, the most stable) variations of the genre--they take fewer risks, because they're less comfortable deciding just how far they can play with the genre. To adapt a tennis metaphor, they don't "aim for the lines" as much. As their understanding of the genre and its situation grows, so too does their willingness to employ more of the genre's flexibility.

Correlation of genres

So far the discussion has focused on genres as discrete entities. But, especially since the mid-1990s, genre researchers have become increasingly attentive to how genres work in combination, and also how genres relate to the various roles played by members of a workplace or social group.

Long before the boom in scholarship along these lines, Mikhail Bakhtin (1986) had noted that every instance of communication is an utterance in response to previous utterances, and anticipating future utterances. Genres are not employed in isolation; all utterances (that is, all instances of speaking or writing) are in a sense *responses* to some prior utterance, and they instigate some sort of response, which itself instigates another response, and so on. The "rules" governing the appropriate types of response are genre rules; utterances of a genre tend to be made in particular, regularized patterns of relationship, and these patterns themselves reflect the relationships within the rhetorical community (e.g. workplace) in which they occur.

For example, if a friend gives you an insult, you have a limited number of conventionalized genres available to respond. You could respond with another insult, a joke, an angry retort, a defamation suit, or a punch in the nose (but not a purchase order, an anniversary toast, or a resume). The punch in the nose could yield a return in kind, an apology, a curse, or a lawsuit. These conventionalized responses are not suitable merely because some "rule set" stipulates them. Rather, they're suitable because they *mean* something specific and conventional within the context and community in which they're used. To respond to an insult with a defamation suit might be interpreted negatively (as an overreaction, perhaps), but it would at least carry meaning. To respond with a resume, on the other hand, would simply be unintelligible.

Thus genres are not merely standardized containers of message content. Genres establish, articulate, and reinforce socially recognized relationships, and these relationships play a role in how the content of messages is understood. Just as the shape, size, and design of a document often can prepare readers for the content within (helping a reader to know whether to expect a novel, a shopping list, or a progress report), so too does genre cue readers' understanding of the social and structural relationships that workplace communication depends upon. Consider business correspondence. Business letters are often written in response to previous utterances (a prior letter, an advertisement, a phone call), and they provoke other typical generic responses. A client's letter of inquiry will prompt a letter of reply (either informational, good news, or bad news). A good news letter may prompt a thank-you letter or an acceptance letter. The exchange of letters coincides with, and depends upon, the social relationship between (in this example) a company and one of its clients.

Genre systems

Beyond the basic notion that genres are interrelated (and that they reflect the conventionalized relationship patterns of rhetorical communities), there have been several specific models proposed for understanding the correlation of genres. Genre researchers have used various terms, including genre sets (Devitt 1991, 2004), genre systems (Bazerman 1994; Russell 1997; Yates and Orlikowski 2002), genre repertoires (Orlikowski and Yates 1994), and genre ecologies (Spinuzzi and Zachry 2000; Spinuzzi 2003), to describe these interrelationships (cf. also Spinuzzi 2004; Artemeva 2006b, 25-27). These concepts differ somewhat in their details, but they all endorse the notion that participants in a rhetorical community engage in recurrent, typified interactions using multiple, related genres. Consider these examples:

- Your boss sends out a memo calling for applications to head a new division of your company. This conventionalized genre—the call for applications—propagates a similarly conventionalized response—the letter of application.
- A government agency issues a request for bids on a new information technology services contract. Your IT services company responds to this request for bids by submitting a bid. (Leading up to that bid, other internal genres might also be used; for instance, memos, phone calls, strategic plans, recommendation reports, and other genres may be circulated, all resulting in the bid itself.)
- A customer writes a letter of complaint about a product manufactured by your company. The letter is delivered to your desk. First, you evaluate the complaint (perhaps by talking with a technical support specialist or reading reports of past complaints about this product). Based upon your evaluation, you reply to the customer, using one of several possible conventionalized responses: a letter of correction or apology; a refund; an explanation that may or may not assign responsibility to the customer, the shipper, or

> some other party for the failure; or perhaps a query, asking for more information about the complaint. Additionally, you may file internal documentation reporting on the problem and its solution. If you discover that the problem is significant and affects other products or customers, you may need to compose additional messages as well, possibly even recommending a product recall or reporting the problem to an internal quality control department or external agency, depending upon the scope of the problem.

As these examples demonstrate, certain genres propagate certain other genres in predictable patterns. These genres don't simply structure messages; they engage in work—going back to Miller's germinal insight, they are forms of social *action*, the way an organization gets things done. As a new member of the community, you are tasked with learning not only how to produce whatever individual genres are common in your position, but also when to produce them—in response to what events or signals.

Spinuzzi's concept of "genre ecologies" builds upon these other types of assemblage; however, in Spinuzzi's formulation, the interwoven genres in any workplace or activity network "are not simply performed or communicated, they represent the 'thinking out' of a community as it cyclically performs an activity" (Spinuzzi and Zachry 2000, 114). Moreover, genres actually alter (Spinuzzi's word is "mediate") the nature of the activity itself; that is, the activity is fundamentally shaped by the nature of the genres that enact it, such that it is impossible to separate the "social activity" (say, fulfilling purchase orders) from the genres (the "purchase order") that one uses to do that activity. The act of fulfilling an order is encoded in the "purchase order" form, and conversely, the form structures the act.

This notion of mediation elevates genres to the same level of importance (or agency) as the people who use them. Though people act through genres (for instance, by writing reports to influence a supervisor's decision-making), genres also shape or "mediate" people and their activities by creating a system of authorized ways of doing things—ways that create certain possibilities for individual action, that foreclose other possibilities, and that even create and foreclose certain types of intentions. For example, within a genre ecology that includes various genres for lodging complaints or expressing dissatisfaction, certain activities associated with dissent are enabled and regulated—they're written into specific social relationships and communication modes. Within a genre ecology that does not offer customary genres for complaint, people either cannot participate in that activity, or, if they're sufficiently motivated, they are forced to employ existing genres in unconventional or illegitimate ways (such as by "whistle-blowing")—ways that defy the social relationships of the group and that may cause disequilibrium in the genre ecology.

Genre, flexibility, and originality

This account of genres propagating other genres and fitting together to reflect a social structure may make it seem as if technical communication is a purely mechanical process: standard letters come in; standard responses go out; standard forms are filed, calls made, and so forth. But there remains a great demand for invention, judgment, and creativity in how writers actually use genres. Each situation may call for certain distinct types of response, but each response is nevertheless unique.

Mikhail Bakhtin (1981) talks about the chronotopic element in genres: every distinct place and time brings together a unique set of circumstances, tools, and people, yielding new combinations of generic responses. Participants in an exchange may recognize the situation as "typical," but what they actually produce—the words on the page—is necessarily timely and unique. Just as no performance of a song is ever going to come out exactly the same, no situation is ever truly the same as any other situation. As a communicator, you're always making judgments about what typical forms and content can be reused and what must be adjusted to suit each new circumstance.

Katz notes that the conventions of genre "*constrain* writers by limiting the form, style, language, and content that are appropriate in particular situations. Conversely, conventions *enable* by supplying templates, genres, and topics which can be useful to the writer at all stages of the writing process" (qtd. in Artemeva 2006b, 23; italics in original). Schreyer (2000, 2002) highlights the strategic aspects of genre, arguing that working within a genre is an improvisation; writers draw upon the conventions of genre as strategic resources that allow them to strike certain socially recognized notes (cf. Artemeva 2006b, 25).

In fact, genres are never truly stable; they are, to return to Schreyer's (1993) oft-quoted phrase, only "stabilized-for-now" (200). They evolve in response to changing purposes, content, participants, and technologies. They can evolve only because those who use them are continually improvising—making small, situation-specific changes in their performance of the genres, drawing upon strategies that they have learned from other genres and settings, and, in some cases, flouting the conventions of the genre for strategic purposes. Much of the genre research of the past decade has reported on various forms of genre change: writers' uses of novel rhetorical strategies and new, emergent, or hybrid genres in the face of new rhetorical problems (for instance, Artemeva 2006a; Bazerman 1988; Freedman 2006; Henze 2004; Yates 1989). In some cases, this genre change or hybridization can be a strategic effort to overcome the structural limitations of a rhetorical situation; Wendy Sharer (2003) uses the term "genre work" to describe the "strategic blending of typified and innovative textual elements" intended to explicitly adapt the genre resources of privileged communities to a new set of purposes for which no effective genres exist (8).

New professionals (and people in new professional situations or identities) must be aware of the stability of the genres that they're expected to use in their work settings, but they must also be conscious of their flexibility—in other words, they should understand genres as resources to support strategic improvisation. Likewise, communicators need some understanding of how their workplace genres have evolved, and how they might evolve in the future. Not every writing task is the right moment to innovate, but often it's possible to alter the expected pattern of communication in order to solve problems.

Learning genres—and learning with genres

So how do you learn the genres of your workplace, and how do you use genres once you've learned them? As noted above, genres provide a kind of "shorthand" for professionals. If you're familiar with the basic set of genres typical of your workplace, including how and when they're used, you can rely upon those genres to simplify many everyday decisions. Knowing to use a particular genre doesn't eliminate all of the decisions that you'll need to make, of course, but it takes some variables out of the equation, giving you a starting point for engaging in the routine behavior of daily professional activities in your workplace.

So far I have summarized several of the major theoretical insights related to genre in the workplace. Let's turn now to a new genre, the heuristic—a set of questions and tips that are adapted from the theoretical material above, and designed to guide you as you begin to use new workplace genres. I model the use of this heuristic with an extended scenario adapted from the insights of several new technical communicators.

Bear in mind that the genre perspective can serve as a resource not only when you are writing or speaking, but also when you're the recipient of workplace messages. As workplace-situated tools, genres can help you to make sense of your worksite just as they can help you to participate in it.

Heuristic: Understanding and Using Genres in Your Workplace

Ask the following questions to help you interpret technical communication tasks from the perspective of genre:

- **Think about the genre as a dialogue.** Who are the players in this genre? Who normally writes it and who normally reads it? Do any others participate in some way (e.g., by contributing data or feedback)?
- Beyond the most immediate transaction occurring here, **what else can you learn about the relationship that exists between these players?** Is the relationship hierarchical or non-hierarchical? Do the people involved have similar or different goals or concerns? Do they know each other or not? Is the relationship short-term or persistent?
- **What is the primary purpose of this genre?** What result is it intended to achieve: a decision, an action or event, a reply, a change in understanding or perspective? Remember that genres are not just "document types"—they are *actions* intended to produce a result.
- **Does the genre have any secondary purposes?** In addition to the direct outcomes of intended for the work, consider what other outcomes, including relationship outcomes, your organization might be hoping for. For example, some messages have the direct purpose of informing but also the indirect purpose of establishing connections or promoting an organization's credibility.

- **Where does the genre fit within the "genre system" or "genre ecology" of your workplace?** Does it explicitly respond to other, initiating genres? Does it call for specific (either explicit or implicit) genres of response? Is there a range of possible appropriate responses?
- **Are the documents in this genre durable or ephemeral?** Are they filed, bound, shelved, or otherwise stored, or are they read and then discarded? Why?
- **Is this genre read through in its entirety, or is it sampled piece by piece or section by section?** Consider what the text structure reveals about how it is meant to be read. Textual structure often reflects reading behavior. Texts that have lots of clearly marked sections, heavy labeling, navigational tools (like indexes or tables of contents), or a "modular" feel are designed to support sampling/reference rather than cover-to-cover reading.
- If you have access to multiple examples of this genre, **what variations (of structure, size, style, content, arrangement, or other elements) are observable?** Consider possible explanations for the variations that you observe.
- **What characteristics (of structure, size, style, content, or other elements) seem to be the most stable or "required" in this genre?** Remember that genres regulate the choices available to you, but that writers have a great deal of flexibility in how they fulfill the expectations of the genre.
- **Does your workplace provide written instructions or templates** to help people write this genre, or do you have models from which you can work? Ask around; how did others in your workplace learn to use this genre?

- **Are there any "analogues"—similar, more familiar genres?** What familiar genres does this one resemble, either in form, content, medium, or purpose? Consider whether this genre is a version of something more familiar to you, or whether some of the same writing strategies could be applied in this genre. Even if this genre is distinct in some ways, your experience using other genres may help you to make choices in this one. Be aware of the differences, but also exploit the similarities.

As you do your work and build up a genre repertoire that's particularly suited to your workplace responsibilities, also be aware of what you can learn about your workplace through its genre set. Recall that genres arise as conventionalized responses to recurring workplace problems or needs (just as other kinds of tools evolve their characteristic features in response to particular, recurring needs). Why has this genre evolved (or been adopted) as it has in your workplace? These insights will help you make effective decisions in future workplace contexts.

The Case of Joseph, County Development Agency

In this final section, I model the application of the heuristic in a real-world professional writing case. The decisionmaking process is rarely simple or linear, and not all of the heuristic questions will be equally relevant to every writing task. But, as you'll see, the heuristic questions can help you to make effective strategic choices about your writing tasks based upon insights drawn from your workplace and your prior experience with other genres.

Joseph is an economic development specialist for a county development commission. He helps county businesses with access to the county's private and governmental resources, provides research data for businesses and government agencies, and helps to develop new programs to promote economic growth in the county.

His boss asked him to survey county businesses regarding their resource needs and their satisfaction with the agency's services. His audiences were Existing Industries, Community Leaders, Economic Allies, and Business Service Providers. He had been trained as a technical communicator and had some familiarity writing questionnaires for others, but he had never written a professional report for such a complex audience.

Joseph conducted the survey, then considered the data and reflected upon his task. Although he had never written a report like this one in the past, he knew that his boss had been collecting and reporting these data annually for several years. So, rather than start from scratch, Joseph began by looking at samples from the previous four years.

In each previous report, he recognized several common features. They all fit onto two sides of one standard sheet, used the same two colors—blue and green--that appeared in his office's logo, and used the office's preferred typeface. Organizationally, the reports were all modular, with several headings. In the most recent report, the first page used three text columns while the second page displayed several pie charts that represented survey data; previous years' reports were visually simpler, using single columns and fewer, less polished visuals. (When he asked his boss about the differences, she said she'd wanted to make the report more "professional-looking," but she didn't have the document design expertise—one of the reasons that she was asking Joseph to do this year's report.)

So Joseph assumed that there was some flexibility in several document design elements (such as column layout and arrangement of graphics and data displays) as long as the results looked "professional." But other aspects of the document design were more stable, including the choice of colors (the organization's documents all used the standard "blue and green" palette), the document length and page size (his boss felt that busy clients wouldn't want to read a report of more than one sheet), and well labeled, modular structure (different constituencies would be interested in different data, and few would read the report top to bottom).

Having seen the samples, and given his understanding of the office's function, Joseph also realized that this report's function was a bit more complex than simply to report data. He considered the stated purpose of the survey and the report: to determine "the issues and problems that stunt industrial growth" in the county, and then to demonstrate the agency's commitment to "resolve/respond to those issues and problems" (Dawson, personal correspondence). Thinking about the mission of his office and its relationships with county businesses, government, and service providers, he realized that the report contributed to a *dialogue* with business leaders, service providers, and other stakeholders; it reported information, but, in doing so, it also established good will, reinforced the agency's commitment to solving business problems, and demonstrated its joint partnership with the community and area businesses. Joseph realized that maintaining this dialogue with stakeholders was just as important—in this report and in all of the agency's dealings—as the "data reporting" function itself.

Joseph also knew that his audiences were extraordinarily busy people; they would probably spend only a few minutes with this document, so the design and content had to be high-impact. Since he was presenting data trends that were fairly dramatic, he decided to foreground the data by displaying them in high-impact pie charts accompanying short blocks of explanatory text. He positioned the pie charts in close proximity to their corresponding text sections so readers wouldn't need to flip back and forth. Applying some principles that he had learned as a professional writing student, he got rid of the long sections of narrative and descriptive text that had been used in previous years' reports, believing that a more concise presentation with data displays would do the job better. He also used the same professional, courteous writing style that he had developed in his regular correspondence with business leader in other facets of his work. Despite the need to be concise, Joseph recognizing that simply presenting the data might not sufficiently convey his agency's commitment and its partnership. So he added a brief but somewhat more relationship-oriented, "'purpose-setting' introduction [in an] attempt to achieve credibility" (Dawson, personal correspondence). However, Joseph chose not to provide a lengthy analysis or conclusion because, in his words,

> I wanted the results to speak for themselves. Since I had three primary audiences that this survey was for, I wanted them each to come to their own conclusions. Business owners needed to focus on what they could do better, service providers could focus on what they could do to help companies better, and community leaders and economic allies could see that our office was actually working (by the mere fact that we surveyed industries and distributed the results). (Personal correspondence)

Although he knew from looking at other data reports that an analytical conclusion was fairly conventional for such reports, he judged that in this case—with multiple audiences motivated by somewhat different interests—it was more useful to flout that convention in favor of more of an overt "data reporting" approach. He knew that there would be other occasions to dialogue with each constituency about what the data meant for them.

Joseph's experience composing his first annual report of county business data was a success, at least in part because he took the time to analyze his task in terms of the rhetorical situation and genre conventions that the task posed. He also understood that this report was only one of many genres that his office used in combination to achieve its mission of supporting business growth in the county. In turn, the learning (and strategic decision-making) involved in producing this report gave Joseph a fuller understanding of the mission, methods, and strategic goals of his agency—insights that he could apply in future writing tasks.

Conclusion

Technical communication genres are patterned, situation-specific responses to the recurring communication needs found in technical communication workplaces. As a technical communicator, you will spend much of your time reading and writing texts that conform to the genres of your workplace; understanding these genres is therefore important.

Technical communication genres might at first appear to be simple patterns into which the communicator plugs in content. But an understanding of the social and rhetorical characteristics of genre can help communicators to diagnose and respond to communication needs creatively, efficiently, and effectively. Genres bring together a writer's and reader's shared understandings of communication purposes and social relationships; communication is "typified" when the participants in communication share an understanding of the communication situation. By employing genre conventions, communicators reinforce this shared understanding.

Genres also offer communicators many choices and opportunities to vary their approach to any communication situation. By constraining some characteristics of a text, genres make it possible for communicators to vary other text features, allowing them to respond to the particular needs of their communication situation. In fact, as a communicator's genre expertise increases, his or her ability to adapt genres for strategic purposes also increases.

Technical communication genres usually work together in groups or “genre systems” in the workplace, helping the participants in a professional community to engage in a range of ongoing communication types. An expert technical communicator not only knows how to use specific genres, but also understands how these genres fit together in a sustained conversation. In fact, examining the “genre system” in a workplace setting is a good way to learn about the community itself, since genres (and genre systems) are one of the key tools used by communities to accomplish work. As the activities, goals, and challenges of a community change, the genres in that community’s genre system also evolve, enabling the community to adapt to new circumstances. As a new technical communicator, one of your most important tasks will be to learn your new community’s genres, and also to use your growing knowledge of those genres to understand the values, priorities, challenges, and social relationships of that community.

Discussion Questions

1. Find a technical communication document for which you are member of the intended audience (for instance, a product manual, a business letter, or a newsletter). Thinking in terms of this chapter’s discussion of genre, diagnose the communication system to which this document responds. What relationship does the document reflect between its writer and its reader? What formal, rhetorical, or stylistic features of the document provide clues about the document’s genre? Are there any unexpected or anomalous characteristics? If so, how would you explain them?
2. Now find at least two other examples of the technical communication genre selected in the previous question—examples from either the same company or a different company.

Identify the formal, rhetorical, and stylistic elements that these documents all share. What tells you that these documents are all examples of the same genre?

3. Using the same set of documents that you used in the previous question, identify any formal, rhetorical, and stylistic differences among these documents. In what ways does each document stretch, modify, or challenge the conventions of its genre? How would you explain these modifications? Do you see these modifications as examples of the flexibility of the genre, or do they fundamentally conflict with the genre as you understand it?
4. How transferable are genres? To what extent are genres specific to a particular workplace or professional community (e.g., Celltech) and to what extent are they transferable to other, similar workplaces (e.g., technology manufacturers in general)? If you move from one technical communication job to another in a different company, what genre knowledge and experience do you imagine you'll be able to transfer, and what new knowledge or experience will you need to obtain in your new position?
5. This chapter argues that our responses to communication situations tend to be generic, and it describes the advantages of learning and working with the genres of the workplace. The chapter does not discuss any disadvantages of genre. In what circumstances (if any) might genres be a disadvantage? As a technical communicator, how would you address this situation?

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Chapter 14: What Do Technical Communicators Need to Know about Writing?

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Summary

Responses of 24 technical communicators to questions about the writing they do for their jobs revealed a heuristic that new technical communicators can use to determine ways to write effectively in the various roles and contexts in which they find themselves. This heuristic consists of questions that encompass the amount and quality of writing technical communicators do, the nature of that writing, the genres technical communicators produce and the rhetorical strategies they use to produce them, their writing approaches and processes, the knowledge and skills they need, and the personal traits and qualities they should have. Our data suggest the range of answers writers might give to these questions and how those answers often depend on factors such as the workplace, the nature of one's job, the industry, the project, and even one's personal work preferences and styles. In addition to sharing the variety of responses to these questions that our data revealed, we also present an extended example to illustrate how a newcomer to the field can use these questions to determine the writing knowledge and skills (s)he may need to be successful.

Introduction

Siena just started as a technical communicator in a department with 20 technical communicators. Her department is in a division of a large multinational corporation. The division creates specialized business software, and her department produces all of the instructional and reference documents for that software. As a new writer, she is assigned to a team with three other writers to document one piece of the software. The software her team is documenting is targeted at a well-defined user group. Her teammates have all been at the company for at least three years. Her supervisor, Allie, has been with the company for 13 years.

Siena is about to be assigned her first writing task. In anticipation of her meeting with her supervisor, she jots down several questions. She has some sense, from conversations with the other team members, of what she may be asked to do and what might be entailed in doing it. She still, however, is learning the organization and trying to determine its expectations—and what happens if and when those expectations are not met. She is a little anxious because she knows there is still a lot she does not know or has not done. For example, she has never created a fully executable help system. She wonders how much assistance she might get from her supervisor and/or teammates; how much assistance she might need; and what, precisely, she will need to know to be successful. She just earned her bachelor's degree in technical communication; however, does this mean she knows enough to take on this initial, and, for her, high-stakes writing task? In this chapter we present a heuristic that Siena could use to determine how best to approach that initial writing task and to determine what knowledge and skills she will need for it.

Literature Review

Scholars in technical communication have long been concerned with the skills and knowledge technical communicators need. Research, for example, has focused on employment ads, the expectations of employers and managers, and the experiences of technical communication graduates (see Carliner 2001; Thomas and McShane 2007; Lanier 2009). However, in the past decade, research addressing the responsibilities and work lives of technical communicators has taken on a new urgency as the field has undergone significant change and as scholars have, increasingly, pondered the roles that those trained in technical communication (whether called technical communicators, knowledge workers, or something else—and this has been a point of debate) might play in the 21st century workplace (see Whiteside 2003, Faber and Johnson-Eilola 2003, Giammona 2004, Slattery 2005, Conklin 2007). Many of these studies are concerned with identifying the new modes and contexts of practice emerging in workplaces because of changing technologies and evolving organizational structures. Conklin, for example, explores the increasing importance of cross-functional teams and how work processes continually flow and adapt to changing needs, making interpersonal and project management skills vitally important (Conklin 2007; see also, Anschuetz and Rosenbaum 2002; Kim and Tolley 2004; Rainey, Turner, and Dayton 2005; Ford 2007).

A number of the studies cited above focus on management of documentation processes and projects, which involve both interpersonal and technological skills. Most of these scholars focus on the “core competencies” that technical communicators should have. Slattery argues that “information technologies appear to be the primary medium through which these competencies are enacted” (354). Giammona, who interviewed and surveyed individuals regarded as leaders in the field, found that writing was the most important skill for technical communicators: “But the one common denominator was writing—everyone agreed that a technical communicator must, at the core, be able to write” (350). Whiteside (2003), Hart-Davidson (2001), Hart (2000), and Hayhoe (2000) also emphasize the importance of writing and the ability to communicate. Hayhoe stresses that writing is what distinguishes us in our profession (151).

The studies we have cited generally regard writing as a skill that technical communicators use extensively. Most of these studies also acknowledge that technical communicators use writing in combination with a complex and varied mix of additional skills, competencies, and knowledge sets. In many of these studies, the power and complexity of writing as a literacy practice sometimes seems to be in the background, or regarded as no more important, powerful, or complex than other aspects of technical communication. And yet, writing may be the one competency that really binds together the array of practices we call technical communication. Other than writing, no particular set of practices seems to be constant in technical communication; rather, they vary from context to context. Writing, on the other hand, seems to work in relation to the other practices so fundamentally that, without it, the remaining set would be something quite different from technical communication.

While writing is almost always examined in relation to other skills and practices in technical communication scholarship, a few studies have focused on writing more exclusively. For example, Farkas develops a detailed rhetoric of procedural writing (1999). His study distinguishes between human actions and system actions, and he provides several alternative models for procedures (50). Isakson and Spyradakis investigate the influence of semantic and syntactic features of a text for helping users remember information. They make suggestions about sentence structure and the placement of key information that can help readers use a text more effectively in interacting with technologies and following procedures (1999). Schneider develops guidelines for helping writers avoid ambiguity and for determining what "clarity" really involves in particular writing situations (2002).

Other scholars have sought to answer the question, "what counts as writing?" in technical communication. They suggest that "writing" does not necessarily look like what we usually mean by writing in some contexts. Mirel, for example, has examined the rhetorical strategies that make data reporting effective in database output (1996). She found that the classical elements of rhetoric—invention, arrangement, and delivery–are essential factors to consider in "writing" with data. She also found that structuring and organizing data in ways "that support readers' interpretive strategies" is key to effective data communication (102). Finally, Winsor questions several assumptions we commonly make about the nature of writing—e.g., that it involves free creation of meaning, that a human being must be immediately present when writing occurs, and that writing requires the use of words (1992). Her consideration of the writing that accompanies and facilitates many engineering activities reveals that none of these assumptions necessarily apply and that creativity or individual choice about what or how one writes is limited, and sometimes not even possible.

All of the studies we cite have helped with understanding emerging trends and needs in technical communication, with defining further research, and with developing curricula and courses. However, what they have not provided, as Hart and Conklin (2006) suggest, are detailed insights into the day-to-day writing practices of technical communicators—insights into the perspectives of technical communicators as they write in a variety of settings. The research study that gave rise to this chapter helps meet this need.

Specifically, our research focused on technical communicators in actual workplace settings. We constructed a questionnaire asking respondents how much and what they write, how they write, their perceptions of what writing means and entails in their work, and their perceptions of the skills needed, and the relative importance of those skills, to write effectively. We sent the questionnaire to 30 practitioners, including technical communication managers, writers in industry, contractors, and writers in consulting organizations. Our respondents were geographically dispersed through the Midwest, Northeast, and Southwest United States. We received completed questionnaires from 24 practitioners, who, on average, had been in their current positions for three years and in the field for eight. Sixteen also had earned graduate degrees in technical communication or in a related field. We analyzed their responses both quantitatively, by counting instances of things mentioned, and qualitatively, by looking closely at the rich explanations respondents provided in answering our questions.

More specifically, for our quantitative analysis, we tallied responses to every question—e.g., types of documents produced, time spent writing, number of projects worked on. Our qualitative analysis focused on the narratives respondents provided. Our questions were all open ended, and respondents were encouraged to tell us, for example, not just whether, but also how and with whom they collaborate, as well as how they go about planning and developing documents. We began by identifying broad themes that ran through these narratives, and then we developed more specific categories within the themes that we used to code the responses. The narratives provide rich detail to support our heuristic.

Heuristic

Our research, along with prior studies, point to a number of questions that new technical communicators can ask to determine what they will need to know and do within their work contexts. We present in this chapter a heuristic that groups these questions into six categories:

1. amount and quality of writing entailed and expected;
2. nature of the writing;
3. genres and rhetorical strategies;
4. approaches to and processes for writing;
5. knowledge and skills; and
6. personal qualities and traits.

Each of these categories gets at different aspects of the writing technical communicators do and of the skills and qualities they need to do that writing. Answering the questions within each category can assist technical communicators, especially those new to the profession, with determining what might be expected and needed from them in their work contexts. In this section, we present and briefly explain the questions that comprise each of the six categories.

Category One: Amount and Quality of Writing Entailed and Expected

The amount of writing technical communicators do involves two aspects of their work: their job description and the specific tasks and projects they work on. Although job descriptions do not typically state, for example, "A Technical Communicator in XYZ Corporation will spend at least 85% of her time in writing tasks," the typical duties of technical communicators in any organization may involve a fairly consistent amount of writing. That amount, however, may vary from one organization to the another. In our study, the amount of time writers spent on writing tasks ranged from somewhat less than half of their work time to nearly all of it. Specific tasks are also likely to influence the amount of time spent writing. This could mean that a technical communicator writes a lot but that all of her writing tasks involve brief documents. It could also mean that a person spends considerable time on tasks that do not involve what we often think of as writing. Instead, a technical communicator may spend many hours meeting with team members, talking to subject-matter experts, carrying out research, and so on.

Knowing how much you will write as a technical communicator is important for several reasons, not the least of which is determining how best to manage your workload, time, and resources. Technical communicators need to plan and make informed decisions about managing competing demands, satisfying managerial and employer expectations, and, most importantly, meeting deadlines. As a result, our questions for this first category of our heuristic include the following:

- How much time will I spend writing?
- How many documents will I write at one time? How many in a year?
- How important will it be to write well? And what does it mean to write well in my industry, field, and company?

The final questions relate to the quality of one's writing and how important that is, both in the context of the organization in which the technical communicator works, and/or in relation to a particular workplace task, and in the context of the larger industry or field. Quality can involve a range of concerns, from deadlines (how much time do I have to write a document?), to what is at stake in the writing (could readers be physically hurt if they do not understand my document?), to audience (is it internal or external to the organization?), to the value placed on writing and/or documentation by the organization. How quality is defined may also vary depending on the project, its circumstances, and/or the organization—e.g., does it mean mechanical correctness, technical accuracy, rhetorical effectiveness, or some combination of these? Further, does it mean that all documents must meet certain standards for usability, and/or does it refer primarily to things like readability, visual appeal, or conformity to stylistic or design standards?

Category Two: Nature of the Writing

This second category of our heuristic is concerned with determining the kinds of writing one will be asked to do as a technical communicator and what that writing will entail. The kinds of documents you are assigned, and where and how they originate, can greatly determine how you write. Therefore, the questions we recommend for this category include

- How much of the content for my writing will I have to research and develop from scratch? How much will I take or borrow from elsewhere? And what, then, will I need and/or be expected to do with it?
- What will be involved in writing original documents in my organization? Will I need to locate and interview subject matter experts; locate in-house source documents; locate outside sources, such as books, research studies, or Internet sources?
- What will be involved in reusing or repurposing existing documents in my organization? Will I need to know where and how to locate such documents? Will I be provided the relevant documents at the start of a project? Will I need to verify the completeness or appropriateness of the documents with which I am provided? Will I need to conduct additional research similar to what I would do when writing from scratch?

Another common practice in technical communication is for writers to work in teams to develop larger documents that are assembled and/or disseminated in various ways. Knowing which of these practices you will be engaging in will have a significant impact on the tasks you undertake as a writer, and on how much time and what resources those tasks require. All of these approaches to writing are likely to involve research, but they may differ in the kind of research, sources, and skills required. The nature of the writing you do can also influence the tools and technologies you use, the way you organize your work, the amount of time you allocate to various tasks and projects, the amount of control or ownership you will have, ultimately, over the documents you write.

Category Three: Genres and Rhetorical Strategies

This third category in our heuristic is closely connected with the previous one. New technical communicators also need to know what kinds of documents they will produce and what the requirements and conventions are for those documents. Technical communicators need to know a variety of genres. They also need to be able to move easily between genres, and they need to understand the conventions of various genres, and why those particular conventions exist. Technical communicators need, as well, to be prepared to produce new kinds of documents since needs and expectations evolve within most work contexts and with new technologies.

Technical communicators need, in essence, to know how versatile and flexible they will need to be, both in regards to the kinds of documents they will be asked to write and in regards to the rhetorical strategies they will need. The key questions for this category include the following:

- What kinds of documents will I write and in what situations?
- What genres do I need to know and understand?
- What are the conventions for those genres?
- What rhetorical skills and strategies will be most helpful to me overall and for the particular genres and documents I will need to produce?
- How will I learn about my audience? What will I need to know about it?
- How will I determine my purpose(s) in writing? How will that purpose (or those purposes) influence the document(s) I produce?

The questions in this category encompass the various rhetorical concerns inherent in the work of technical communicators—concerns with purpose, audience, persuasion, and so on. Such concerns always need to be at the forefront for writers, which scholars have long stressed. Rainey, Turner, and Dayton, for example, found the “ability to write clearly for specific audiences directed by clearly defined purposes" to be one of the most important competencies for technical communicators (2005, 323). Similarly, Kim and Tolley found that rhetorical skills and knowledge of audience are essential for technical communicators (2004, 382-383). We also believe that technical communicators need to be diligent in seeking and obtaining sufficient knowledge of their audiences, and of the rhetorical contexts of their work more generally, employing a full range of strategies. In short, rhetorical skill and competency remain central in the field.

Category Four: Approaches to and Processes for Writing

As the previous heuristic categories show, there is no single approach to writing; it depends not only on individual preferences and skills, but also on the project, company, type of document, technologies used in documentation processes, and so on. Further, writing processes, for our purposes, encompass a full range of tasks, including research, planning, drafting, reviewing and editing, revising, proofreading, and publishing. The questions we recommend for this category, and there are a lot of them, are as follows:

- How do/will I write?
- What might influence how I write (e.g., individual preference, genre, organizational context, industry, tools, work environment, project complexity, deadlines)?
- What research skills will I need for my work? Or even for a particular project?
- What will I need for a project in terms of tools, skills, resources, information, and time? (This question speaks to being able to break down a project.)
- Will I write alone or as a part of a team of writers?

- What will I need to know about reviewing and editing? Will I have to review my own work? Will I review the work of others? What kind of reviewer/editor will I be?
- Will I be open to having my own work reviewed and edited? Who will review my work? What will they focus on?
- How will I assure the technical accuracy of my work?
- How will I make sure the reviews I receive are useful?

Technical communicators need both an awareness of themselves as writers as well as an understanding of how the work they do—and both for and with whom they do it—may influence their writing process. Writing processes vary considerably from one organizational setting to another. Significant variations in processes can be connected to any of several factors: individual preferences and differences; types of documents; the industry and/or nature of the organization; tools; the job setting and work environment; and the specific requirements of the project, including its deadlines.

Category Five: Knowledge and Skills

In addition to knowing oneself as a writer, technical communicators also need to possess technical skills and knowledge. What this encompasses is, again, highly variable; dependent on such factors as organizational context, industry (e.g., finance, transportation, telecommunication, healthcare), position, responsibilities, and so on. The questions to ask in this category may include the following:

- What technologies will I have access to in my workplace? What or how much will I be expected to know about those technologies? And/or what technologies, more generally, will I need to know (hardware, software, digital communications technology, new media, etc.)?

- What will I need to know about the industry for which I write? Also, will I be expected to understand the industry for which I write when I begin, or can I learn about it on the job?
- What will I need to know about the subject about which I write? Will I be expected to be an expert on the subject matter about which I'm assigned to write? If not, will I be expected to know how to find the information on my own?

As a field, we have long debated the importance of skill with and knowledge of technology, especially relative to other knowledge and skills. Some argue that such skill and knowledge are essential and primary—technology is, after all, what we're about as a field. Others, however, argue that such knowledge is secondary—that knowing how to write, for example, is much more important. Many recent discussions place the importance of knowing technology someplace in the middle, arguing that such skill is important but also putting it into a larger context of other knowledge. This is what we do. Our findings, on which we elaborate further in our extended example, come down to this: Technical communicators need to understand technology and this means they need an aptitude for learning technology. Hart says,

> Most experienced technical communicators have yet to encounter software we couldn't begin using productively within a day, and become skillful within about a week. Mastery can certainly take far longer, but most of what we do doesn't require that level of mastery. (2000, 291)

Technical communicators certainly need technological skills; however, more importantly, they need the aptitude to learn and begin using new technologies as needed in their work.

Category Six: Personal Traits and Qualities

The final category of our heuristic concerns the personal traits and qualities that can help technical communicators with their writing. Our questions for this category are as follows:

- As a technical communicator, will I primarily be expected to work alone or closely with others?
- Will I be expected to plan my own work processes or will I have projects mapped out in detail by a supervisor or team leader?
- How adaptable will I need to be? How open-minded?
- What will it mean to be adaptable and flexible in my organizational context?
- How important will learning and acquiring new knowledge be in what I do?

As an example of the importance of this category, much of the research we have cited about technical communication competencies supports our findings that interpersonal skills are essential. Hart says that such skills include being willing and able to interact face-to-face and often across professional, cultural, and linguistic boundaries. He says, "*communication is about contact between two people, not simply an exchange of words*" (2001, 73, italics in original). Interpersonal skills—the ability to listen and ask questions, in particular—are also essential to writing and to carrying out research for one's writing.

Equally, technical communicators need an interest in and passion for learning as well as an ability to adapt easily to change. Giammona quotes Jack Molisani, who says, "Today, I would say the ability to learn quickly and adapt, a tolerance for change, hands-on technical skills appropriate to what you are documenting, experience in the industry in which you are writing, and communication skills are key" (2004, 354).

Extended Example

In order to see how our heuristic might be applied in the workplace, let's return now to our writer, Siena, as she starts her first technical writing job. We will follow her in this example as she asks questions from our six-part heuristic and learns what writing means and involves in the company where she will be working. We will also share what the writers from our research had to say in relation to our six categories.

Amount and Quality of the Writing

As Siena enters the field, she wonders first just how much of her professional time will be devoted to writing. Some of the questions she has for her supervisor include,

- How much time will I spend writing?
- How many documents will I write at one time? How many in a year?
- How important will it be to write well? And what does it mean to write well in this particular industry, field, and company?

Siena's supervisor, Allie, will likely answer her questions about the amounts of writing she will do the way most of our respondents did: most technical communicators, especially those recently hired, spend the majority of their time writing. Eighteen of our respondents said they spend at least one-quarter of each day on writing or writing-related activities. Sixteen (almost 66%) said that writing is what they do, primarily, in their jobs. All but two said that at least 25% of their job entails writing.

Allie tells Siena that she will start with just one project, but that she can expect to be working on additional projects very soon. Some will be short, but others will involve months of work. Allie cannot give Siena an exact number, but she guesses that Siena could easily complete

"20 or more" writing projects in a year. Overall, our respondents reported working on an average of 4.3 projects at a time and 29 projects in a year. As an example, Roberta, a medical writer in an advertising agency, said she typically juggles four projects at one time and completes 18 to 20 in a year. Olivia, who works for a consulting company, estimated that 80% of her work day involves writing. She said she often juggles eight to 10 projects at one time.

Writers also often need to make decisions about quality. Siena becomes concerned about this as she thinks about juggling several projects. Allie tells her that projects occasionally have different levels of importance depending on factors such as audience, purpose, and different stakeholders. Related to this, our findings suggested the importance of understanding just "how good" one's writing needs to be in any situation. We were initially surprised that some of our respondents said that writing skill and quality were not the most important thing for them, and/or were secondary to other concerns. For example, Madeline, a documentation manager, said, "Even without stellar writing skills, if you care about the user's experience, your documentation will have value." She added, "I don't consider perfect writing skills to be the most important skill, at least in our organization." Claire, a proposal writer, said, "Writing ability is necessary, but if I didn't possess the top 3 skills [interviewing, time management, and industry knowledge], Pulitzer prize winning writing skills would be useless in this position."

Most of our respondents, however, ranked quality in writing high in their work. Most said the ability to write well was essential, both in obtaining and in advancing in their jobs. One of these, a writer in a contract organization, said: "When I first began in this type of work, the ability to write and coherently construct a document was critical to my success in the position." Another, who now manages other writers, said, "Writing and editing skills – This is still number 1 for me, primarily because I cannot teach it. And the strong need for these skills is what makes me require a BA in tech writing." This respondent added that writers need not "excel at **all** [her emphasis] aspects of writing … as long as they're enthusiastic about having someone pitch in where they have weaknesses." Further, the ability to write well was defined broadly by most respondents—as encompassing, for example, stylistic and mechanical accuracy, sensitivity to audience and purpose, rhetorical skill, editing, clarity and conciseness.

Nature of the Writing

In addition to how much writing she will likely do in her job, Siena wants to know the kinds of writing she will be asked to do and what that writing will entail. She asks Allie, "Will I need to create documents entirely from scratch, or will I mostly repurpose existing documents, for example, for the purpose of single sourcing?" Allie, as a manager, is happy to hear Siena ask these questions since they are important ones for new writers. Siena needs to know how to approach the writing tasks she's assigned. She needs to understand what, precisely, she's being asked to do and why, where and how all of it will fit within the larger context of the department, organization, and so on. By understanding which tasks might be original and which might entail repurposing previous work, she can do a better job managing projects and balancing tasks. Allie may tell Siena, "You will do some work from scratch, but often your work will involve reworking existing documentation. However, most important will be making sure you know which you'll be doing before you even begin."

Based on our findings, we decided that the most important questions for this category in our heuristic include,

- How much of the content for my writing will I have to research and develop from scratch? How much will I take or borrow from elsewhere? And what, then, will I need and/or be expected to do with it?
- What will be involved in writing original documents in my organization? Will I need to locate and interview subject matter experts; locate in-house source documents; locate outside sources, such as books, research studies, or Internet sources?
- What will be involved in reusing or repurposing existing documents in my organization? Will I need to know where and how to locate such documents? Will I be provided the relevant documents at the start of a project? Will I need to verify the completeness or appropriateness of the documents with which I am provided? Will I need to conduct additional research similar to what I would do when writing from scratch?

Twenty of our respondents said they spend at least part of their time creating documents from scratch and that doing so is central to their roles; however, twenty of them, some the same and some different, also said that they spend at least part of their time rewriting and/or repurposing existing documents. Char, a technical writing manager at a security software company, talked about how her work encompasses both kinds of writing:

> Writing means creating the user documentation. We do repurpose most of our guides and quick start cards, updating information for each release. There are always new products to document so that requires creating new documentation.

Char talked about updating existing documentation for new releases as well as about how existing products may also require entirely new documentation: “Sometimes, based on feedback from the Consulting Engineers, we create new documents (offshoots) for existing products.”

In technical communication, repurposing documents typically involves preparing them for delivery in multiple formats. Since single sourcing is now so common, many writers re-purpose documents for this reason. Madeline, a documentation manager in a software company, said,

> I spend time thinking about how to structure information so that it can be reused…. When you move towards single-sourcing, you have to think about how to modularize information as well as how to set up the underlying template structure so that the content outputs appropriately for different types of deliverables.

For other respondents, re-purposing meant re-using existing text as a way to save time. For example, Claire, a proposal writer, said "Since many of the same topics are frequently discussed, my department maintains a library of standard, or boilerplate, text that is available for use as-is or customizable."

Genres and Rhetorical Strategies

Building on the previous questions, Siena also asks Allie if she can give her some idea of the types of documents she will be developing, including whether a new version of an existing document will be the same type of document as the original. At this point, Siena also should begin considering the larger rhetorical context of her work: Who will her audience(s) be for her writing? How will they read and use what she produces? What will be the purposes of the document(s) she produces? And finally, in what ways, if any, should her writing project an image of the company and/or the product? Allie may well tell her that in some situations these aspects of a project are spelled out very precisely; however, for many projects the writer, or the team, ends up working and reworking these issues throughout the project.

In relation to the questions for this category of our heuristic, our research suggested that technical writers produce a variety of documents. When we reviewed the completed questionnaires, we counted 50 different types, which we ultimately grouped into 30 categories. The largest category, as might be expected, was that of manuals, guides, instructions, tutorials, and job aids (there were 41 mentions of these). There were 21 mentions of documents such as newsletters, newsletter articles, articles for other kinds of publications, press releases, press kits, and blogs, and about 12 mentions of reports, product reviews, and/or minutes.

On average, each of our respondents writes eight kinds of documents. Many are genres we commonly associate with the field, although new types of documents associated with new media are increasingly being added to these lists. As an example of the variety we found, Cecelia, one of the writers at a tax and accounting software company, listed the following:

> Getting started guides, installation instructions, walkthroughs/tutorials, user bulletins, report samples, online help (WebHelp), Captivate sequences (animated demos), training guides, conversion/comparison guides (guides for transitioning from one product to another), status reports, meeting minutes.

Lists like these suggest that technical communicators need to know a variety of genres. They also suggest that writers need to be able to move easily between genres, and they need to understand the conventions of various genres. Technical communicators also need to be prepared to produce new kinds of documents since needs and expectations evolve within most work contexts and with new technologies.

Finally, in relation to our questions about audience and purpose, we found that a common guiding principle for most technical communicators is that everything is driven by the needs of audiences. So how do technical communicators learn about their audiences? Diane, who writes for a financial company, relies on a variety of resources—her manager initially, but primarily the users themselves through interviews, follow-up queries, and observations. In our study, five respondents said they employ user interviews, and three of these also talked about observing the user with the product.

It did surprise us, however, that only six of our respondents (about a quarter) talked about having direct contact with members of their audiences. The remainder (up to three quarters) talked about having to rely on others in their organizations, on clients, on product documentation, and even on intuition. Within their organizations, audience information came from managers, SMEs, editors, sales representatives, and client representatives. While people in these roles may be familiar with users, accepting their assessment of audiences for technical documentation purposes presumes a familiarity with audience, especially as a rhetorical concept, that they very likely do not possess. What we conclude from these findings is that technical writers need to be diligent in seeking and obtaining sufficient knowledge of their audiences, and of the rhetorical contexts of their work more generally, employing a full range of strategies. In short, a writer, like Siena may realize that she needs to begin thinking about her audiences as soon as she is assigned a project, and that she needs to be strategic in learning about and considering how best to address them. Directing questions about audience and purpose to her manager might well be Siena’s most important strategy in establishing a productive course for her work.

Approaches to and Processes for Writing

The next category of our heuristic concerns how technical communicators actually write. Siena, in all likelihood, learned in school that there is no single writing process that works in every situation. She probably also developed confidence in her ability to write well. However, she may wonder if she can count on that confidence in her new situation, and if there are processes already set in place that she will be expected to follow. In response to questions about this, Allie informs her that the company has "SOPs—standard operating procedures" for different documents but that standards still need to be adapted to particular situations since every project is unique. As she considers Allie's response, Siena also likely realizes that she needs to figure out the best process for each project.

Once Siena is assigned her project, she will likely have to determine, first, how best to research it. She'll consider, as most of our respondents acknowledged doing, who the appropriate SME's are, how accessible they are, whether documents exist that support or explain the technology, and whether she can get access to and use the technology. After Siena has researched the product and its users, (s)he will begin, at some point, putting words, images, and/or multimedia together to compose the document. This is where writers put their rhetorical knowledge to work in the service of the actual writing. As suggested previously, effective writers have a repertoire of rhetorical strategies they can draw on. More than a few of our respondents, for example, talked about planning their documents very deliberately, often by using outlines and templates. For these writers, organization of the document is a primary concern. Others talked about creating planning documents to move into composing, and some talked about diving right in and drafting.

Finally, several of our respondents stressed the importance of the review and editing stages of the writing process, emphasizing the contributions that others can make to one's writing. In fact, more than half said that editing their own and their colleagues' work is one of the tasks they do most often. Maureen said that in her organization, which is focused on marketing, "Everything is reviewed by someone else!" Further, she said, "Account managers assign projects to me, and then review what I've written to double-check I've covered the client's requirements AND adhered to brand standards."

The review processes our respondents described were almost as varied as their writing processes. Susan, the manager at the company specializing in tax and accounting software, described a review process that involves a range of constituents:

> When the SME is happy with the doc (or, often, when they've run out of time to hone further), the doc is routed for formal review to multiple departments: Development (which includes the SME), Support, Training, at least one other Tech Comm staff member, and other interested parties (e.g., Sales) as required.

The process Susan described is a complex one that involves negotiation, interaction, and sometimes even office politics.

Knowledge and Skills

Technical communicators, like Siena, also need to possess technical skills and knowledge. This certainly involves skills with the technologies needed to write, design, and edit documentation. It also includes knowledge of, or ability to learn about, the technologies they will write about, e.g. finance, transportation, telecommunication, healthcare, and so on. Siena, therefore, wonders how prepared she is for the demands of a real professional workplace. The questions she'll want to ask herself—and/or her manager—include the following:

- What will I need to know about technology? And/or what technology will I need to know (hardware, software, digital communications technology, new media, etc.)?
- What will I need to know about the industry for which I write? Also, how important will it be to be familiar with the industry for which I will be writing?
- What will I need to know about the subject about which I write? Will I be expected to be an expert on the subject matter about which I'm assigned to write? If not, will I be expected to know how to find the information on my own?

Siena needs to be flexible in learning and using technology, both that which is new to her as well as that which she may already know but may be using in new ways or for new purposes.

Our respondents certainly agreed that technological skill is important: 19 (almost 60%) ranked it among the top skills they themselves have. Fourteen also said that knowledge of technology was essential for obtaining their jobs. Maureen, a writer in a marketing agency, summed it up saying, "The computer is king. If you can't use it, you're dead. I work from my home office, and spend 95% of my work time in front of the computer." Susan also stressed the importance of technology, but said that for her it is not number one:

> Obviously, we need writers who are comfortable with the considerable technical aspects of the job and who won't panic when the software their documenting crashes repeatedly, as software under development so often does. And it's definitely an advantage if they've had some experience in the actual tools that we use. That said, I never hire based on tools expertise because (a) they change all the time, and (b) we can teach these skills to a new writer.

On the topic of writers learning tools, Susan had this to say:

> I want writers to become experts on the product they document, not on a certain type of deliverable and the tools used to develop it. So everyone in TC needs to learn most of these tools. This makes for some variety in their work, but it means they have to be flexible and quick learners.

When asked what they use in their everyday work, respondents identified 64 different tools. We were also able to pull from our data several areas of specialized knowledge that relate to technology. These include knowledge of document design, Web design, project management, multimedia design, content management, editing, single sourcing, and computer programming. Of course, mastery of all of these tools and areas of knowledge would be impossible, which is, again, why so many of the respondents stressed the ability to learn new tools. Further, outside of MS Office and a few other tools—namely Dreamweaver, Photoshop, FrameMaker, and Robohelp—most tools were mentioned by only a few respondents, suggesting that there is great variety in what writers in the field are using.

Personal Traits and Qualities

As she gains experience, Siena increasingly realizes that she is going to have to deal with many different personalities and work styles. Her co-workers also will tell her that projects seldom proceed as anticipated, and, as a result, she will often have to respond to contingencies. The questions she will want to ask herself, and perhaps her manager, include the following:

- As a technical communicator, will I primarily be expected to work alone or with others?
- Will I be expected to plan my own work processes or will I have projects mapped out in detail by a supervisor or team leader?

- How adaptable will I need to be? How open-minded?
- What will it mean to be adaptable and flexible in my organizational context?
- How important will learning and acquiring new knowledge be in what I do?

The writers who responded to our questionnaire all identified traits and qualities that they have found important in their work. Interpersonal skills, for example, were viewed by most of our respondents as essential. Few jobs exist in which technical communicators work alone, with little or no need to talk to and negotiate with other people. Time and again, previous studies and our own research have made it clear that the technical communicator needs to be a "people person," outgoing, good at oral communication as well as writing, and adept at working effectively with a variety of people. As mentioned previously, technical communicators also need an interest in and passion for learning as well as an ability to adapt easily to change. Our research supports this. In short, if our writer, Siena, loves learning and has a desire to learn—if she's someone who is not afraid to learn new things—she will likely do very well as a technical communicator.

Conclusion

The 21st century technical communication workplace is not monolithic. One's formal education is a vital foundation for a career as a technical communicator, but one also needs to continue learning, and this starts the first day on the job. It is common for technical communicators to change jobs, often because they want the challenge of working in a new industry and/or of doing different kinds of writing. Many also take on added responsibility and/or new roles within their organizations (e.g., as managers or supervisors). As our writer, Siena, advances in her career, she will very likely internalize the heuristics we have made explicit in this chapter, but she will continue to seek answers to the questions about writing in whatever new situation and context she finds herself.

In particular, she will look for indications of what is expected in terms of good writing and how it is typically accomplished for particular tasks. She will want to see how genres are adapted to workplace contexts, subject matter, organizational goals, user needs and expectations, technologies and media, and other factors specific to a situation. She will expect to have to learn new subject matter, new writing and editing technologies, and new project and content management tools. She may also have to learn to work in organizational structures that are different from any in her past experience. She may have to work with colleagues, clients, or users whose cultural or national backgrounds are different from her own, or who speak English differently than she does. But one thing will probably remain the same for Siena—she will enjoy and welcome the challenges of new technologies; of working with varieties of people; of figuring out organizational processes, structures, and cultures; and of developing communication products and processes that truly connect with others to help them to do their work.

Discussion Questions

1. Our research suggested that knowing your audience is one of the most important things in technical communication. What are some possible approaches to learning about audience? What can a writer do when he/she isn't able to talk directly with the members of an audience? What might be some other ways to find out about the people who will use what you write?

2. How would you describe yourself as a writer? What do you believe are some characteristics or qualities you possess that will assist you with the writing you will do in your career?
3. You probably have learned a lot of research skills in school. You may also have done client-based projects in some of your technical communication courses where you had to apply these skills to the projects that the clients asked you to do. Based on your own experience and the findings from our research, what research skills do you think will serve you best as you begin your work in the field? How do you anticipate using those skills?
4. Susan, the technical communication manager at a tax and accounting software company, said, "I want writers to become experts on the product they document." Assuming you do not have such expertise when you're hired, what strategies might you use to become an expert, as she suggests? How much time do you think you would need to acquire the expertise you need?
5. How important do you believe it is to be familiar with the industry for which you will be writing? How might you acquire that familiarity? Also, do you think it will be more important to know about writing and to have the skills you need to be effective as a writer? Explain your perspectives on this.
6. Will taking science and technology courses prepare you adequately for writing about technical and scientific topics in your job? What else might prepare you?
7. How might the technology used in your professional workplace compare with/differ from the kinds of technology you learned in school and the ways you used it in school? How

can you best prepare yourself for using the technology you may end up using in your work?

8. Do you believe that your education has prepared you adequately for everything your job will require of you? What else might you want to know or need to do to prepare yourself for your career as a technical communicator?
9. Do you believe that your education has prepared you adequately, in particular, for the writing you will do in your job? In what specific ways might that writing differ from the writing you did for your courses, both within and outside of technical communication?
10. Technologies change all the time and technical communicators need to keep up with them. There is also a lot of emphasis in this and many professions now on lifelong learning. What might be some effective ways to engage in lifelong learning as a professional in the field of technical communication? What kinds of learning and activities might you do and engage in to continue developing yourself professionally, and, in particular, to continue developing yourself as a writer? What are some strategies for being well rounded and staying up-to-date? In short, how can you best keep up with and adjust to the continually changing needs and requirements in the profession?

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Chapter 15: What Do Technical Communicators Need to Know about Information Design?

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Summary

While technical communicators have always understood the value of good writing, they are now increasingly aware of the value of good information design. Today's technical communication professional needs to develop skills in information design—the art and science of integrating good writing and visual design so that people can use the content for their particular purposes. This chapter answers the question of "what do technical communicators need to know about information design" by exploring the empirical research on visual and verbal strategies for meeting the needs of audiences. The chapter integrates a diverse literature about visual design and its relation to content development. The chapter presents a heuristic for shaping content visually. In particular, the heuristic explores the thinking that underlies three activities to developing content that are central to an information design approach: (1) grouping content rhetorically, (2) using contrast to make the hierarchy clear, and (3) signaling and cueing rhetorical relationships.

Introduction

Over the past few decades, technical communicators have been challenged by the need to develop their expertise not only in writing, but also in information design. Whether they are designing reports about the environment or manuals for mobile phones, technical communicators need to be concerned with how to present their messages visually and verbally. As more companies around the globe expand the audiences for which they create products and services, the need to create well designed text and graphics has become increasingly important. Although most technical communicators have honed their skills as professional writers, they often lack skills in information design. Moreover, they may not be familiar with the growing research on information design that could help them make decisions as they compose. The purpose of this chapter is to help you as a technical writer expand your repertory of strategies for solving problems of professional communication.

Let’s say, for example, that you recently acquired a new job with a government agency within the United States Department of Agriculture. Your department within the agency might have as part of its mission to spread the word about healthy eating habits to parents of school-aged children. One of your first tasks in this new position is to gather empirically based information about what constitutes healthy eating with an eye toward creating a set of print-based and online documents that integrate data-based recommendations for healthy eating.

Your goal for the information packet is a set of easy-to-understand ideas about what constitutes healthy eating, what foods to eat, and the benefits of eating such foods. While initially the task sounds rather easy, you quickly find that there is an enormous amount of content that you can draw on, and that the content is scattered among many professional and popular literatures, both in print and on the Web. Moreover, much of the information is contradictory, and worse, hard to understand and to draw conclusions from.

What approach would you take in order to meet this rhetorical challenge? How would you proceed in making decisions about the content? How would you draw on your education in professional communication as you write? Once you have gathered what you deem to be the appropriate content, how would you go about designing the information so that it is easy for any parent to understand? In other words, how will you organize the content visually and verbally?

This chapter will give you a strategy for approaching such problems of communication by introducing an information design approach. When technical communication skills are combined with skills in information design, it can lead to more effective communications.

Why Research on Information Design Is Useful

As the above scenario from the Department of Agriculture shows, technical communicators would benefit from research about designing visually as well as verbally. In this way, they could both manage their own creative process and do a good job in persuading supervisors that their design choices are sound. Research on information design helps us to understand how different people typically engage with visual and verbal content. It provides insight about kinds of text features that make content clear and understandable, promoting comprehension and usability. Moreover, information design research shows us how visual design may influence the persona projected by the content and how design can influence whether readers believe the content is credible and the authors trustworthy (Schriver 1997).

What is Information Design?

Information design is the art and science of integrating writing and design so that people can use content in ways that suit their personal goals. Information design involves shaping content through verbal language, visual language, and increasingly in many technical and scientific contexts, mathematical language. A fundamental goal for information design is to create more effective relationships with stakeholders by designing rhetorically sensitive communications that meet their needs and expectations. In this way, information designers enable relationships among people through the effective design of content (Frascara 2010, March). When information designers "shape" their communications, they engage in designing, selecting, and orchestrating visual and verbal language in order to achieve:

- The right content
- The right level of detail
- The right organization
- The right media

Of course, achieving the right content, at the right level of detail, with the right organization, and delivered in the right media is not easily accomplished. Research tells us that communications designers need to acquire sophisticated skills in modeling the "reader-at-work" by understanding stakeholders' likely real-time processes of interpretation (Schriver 1989, 1997). When there is research available, experienced information designers opt for writing and design strategies that have been evaluated for their effectiveness with readers.

Experienced information designers recognize that they may perceive the content differently than their audiences, who typically bring different knowledge, background, experience or culture to bear during interpretation. Expert designers pay close attention to the findings of empirical research in order to understand the kinds of writing or design choices that may help or hinder readers as they attempt to make sense of text and graphics. The stakes are high because bad information design can leave stakeholders with a lasting negative impression, inviting them to ignore a message, misunderstand it, poke fun at it, or simply give up and stop reading. As we can see, information designers need to worry about both people's cognitive and emotional responses to content.

Information Design Emphasizes the Visual

Information design emphasizes designing content visually. This emphasis stems from information designers' longstanding belief that the appearance of a communication influences whether or not people will want to engage with the content. Studies of reading show that people who are confronted with content begin to interpret that content immediately (Anderson 2009), and that the visual display of that content can help or hinder people's interpretation. Studies suggest that people may form immediate opinions of the visual display of content. For example, researchers found that viewers found it easy to rate a website attractive or unattractive, and that they could make such judgments reliably and consistently based on their looking at a webpage for only 1/20th of a second (Lindgaard et al. 2006).

Moreover, researchers have shown that people remember content presented visually more easily than content presented verbally (Paivio 1969). Importantly, research finds that a careful integration of both words and pictures engages people more effectively (Sadoski and Paivio 2001). When designers provide access to their content through both visual and verbal means—what psychologists call "dual coding"—readers will have two ways of understanding the content and are more likely to remember it (Paivio 1990). Studies show that people tend to remember more when they acquire new content visually and verbally, rather than only visually or verbally.

Because the human eye is hardwired to interpret and organize what we see, people tend to make immediate inferences about what they see in their field of vision. This aspect of the human interpretative processes has implications for information design. On one hand, if the visual display meets the readers' expectations, readers will recognize the structural cues and be able to navigate the content and will be more likely to sustain in their reading. On the other hand, it also means that if the visual display of the text does not attract viewers or confuses them, reading may never begin or will stop before much of the content is considered.

While research on information design is broad and diverse, technical communicators can start with the literature with three areas central to displaying text visually:

1. Grouping content rhetorically
2. Using contrast to make the hierarchy clear
3. Signaling and cueing relationships

1. Grouping Content Rhetorically

Technical communicators already know how important it is to shape their writing or design with a reader or viewer in mind. Taking an audience-centered perspective applies to grouping content as well. Information designers are concerned with making sure the visual display of the content is rhetorically effective. This means worrying about whether the content is formatted into meaningful groups that readers will notice, expect, and appreciate.

Research suggests that visual grouping enables readers get a sense of the overall structure (Tullis 1997). When text and graphics are organized into meaningful semantic clusters, it makes it easier for readers to chunk the content (Kahn, Tan, and Beaton 1990). Grouping can also help to reduce cognitive load by helping readers remember content, which can make the content seem less complex, leading to fewer errors and increased satisfaction (Niemela and Saarinen 2000).

Grouping can be visual or verbal

When information designers group related verbal content they often create a mix of paragraphs, lists, sidebars, pull-quotes, or menus that organize content elements in relation to other content elements. In this way, information designers strive to make implicit structures explicit for readers.

Similarly, content can be grouped rhetorically by employing visual strategies, such as by using boxes, shading, color, or vertical or horizontal white space/blank space. When the visual groups are formatted consistently so that each functionally distinct group is formatted similarly (e.g., and, readers can perceive intended relationships among the content elements more readily (e.g., all procedures are formatted using enumerated lists with a short line length while all overview text is formatted as body text with a longer line length).

Grouping can have cognitive and affective benefits for readers

When content is grouped in ways that allow readers to form meaningful relationships among the elements, readers can often make connections across the content that they might miss otherwise. Grouping content spatially makes the content more coherent, allowing readers to recognize how the pieces of the message fit together. In this way, grouping helps to make what otherwise might be invisible structures present to the reader. Grouping not only organizes the content, it also renders it visually conspicuous—quite important for busy readers, impatient readers, less-able readers, and readers who are reading in a second language.

How the content is grouped may also influence readers' first impressions of the content (Lindgaard et al. 2006), triggering emotions about the message and setting in motion positive or negative attitudes about particular aspects of the message (Schriver 1997) .

Grouping can make complex content seem simple

Information designers are often faced with the task of reorganizing lengthy content into meaningful groups, particularly as they help their clients move content from paper to the Web. Breaking the text into short paragraphs (e.g., one to three sentences) promotes faster reading, and importantly, the shorter length influences readers' sense of how much effort it will take to read. Researchers at the Poynter Institute for Media Studies used eye-tracking to investigate how people read print and online newspapers. They found that readers skim and scan the content, following the modular clusters of the newspaper's grid (Stark Adam, Quinn, and Edmonds 2007). In a related study readers tended to give stories with shorter paragraphs twice as much attention as long (Outing and Ruel 2004).

Grouping can show semantic relationships

By clustering content in ways that make the text simple and inviting, information designers can support readers' affective needs. Designers can also use grouping to show how the content is logically and semantically related; for example, by using vertical blank space to segment paragraphs. When two or more pieces of content are positioned in close proximity, whether on a page or screen, readers can easily infer their relatedness. In this way, proximity is a powerful grouping tool for information designers.

Information designers often use *grids* to structure the space of a page, and designers of online information have drawn heavily on design concepts such as layering, grouping, separating, zoning, highlighting to make the structure of their information both visible and clear (Müller-Brockmann 1985). For example, researchers find that by aligning content elements and by consistently positioning content elements on the screen, they can enable viewers to find information more quickly (Parush, Nadir, and Schtub 1998). The overall visual look, including the layout, significantly shapes users' perceptions of consistency and user satisfaction in browsing tasks (Ozok and Salvendy 2000). When readers can form judgments about the nature of the content quickly, they are more likely to continue reading, an important benefit of grouping content rhetorically.

2. Using Contrast to Make the Hierarchy Clear

In the early part of the twentieth century, Gestalt psychologists systematically studied how the properties of the visual world shape our perceptions (Wertheimer 1922), (Köhler 1947). One of the earliest discoveries of Gestalt psychology was that the way things look depends not just on the properties of their elementary parts, but also, and more importantly, on their organization. They pointed out that *contrast is fundamental to human perception* and that the human eye is attracted to areas of high contrast (dark-light, large-small, thick-thin, saturated color-unsaturated color). For a discussion of gestalt principles for information design, see (Schriver 1997), pp. 303–326. In the design of content, contrast can be rendered graphically or typographically.

Graphic contrast

Information designers can create graphic contrast by juxtaposing changes in size, shape, color, weight, saturation, and position (Mullet and Sano 1995), (Tufte 1983). When used purposefully, contrast can reveal the architecture of the content, making the hierarchy visually present and helping readers see relationships among the parts (Ivory, Sinha, and Hearst 2001). Contrast also helps people as they search for content. It highlights key information on a page, segregating main points from minor ones (Jenkins and Cole 1982), (Scharff, Hill, and Ahumada 2000). Contrast can be achieved in many ways, for example, through integrating pictures within pictures, text within text, and pictures in relation to texts. When the eye is confronted with contrast, it provokes curiosity and invites the reader to look closer to see what is going on.

Typographic contrast

The best typographic contrast is achieved by using black type on a white background. In every study in which this aspect of the text has been studied, the same result was obtained: the darker the type and the whiter the background, the better the legibility of the text (Scharff, Hill, and Ahumada 2000), (Muter and Marrutto 1991). Moreover, studies of low-vision readers suggest that contrast is a fundamental perceptual aid to their seeing the text at all. Reece found that low-vision readers rely heavily on typographic contrast to see the text, adding extra reason for information designers to concentrate on building effective typographic contrast into the overall design of their online content (Reece 2002, December).

Using typography to enhance contrast

Researchers have studied the role of typographic features in text design since the 1800s. Consequently, most of what we know about typographic design has been derived on the basis of people reading on paper. In the past decade or so, there have been more studies of online typography. Some findings of the typographic research apply to both print *and* online information design, while other findings apply particularly to print or to the electronic displays (computer screens, tablet displays, cellphones).

Research that applies to both print and online applications tells us that *typographic contrast* is a critical feature of good design. Typographic contrast can be signaled in many ways, including variations of type light to dark, thick to thin, bold to italic, upper case vs. lower case, serif to sans serif. Typographic contrast is employed to signal the hierarchy and structure of content. When the contrast is working well, readers or viewers can easily make discriminations about how the content is organized. Moreover, good contrast facilitates search and rapid retrieval of information.

In looking at the research on typography one finding reappears in the literature. Studies comparing serif and sans serif faces find that readers pay more attention to the amount of contrast among styles within a typeface (e.g., light, medium, bold, extra bold, black) than they do to the distinction between serif and sans serif (Schriver 1997), (Spencer, Reynolds, and Coe 1974).

Typeface: Serif or sans serif?

Research shows that when the typographic resolution is excellent, serif or sans serif typefaces are equally legible and equally fast to read. Thus, when text is printed on paper at high resolution, the text will be equality legible whether it the type is serif or sans serif. However, when the resolution is average or poor, sans serif is more legible (Bernard et al. 2001). Legibility is still an issue and matters a lot when busy readers must distinguish between pairs of characters such as o's and e's, 8's and 6's, 0's and o's. Practical situations in which readers must make rapid discriminations among numbers or characters include e-mail addresses, URLs, serial numbers, order numbers, and prescription numbers.

Previous research on paper documents showed that when American readers engage with continuous text, such as a short story, they preferred serif faces, but when reading the more telegraphic prose, such as found in instruction manuals, they preferred san serif (Schriver 1997), pp. 289-303. Others find that European readers prefer sans serif rather than serif for the same genres. Researchers conclude that people tend to prefer what they are accustomed to reading.

Readers prefer sans serif online

People tend to prefer sans serif typography when they read online, whether they have corrected, uncorrected "normal" vision (that is, 20/20 with or without glasses), or low vision (that is, severe loss of vision even with glasses). Even though there is no difference in the legibility of serif and sans serif type when the screen resolution is good, people still have preferences for typefaces. And whether one is young or old, as they read online, most people prefer sans serif.

Low-vision readers prefer sans serif

Over a number of studies, low-vision readers and readers with “normal” vision were found to prefer sans serif to serif type in computer displays 87%–95% of the time (Reece 2002, December). Readers also preferred roman (non-italic) type to italic type (67% –82% of the time). Overall, Reece’s study underscores the importance of typographic contrast for low-vision readers and suggests that both reduced vision readers and normal readers show strong similar preferences for sans serif typefaces online. Theofanos and Redish remind us that it is important to worry about low-vision users when we design text for online displays because vision impairments are more prevalent than we think and the number is growing as the baby boomer generation ages (Theofanos and Redish 2005).

Typesize

Generally speaking, research on typesize has investigated the impact of point size on reading speed, reading accuracy, and reader preference. Most studies have concentrated on the point sizes that most legible for body text: 10-point, 12-point, or 14-point type (Bernard and Mills 2000; Bernard, Liao, and Mills 2001). The results of these studies are fairly consistent, leading researchers to draw the following conclusions:

- 10-point type is read more slowly, but more accurately
- 12-point is read faster, but less accurately
- Smaller typography slows reading, but tends to be read with better accuracy (perhaps because more concentration is required to see it)
- Most readers prefer larger type (12-point) rather than smaller type (10-point)
- Children (ages 9 to 11) prefer 14-point sans serif
- Older readers (age 70+) prefer 14-point sans serif

- Partially sighted or visually-impaired readers prefer 14-point to 16-point sans serif

Upper case versus lower case type

Upper case type (all capital letters or “all caps”) is hard to read when employed to set sentences and paragraphs (Vartabedian 1971). In fact, when the body text is set in all capital letters, reading speed can be slowed about 13 to 20 percent (Breland and Breland 1944, April). The problem with upper case is a lack of contrast.

Reading speed is optimal when upper case and lower case letters are used (Rickards and August 1975). The variation in character height among upper and lower case letters allows rapid discrimination of letters and facilitates word recognition (Paterson and Tinker 1946). Thus, a combination of upper and lower case makes the reading process more smooth and efficient, enabling the eye to track the text more easily. When extra emphasis is needed, bold has been found to be a better cue than uppercase (Coles and Foster 1975).

3. Signaling and Cueing Relationships

Information designers signal the content’s structure in two primary ways: visually (through layout and typography) and verbally (through cues such as headings, subheadings, and captions, topic sentences, transitions, logical connectives, overviews, sidebars).

Signaling visually

To signal the structure visually, designers can use a variety of graphic and typographic techniques. For instance, to signal that text elements are of equal importance in the hierarchy, designers may vertically align them, indicating the parallel nature of the elements within the structure.

Size and position are primary visual cues to signal importance. When a message is dominated by a few large elements (e.g., photos), their size tells the reader they have priority in the message structure. Alternately, when textual content is placed in a focal position for the reader (such as at the top of a letter or on the first page of a website), that position indicates the element's significance within the context.

Signaling the various levels of the text's structure can be accomplished through choices in typography. When well chosen, the typographic treatments allow readers to distinguish among, for example, first-level, second-level, and third-level headings. By signaling the structure conspicuously, readers are more likely to notice important relationships in the content and to recognize thematic continuities.

In cases in which encouraging the reader to notice is critical, such as a "warning" label on a medicine bottle, designers often employ *double signaling*—that is, using more than one cue to draw attention to the message; for example, by signaling with size, weight (e.g., boldface), color, and position. However, it is important to be judicious in signaling with typography as too many signals (e.g., too much boldface) or too much repetition a particular cue (e.g., too many itemized lists in a row) can flatten the visual hierarchy, making it hard to tell what is important because nearly everything is signaled with dark type and displayed in list format.

Designers strive to make their layouts show the rhetorical relationships among message elements in a glance. They do so by using features such as grids, colors, shapes, backgrounds, orientation, and size. Research suggests that these dominant features are perceived immediately, making it important that they are well designed and that they cue the structure effectively (Malamed 2009).

Signally verbally

Lengthy or complex content may be signaled by layering the content into levels, with more abstract or general content at the top level and more specific content at lower levels of the hierarchy. Information designers, like technical communicators, aim to make the structure explicit through careful composition of verbal cues including, for example: previews, summaries, sidebars, headings, subheadings, topic sentences, advance questions, transitions, logical connectives (e.g., *and*, *or, consequently, next*), structural cues (e.g., *first, second; on one hand, on the other*), meta-discursive cues (*recall my first point, imagine the opposite interpretation*), pull quotes, legends, and captions (Spyridakis 1989a) (Spyridakis 1989b).

Many print and online documents have a hierarchical structure, signaled by making broader topics (or more important topics) more prominent than specific topics (or less important topics). Subtopics are typically cued by subordination (Farkas 2005). For example, a website's homepage is at the top of the hierarchy and its links provide branches to content at a more specific level, and these branches are split again at each level of the hierarchy. While simple content often has a structure only two levels deep, more complex content often requires a four-level or five-level structure.

Designers can improve the quality of their content by (1) organizing it into logical and semantically-related rhetorical groups, (2) thinking carefully about how many levels of content are needed, (3) determining how the groups should organized to orchestrate a message, and (4) using verbal devices such as labels, names, captions, and headings that enable readers to make quick judgments about the nature of each group.

Heuristic: Taking an Information Design Approach to Shaping Content

As a way of summarizing what technical communicators need to know about information design, I present the following heuristic as a way of integrating the main points about designing visually:

1. Group content to reveal relationships
2. Create meaningful contrasts among types of content
3. Signal and cue rhetorical relationships

1. Group content to reveal relationships

Before choosing a scheme for grouping, consider the reader's likely purposes and goals for using the content. Keep in mind that most online readers skim the content before diving in to read selectively (Stark Adam, Quinn, and Edmonds 2007), (Redish 2007). Organize the groups in order to support likely skimming behavior. Support readers' cognitive processes as they try to understand the text and graphics by making sure the content is (1) grouped in a meaningful way, and (2) coherent within each group.

Position the groups so that the most prominent content connects to readers' prior knowledge or experiences (e.g., at the beginning of a printed piece, high in the text structure, or in a focal position on a webpage). In this way, readers are more likely to make appropriate interpretations of the message.

Consider the readers' feelings and emotions about the content, particularly as you order the groups. Readers will be more likely to read the content when prominent parts of that content speak to them immediately. Consider carefully the size of each group, its location on the page or screen, and its visual prominence in relation to other groups. Avoid making all groups the same size unless the content is actually parallel. Variation beckons the eye to enter.

Indicate to readers how groups are related through the order of presentation or display and through spatial relationships. Keep in mind that relationships among groups can be rendered by using vertical or horizontal space, shading, weight, rule lines, color, icons, or saturation. Use these cues consistently to indicate related groups.

2. Create meaningful contrasts among types of content

Once the content is grouped and ordered appropriately, it is appropriate to create contrasts within and among the groups. As discussed earlier, these contrasts can be graphic or typographic, but above all, they must be meaningful.

If the message is primarily textual, strive for typographic contrast. Begin by (1) identifying the structure of the message, (2) deciding how many levels deep the headings should be, and (3) selecting a heading style for each level of the text. For each level of heading or subheading choose a typeface (font), typesize (font size), style (regular, bold, italic, black), and color. Keep in mind that readers notice the differences among the styles within a typeface (e.g., light, regular, bold, black) as well as whether text is displayed in sans serif or serif. In choosing typography, it important to use apply styles purposefully and consistently. It is a good idea to choose a typeface with excellent contrast among the styles within the face (that is, that has good contrast between the boldface and the regular style). In general, limit the number of faces to two that contrast well, such as one sans serif and one serif face.

Consider the audiences' preferences for typography. Research shows, for example, that most people prefer sans serif typefaces as they read online—whether they are children, college students, older adults, or people with low or corrected vision. A sans serif face for electronic communications will likely satisfy the preferences of most online readers. By contrast, most

American readers tend to prefer a serif face for the body copy of lengthy text presented on paper, while most Europeans tend to prefer a sans serif face for lengthy print-based text.

People from every country appreciate good contrast between the body copy and the headings. This can be achieved by using either of the following: (1) sans serif type for headings and serif type for body text, (2) a serif type for both headings and body text as long as it has good contrast within the face, or (3) a sans serif face for both headings and body text, again as long as it has good contrast within the face.

If the message is primarily graphic, it will be important to consider the size and position of each graphic. Imagine, for example, that you are designing a catalog of laptop computers and smart cellphones that range in price from $100 to $3000. You might start with a collection of images that are many different sizes. Your first task would be to consider how to make all images of the laptop computers a similar size and then do the same for the cellphone images. Your next task would be to devise a way to display which items are parallel (for example, by their functionality and price). You could, for example, use shading or bounding boxes to help readers see relationships among items (such as orienting the laptops left-to-right and putting a gray box behind all laptops that are $500 or less). The idea is to use graphic cues such as size, position, alignment, background, or color to make relationships salient for readers. In this way, they can glance over the content and quickly determine how items are related, which ones look interesting, and which items to skip.

3. Signal and cue rhetorical relationships

Once the content has been grouped and meaningful contrasts have been established, it will be important to worry about the details of signaling rhetorical relationships. This will require revisiting your understanding of your audience's likely purposes for engaging with the content. Once you have a good sense of how readers might interact with the content, it will be more apparent what content should be signaled explicitly using visual or verbal cues.

That said, even when one has a good idea of the reader's likely strategies for using the content, information designers must evaluate the goodness of their predictions by testing the content with readers (discussed elsewhere in this book). Usability testing can help information designers revise their approach to signaling the content. The findings of usability testing often alerts us to visual or verbal cues that are missing, incomplete, inconsistently executed, or just plain unclear (Schriver 1991a) (Schriver 1992).

As mentioned earlier we can signal rhetorical relationships in a number of ways. If we continue the computer and cellphone catalog described in the previous section, we could strengthen the information design by cueing the content visually and verbally. For example, readers would expect that like products would have descriptive blurbs that were about the same length. Editing the text to create this parallelism would cue the reader that they are reading about a family of competing products. By drawing on both textual and graphic cues, the information designer could call attention to particular products that have special features, such as which phones have GPS tracking. The designer might decide to use a large table format with images on the top row and blurbs on the second row, enabling readers to compare each product feature-by-feature.

As we can see, the writing and design process interact. While sometimes information designers start their work with mainly images, other times they start with mainly text. As they execute their plan for a communication, the writing may influence the design or vice versa. An important consideration is to allow for this healthy symbiosis between writing and design while at the same time devising signaling strategies that are clear and consistent.

A Case in Point: Example 1

In this section I illustrate the heuristic described in the previous section with two examples. Example 1 is a series of iterations of an abstract intended for a professional journal in technical communication. Example 2 presents *before* and *after* versions of some advice on healthy eating from the popular press.

Example 1 shows the evolution of an abstract for a scientific paper on the topic of how people read online. There are four versions of the abstract:

1. Original version: Formatted as a single block of text. It displays the text using a serif font in a justified format (sometimes called justified right). Notice that this typographic treatment renders the text a uniform shade of gray and the only cue is the boldfaced italics employed for the word *abstract.*
2. Version 2: Reformatted to display the text in ragged-right format by removing the justification of the type. It also introduces the use of vertical line-spacing as a visual cue to make the organization more visually apparent.
3. Version 3: Modified further through the introduction of sans serif boldface type to highlight the structural signals "first, second," and so on.
4. Version 4: Modified further to shift the display from a series of listed sentences to an itemized list format. Notice this visual display explicitly "nests" the four items within the body of the abstract, making them a visually distinct group.

Abstract Reading online is a complex interaction among people, technology, text, and graphics. This four-part article reviews the research literature from 1980 to 2010 about how people read online. Part one investigates the purposes that people bring to reading online, exploring how differences in goals, expectations, and reading skill influence what people do. Part two explores the impact of computer and mobile technologies on reading, asking how technologies enable and constrain reading. Part three integrates the research on good writing and focuses on the text features that help people to understand, remember, and appreciate online content—from words to whole-text considerations (e.g., noun strings, voice, headings, structure, and text density). Part four examines the research on the visual display of content and consolidates the research literature on graphic issues from typography to overall visual impression (e.g., typeface, line length, grouping, hierarchy, contrast). This article consolidates key issues of interest for information designers and summarizes what we have learned about reading online in order to more effectively fulfill our goals as advocates for readers.

Figure 1. An original version of an abstract (Schriver in preparation).

Abstract Reading online is a complex interaction among people, technology, text, and graphics. This four-part article reviews the research literature from 1980 to 2010 about how people read online.

Part one investigates the purposes that people bring to reading online, exploring how differences in goals, expectations, and reading skill influence what people do.

Part two explores the impact of computer and mobile technologies on reading, asking how technologies enable and constrain reading.

Part three integrates the research on good writing and focuses on the text features that help people to understand, remember, and appreciate online content—from words to whole-text considerations (e.g., noun strings, voice, headings, structure, and text density).

Part four examines the research on the visual display of content and consolidates the research literature on graphic issues from typography to overall visual impression (e.g., typeface, line length, grouping, hierarchy, contrast).

This article consolidates key issues of interest for information designers and summarizes what we have learned about reading online in order to more effectively fulfill our goals as advocates for readers.

Figure 2. An initial revision of the abstract shown in Figure 1.

Abstract Reading online is a complex interaction among people, technology, text, and graphics. This four-part article reviews the research literature from 1980 to 2010 about how people read online.

Part one investigates the purposes that people bring to reading online, exploring how differences in goals, expectations, and reading skill influence what people do.

Part two explores the impact of computer and mobile technologies on reading, asking how technologies enable and constrain reading.

Part three integrates the research on good writing and focuses on the text features that help people to understand, remember, and appreciate online content—from words to whole-text considerations (e.g., noun strings, voice, headings, structure, and text density).

Part four examines the research on the visual display of content and consolidates the research literature on graphic issues from typography to overall visual impression (e.g., typeface, line length, grouping, hierarchy, contrast).

This article consolidates key issues of interest for information designers and summarizes what we have learned about reading online in order to more effectively fulfill our goals as advocates for readers.

Figure 3. A second revision of the abstract shown in Figure 1.

Abstract Reading online is a complex interaction among people, technology, text, and graphics. This four-part article reviews the research literature from 1980 to 2010 about how people read online.

- **Part one** investigates the purposes that people bring to reading online, exploring how differences in goals, expectations, and reading skill influence what people do.
- **Part two** explores the impact of computer and mobile technologies on reading, asking how technologies enable and constrain reading.
- **Part three** integrates the research on good writing and focuses on the text features that help people to understand, remember, and appreciate online content—from words to whole-text considerations (e.g., noun strings, voice, headings, structure, and text density).
- **Part four** examines the research on the visual display of content and consolidates the research literature on graphic issues from typography to overall visual impression (e.g., typeface, line length, grouping, hierarchy, contrast).

This article consolidates key issues of interest for information designers and summarizes what we have learned about reading online in order to more effectively fulfill our goals as advocates for readers.

Figure 4. A final version of the abstract shown in Figure 1.

As we can see, each successive version of the revised format introduces more visual segregation among the content elements. By changing (1) the grouping, (2) the contrast, and (3) the cueing. The final version of the abstract makes it easier for the reader to rapidly accomplish an important goal: to determine if the content of the scientific paper is of interest.

A Case in Point: Example 2

Example 2 shows two versions of a list of healthy foods. The original list extended over two pages and was intended to function as a summary on the consequences of diet (Flanagan and Sawyer 2007), (p. 77). The "Before" (shown in Figure 5) is part of the original list. Notice that it employs minimal cueing and the typography (Times regular and Times bold) makes for rather weak contrast between the food and the explanation that follows.

Healthy Foods

Almonds and walnuts (and other nuts)—Lowers both total and LDL cholesterol levels.
Apples—Low in calories, high in soluble fiber, which helps lower cholesterol.
Avocados—Rich in monounsaturated fat and fiber; source of plant sterol and antioxidants.
Blueberries (and other berries)—Great source of antioxidants and dietary fiber.
Citrus fruits—Lots of vitamin C, folate, thiamine, and potassium.
Cruciferous vegetables—Have unique compounds that are felt to be cancer protective.
Fat-free or 1% milk (and yogurt)—Excellent source of calcium.
Garlic (and onions)—Linked to anticlotting, cholesterol lowering and cancer protection.
Legumes (including beans, peas, lentils, peanuts, and soy)—Vegetarian source of protein; low in calories and saturated fat, good source of vitamin B6, potassium, and zinc.
Melons—Good source of lycopene and Vitamin C.
Olive oil (particularly virgin olive oil)—Beneficial to your health not only for its monounsaturated fat (oleic acid), but also because it is rich in polyphenols.
Red wine—Contains bioflavonoids, phenols, resveratrol, and tannins, which have antioxidant and anticlotting properties; raises HDL cholesterol.
Salmon (and other fish)—Rich in omega-3 fatty acids; great source of protein and iron.
Spinach—Source of vitamins A, K, C, and B6; riboflavin; folate; and potassium.

Figure 5. Before: A list of healthy foods.

The “after” version (Figure 6) draws on the same content, but gives it an explicit visual and verbal structure. First, it changes the visual format from a list to a table. Second, it alters the verbal structure by shifting from the topic-based title “healthy foods” to the scenario heading “why they’re good for you.” (Scenario headings orient the content from the readers’ perspective.) In this way, instead of the textual blurbs appearing as random elaborations about each food, readers can readily reference why these foods are good. Third, the “after” version changes the typography, mixing a sans serif face (Frutiger bold condensed) and a serif face (Serifa light), which increases the contrast between the list of foods and their elaboration. Moreover, the table format promotes access and makes the alphabetical organization seem more appropriate.

After

Healthy Foods	Why They're Good for You
Almonds and walnuts	Lower both total and LDL cholesterol levels.
Apples	Low in calories, high in soluble fiber, which helps lower cholesterol.
Avocados	Rich in monounsaturated fat and fiber; source of plant sterol and antioxidants.
Blueberries (and other berries)	Great source of antioxidants and dietary fiber.
Citrus fruits	Lots of vitamin C, folate, thiamine, and potassium.
Cruciferous vegetables	Have unique compounds that are felt to be cancer protective.
Fat-free or 1% milk (and yogurt)	Excellent source of calcium.
Garlic (and onions)	Linked to anticlotting, cholesterol lowering and cancer protection.
Legumes (including beans, peas, lentils, peanuts, and soy)	Vegetarian source of protein; low in calories and saturated fat, good source of vitamin B6, potassium, and zinc.
Melons	Good source of lycopene and Vitamin C.
Olive oil (particularly virgin olive oil)	Beneficial to your health not only for its monounsaturated fat (oleic acid), but also because it is rich in polyphenols.
Red wine	Contains bioflavonoids, phenols, resveratrol, and tannins, which have antioxidant and anticlotting properties; raises HDL cholesterol.
Salmon (and other fish)	Rich in omega-3 fatty acids; great source of protein and iron.
Spinach	Source of vitamins A, K, C, and B6; riboflavin; folate; and potassium.

Figure 6. After: A list of healthy foods.

Conclusion

In this chapter I have argued that taking an information design approach can improve the quality of the content that technical communicators create. When the structure of a message is made prominent visually and verbally, readers are more likely to attend to the message and appreciate it more fully (Schriver 2009). As I have shown, technical communicators need not be graphic artists in order to improve the design of their content. I have presented a heuristic for visually displaying content that involves three key activities:

1. Grouping content to reveal rhetorical relationships
2. Creating meaningful contrasts among types of content
3. Signaling and cueing rhetorical relationships

The research presented in this chapter provides very strong evidence that each of these activities can help to improve readers' engagement with content. These activities are especially powerful when they are employed iteratively and when combined with usability testing. Content that has been shaped by these activities and followed on with usability testing is likely to be easier to understand, better used, more liked, and better remembered. Moreover, each component of the heuristic is supported by empirical evidence.

Taken together, the research tells us that information design is neither decoration nor artifice. Rather, good information design supports readers' cognitive and emotional interactions with content. In this way, information design is about enabling communication and engineering experience. Research on expertise in information design suggests that as communicators become more sensitive to the visual, graphic, and typographic aspects of their content, they become more flexible and more skilled in their approach to designing messages (Schriver 2010).

This expansion of technical communicators' concern from focusing mainly on verbal aspects of messages to both visual and verbal is important because many messages are never read because readers deem them boring or ugly. As technical communicators develop their expertise in information design, they will become more articulate advocates for readers. They will also find that information design is not about choosing between serif and sans serif typefaces, but about making sure people engage with the message. The hardest part of the work lies in understanding what content will best help readers, in developing the best content, and in envisioning novel ways to shape the message.

Considerations for Further Inquiry

This chapter has advocated an information design approach to technical communication. Unlike traditional approaches, which tended to treat visual design as a tidying-up activity to be carried out at the end of composing, taking an information design approach means seeing visual design as a generative activity from the start. Taking an information design approach means embracing the idea that visual and verbal design processes should unfold interactively and should be driven by common sense of rhetorical goals (Schriver in preparation).

While the last decade has told us much about best practices in information design, there are many questions that remain unanswered, particularly about the people who are doing the practice. Among of the most pressing questions include the following:

1. How does expertise in information design develop?
2. What are its key features/indicators?
3. How can it be nurtured? In the academy? On the job?
4. What techniques or strategies help to improve designers' skills?
    - How does sensitivity to grouping content, creating contrast, and signaling rhetorical relationships develop?

4. How long does it take to excel in information design practice?
5. What methods are most sensitive to assessing information design expertise?
6. How can employers tell a great information designer from good one or a mediocre one?

Once these questions receive serious attention from the research community, the field will not only have better information about how to develop sensitivity to visual design, but we will also have empirical evidence for why expertise in information design has value.

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Chapter 16: What Do Technical Communicators Need to Know about New Media?

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Summary

Like other communication technologies, new media—networked digital communication technologies—entwine with how we build relations with each other and set up conditions for acting together socially, culturally, economically, politically, and in the workplace. Technical communicators therefore need not only to stay aware of new digital communication technologies—new software and hardware—but also to stay aware of how we can use and so shape those technologies and their environments to support our work as communicators. This chapter suggests how the rhetorical approaches many technical communicators already use for planning and developing communications can open to address projects in which new media are or might be used, as well as how to consider shifts in living and working environments that seem solely technical but that are in fact also rhetorical and political.

One Possible Future

> The three left the edge of the flood channel and followed a narrow trail along the east edge of Pyramid Hill. This was far from any entrance, but the twins' uncle worked for County Flood Control and they had access to CFC utilities support imagery—which just now they shared with Juan. The dirt beneath their feet became faintly translucent. Fifteen feet down, Juan could see the graphics representing a ten-inch runoff tunnel. Here and there were pointers to local

> maintenance records. Jerry and Fred had used such omniscience before and not been caught. Today they were blending it with a map of the local network nodes. The overlay view was faint violet against the sunlit day, showing communication blindspots and active high-rate links.
>
> The two stopped at the edge of the clearing. Fred looked at Jerry. "Tsk. Flood Control should be ashamed. There's not a localizer node within thirty feet."
>
> "Yea, Jer. Almost anything could happen here." Without a complete localizer mesh, nodes could not know precisely where they and their neighbors were. High-rate laser comm could not be established, and low-rate sensor output was smeared across the landscape. The outside world knew only mushy vagueness about this area.
>
> They walked into the clearing. They were deep in a network blind spot, but from here they had a naked-eye view up the hillside, to ground that must surely be within Pyramid Hill. If they continued that way, the Hill would start charging them. (51-52)

On a morning in 2025 (in Vernor Vinge's 2006 novel *Rainbows End*, from which the quotation above comes), three high-schoolers walking to school decide they will duck into the local amusement park—Pyramid Hill—to play a little "Cretaceous Returns," one of the virtual games offered within the park's boundaries. They are "wearing": their clothing is wired, as are their contact lenses, and they can thus interact—with no need for other hardware and carrying nothing in their hands—with the public and, in this case, private networks overlain on the hills, gullies, and scrub of northern San Diego County. Because, as Vinge describes, these networks spread throughout the countryside and because people are wearing the digital devices that allow them to see in the environment what we are now accustomed to seeing only on computer screens or book pages, these students, like those who manage the environment to deal with flooding, can see and interact with visual representations, hanging in the air, of the CFC's tunnels and pipes; they can also see maintenance records for that infrastructure of tunnels and pipes and can see instructions for working with the infrastructure. Similarly, people in this imagined future can send representations of themselves (accurate representations or represenations that are modified so that one would appear to others as, say, a rabbit) to interact with others at great distances, either through talking or through "silent messaging" (where one's text messages hang silently in the air before others, typed in not through a keyboard but through idiosyncratic and subtle body movements one develops in private interaction with the technology one is wearing; there is no longer a need for cellphones).

In line with the other chapters of *Solving Problems in Technical Communication*, I could now pose the following problem for you, as a way to shape the rest of this chapter: *If you were the technical communicator responsible for developing training materials for the people charged with maintaining the County Flood Control's networked visual overlays (the overlays described above, the ones illegally brought up by the twins), what sort of materials would you develop? Through what sorts of process would you develop them? With whom would you work?*

Instead, however, the problem with which I wish to challenge you in this chapter is more general, and although it could help you address the questions above, it is aimed instead at helping you think yourself into some future potentials of technical communication: *How do you prepare yourself as a technical communicator as our media are shifted, redesigned, and presented to us as "new media"?*

I have started this chapter differently than the others in this collection—with an extended quotation, which I will soon explicate more—because ongoing changes in media require, I believe, a shift in the imaginings we use if we are to develop as or continue being competent and fluid technical communicators. As necessary as it is to imagine developing communications with and for the people sitting around you at this instant, it is also necessary to imagine developing communications for the people who will be around you five and ten years from now—who could be the same people around you now but who, after some years of shared engagement with new media, will likely have very different expectations not only about what documents are but also about time and how we interact with each other. People in the future are likely to be different, that is, for it is an argument of this chapter that new media modify and change our relations with each other, whether we are facing each other in the same time and space or engaging through texts asynchronously and at distance.

The novel from which I took my opening quotations is one visualization of a near future in which governments, citizens, workers, teachers, and students use ubiquitous computing so as to reshape the communication practices you and I now know and, in the process, reshape government, work, and learning. In the novel, writing appears as code, comment, and message. In place of extended narratives like novels and movies, there are extensive immersive games. In place of individual written composition, there is partnered composition of water purifiers or of real-time virtual musical performances that bring together orchestras from Punta Arenas, Chile and Boston, Massachusetts. In one narrative thread, a rejuvenated Pulitzer Prize winning poet, once thought lost to Alzheimer's, must find new work and meaning for his life because his cure has killed his talent (and because it is unclear how many people still read poetry); the poet instead becomes a coder, focusing on the synchronization that (for example) enables so many individuals to see the same environmental overlays, to work and to play together at great distances, as when, no matter where they are in the world, they can see—and participate in—costumed performances and games.

The novel's author, Vernor Vinge, taught computer science but has been able to make a living as a novelist and consultant to technology companies because his novels have so well predicted the latent potentials of current technologies. In 2008, for example, a website described by the New York Times as the "leading Augmented Reality News blog" ranked *Rainbows End* as the number one "augmented reality demo" over digital examples of augmented reality (Inbar): In his novel, that is, Vinge imagines for us what it is to live and work together in a world in which what we are now accustomed to seeing only on screens mixes in with or augments our physical reality. (One well-known movie example that uses augmented reality is *Minority Report*.) In *Rainbows End*, Vinge's imaginings **are** imaginings—but they are sufficiently concrete and articulated to allow us to consider how the changes we make as we develop digital technologies are not simply changes in tools—with all else staying the same—but instead are changes in the communication structures that weave into the relations we have with each other and that hence push at how we talk, govern, teach, deliberate, act, work, and otherwise live together.

If new media *were* only about software or genres of electronic texts, the answer to this chapter's question of what technical communicators need to know about new media would be an easy list recommending that readers learn the most commonly used software packages for creating webpages; help systems; blogs and other social-networking sites; instructional video games, software, or videos; and single-source and content management systems. But because the production, distribution, and consumption of such texts can differ considerably from the production, distribution, and consumption of "traditional" print texts, technical communicators who wish to engage with such texts, or with whatever kinds of texts we develop, need therefore to engage not only with software and genre features but with larger concerns such as the relations we establish with each other as we choose among the communication technologies available to us and just what audiences do learn from engaging with such texts.

In this chapter I therefore discuss ways in which our relationships with each other and our texts are shifting because of how we use new media. Out of those discussions I will build a heuristic for thinking rhetorically when you work on projects that engage with new media in the future—and now. That is, I will situate new media work within an understanding of how texts of all kinds are designed to persuade us toward particular actions or beliefs by being designed to address particular audiences operating within particular times and places. I want to help you consider how these shifting contexts in which technical communication texts are produced—contexts that swirl together the technological and the social—also shift what it is to write, to be a writer, to be an audience, and to make judgments about the efficacy of texts.

Defining "New Media"

For many, "new media" are simply any communication produced, distributed, and/or consumed in some part through computers: In this view, "new media" are nothing more than blogs, online newspapers, digital help systems, computer games, podcasts, text messaging, Facebook, GPS systems, mp3s, interactive Flash poetry, wikis, content management systems, Twitter, digital television recorders, or [you can continue to fill in this list with further examples]. In their production, distribution, and consumption, these "new media" stand in contrast to the media with which we were familiar leading into the late twentieth century: books, newspapers, magazines, radio programs, television shows and commercials, and movies. This definition—"any communication produced, distributed, and/or consumed in some part through computers"—separates the *what* of a communication (*what* we read, see, or hear) from the *how* of the communication, potentially implying that it doesn't matter whether (for example) I write a report by hand or with my keyboard because what I write is separable from the medium in which I produce it and through which you, as reader, see it. Starting in the late nineteenth century, however, theorists and scholars started questioning whether we can separate the content of a message from how we produce, distribute, and consume the message; considering the arguments of these theorists and scholars will necessarily lead me to complicate the preliminary definition of "new media" I offered at the start of this paragraph.

In the late nineteenth century, the philosopher Friedrich Nietzsche used an early version of the typewriter and noted that "Our writing tools are also working on our thoughts" (qtd. in Kittler, 200). Recently, media theorist Friedrich Kittler has written (in part) about how one initial stated purpose for typewriters was to help the blind write (which is why Nietzsche, losing his eyesight, got himself one) and how with the introduction of the typewriter business use of this device entwined with a shift from male to female secretaries and so with a shift in a sense of gendered relations to words. Kittler argues that, in using the typewriter, Nietzsche's writing changed "from arguments to aphorisms, from thoughts to puns, from rhetoric to telegraph style" (203); that is, Kittler implies, Nietzsche's shift from the slow handwritten formation of words and thoughts on paper to the quicker movements of a typewriter shortened and speeded up Nietzsche's writing and so his thinking.

Similarly, in discussing the earlier development of the printing press and mass-produced books that could be held in one's hands (as opposed to the still earlier one-at-a-time hand-produced books of the Middle Ages that most often could only be read when supported by a pedestal), various scholars throughout the twentieth century have argued that such hand-held books encouraged people to conceive of themselves as individuals, both because they could hold books in their hands and read silently to themselves (Saenger) but also because books became available to many more people than before, allowing for the broader sharing of ideas (Eisenstein; Illich and Sanders). Some writers argue that the development of the printing press therefore contributed to the spread of ideas that led to the Protestant Reformation and the Scientific Revolution (Eisenstein), while other writers focus on the linear and hierarchical structures of words on the pages of machine-printed books, arguing that the consistency of such structure led to the development of philosophic logic (Saenger) or of philosophy itself (McLuhan), and even to the rise of nations out of medieval political structures (McLuhan).

In my descriptions about these relations between communication technologies and human activity, it can sound as though a single technology such as “the book” or “the typewriter” causes or determines changes in human behavior. Most scholars now consider such a simple one-to-one cause-effect relationship to be too simple and reductionist, and label a belief in such a relationship “technological determinism” (see Deibert 27–29, for example). In response to the technological determinism of some of the earliest scholars who wrote about relations between our communication technologies and our behavior, some later theorists have argued that technologies are always constructed out of already existing social relations and so always reproduce and emphasize already existing but perhaps implicit social structures and relationships (see Winner, for example); this position can be called a “social determinism.” Still other scholars argue that, because we make technologies and that we make technologies to take over or augment some of our actions (as a telephone allows us to speak with others far away), and because we work with other humans and with technologies (and with other non-humans) in networks toward particular ends, we should treat technologies as equal players in our observations of how we work (Latour). I am not here to argue for any one of these positions vis-à-vis our relationships with our communication technologies; what is important to note in all these approaches, instead, is that all of them address technology as being deeply entwined with how we live and what we can do: Nietzsche's oncoming blindness itself certainly had some effect on his thinking, for example, just as changes in population size, movements of people between farms and cities, and existing religious and political structures provided the milieu in which mass-produced books were used to spread ideas. As political scientist Ronald Diebert notes in arguing for his own position of "ecological holism" toward understanding our relationships with our communication media, we need to understand our lives within

> a continuously evolving interplay between environmental and technological conditions, formal and informal institutions and practices, and intersubjective values and beliefs. From this perspective, "rationalities," identities, nations, and states—though potentially stable on their basic contours over relatively long periods of time—are nonetheless products of historical contingencies and thus subject to change as nature and society evolve. (39–40)

Let me say again, then, that in discussing books or new media, I am not arguing that we can find any exact causal relations among our communication technologies and any specific aspects of human culture and politics—but no one doubts that there are relations. I simply want to establish that it is nearly impossible to untease with any certainty the complex ties among our technologies, our politics, our culture, and our senses of ourselves, and that we need to be alert to these ties as we work with our available and changing communication media—even if the task at hand (as mine is here) is the apparently simple task of defining "new media." I hope you now understand why, several paragraphs ago, I was hesitant to define new media in a way that implies that the devices of new media—computers, cellphones, gaming consoles—or the software we use are neutral carrying devices for "content."

If we turn back to focusing on defining "new media," then, it shouldn't surprise you that in a book that claims to be a "foundation for understanding new media" (Wardrip-Fruin and Montfort xi), artist and digital culture theorist Lev Manovich offers not one but eight propositions for understanding "new media," propositions in which technology, media, and culture entwine in differing proportions. In the propositions he offers, he considers how in approaching new media we should take into account how they are "new cultural objects enabled by networked communication technologies" (2003, 16) and that they use "digital computer technology for distribution and exhibition" (16–17); we need to be alert to how such new media objects are structured by their coding, which is also a cultural production, and so also to how the "data" of new media are not the photographs or pages of the analog media of print but rather the "numerical data" of code, even if as we work we are looking at photographs or alphabetic text onscreen (19). As one of his propositions, Manovich asks us to remember that we are discussing these concepts and objects in a particular historical moment and so to remember that all earlier media—phonographs, telephones, movies, television—were also once "new": As a result, we may "look for certain aesthetic techniques and ideological tropes which accompany every new modern media and telecommunication technology at the initial stage of their introduction and dissemination" (19). While emphasizing that "new media" seem new and perhaps wildly evolutionary only because of our particular historical moment, Manovich *does* want us to see how the current new media are indeed different from the media that preceded them, and so he argues that speed is one feature that differentiates the current "new media" from previous media: "Digital computers execute algorithms very quickly—however, in principle, an algorithm, since it is just a sequence of simple steps, can also be executed by a human, albeit much more slowly" (20). In addition, Manovich argues that the change in data of new media—from the analog pages of print and darkroom-based photography to data on a computer—changes our sense of the material with which we work: whereas earlier "artists were concerned with representing the outside world, with 'seeing' it in as many ways as possible," artists now work not with "raw reality" but most often with archives of existing film or video footage, existing photographs and sound, or existing text: the material in these archives becomes "the raw data to be processed, re-articulated, mined, and re-packaged through digital software" (22). As one would expect from an artist, Manovich's proposals emphasize how people have developed computers in times saturated with certain kinds of artistic practices—as, in his earlier book *The Language of New Media*, he also argued for us to attend to how the computer developed in the milieus of both art and military practices. I spend time with Manovich's list of proposals to emphasize what I have been arguing above: new media are not just about how we learn to use computer objects but also about how we use those objects now and in the future to shape our communications and lives.

Manovich's propositions helps me offer a definition for new media that focuses on those characteristics of new media that differentiate it from previous media without making wild claims about how new media radically change our lives; these characteristics also help us keep in mind how new media entwine thickly and deeply with how we live and work together. After listing and giving an initial description of these characteristics, I will investigate how these characteristics come together in different combinations to provide communicative possibilities for us; based on the characteristics and their possibilities I will present a heuristic for technical communicators working with new media.

New media…

1. ***result from digitization.*** With digitization, "graphics, moving images, sounds, shapes, spaces, and texts …. become computable; that is, they comprise simply another set of computer data" (Manovich 2001, 20). When they no longer exist as different materials but are stored in computer code, media such as video, sound, pictures, and text can be blended together in texts; think of how television, radio, music, video, movies, newspapers, and magazines are no longer separate media coming to us from different sources or on or through different devices but are all accessible mixed together on single devices, a process referred to as "media convergence." In addition, in ways much more easy than with print media, digitized media be copied, modified, reused, and mashed together, resulting in what is often referred to as "remix culture." Explorations of remix culture acknowledge how anyone—professional or not—with access to a networked computer can build new cultural objects out of existing cultural objects, publish the new objects, and hence participate in larger cultural and political discussions; such explorations also acknowledge how the ease of copying and re-using existing texts does not sit well with current copyright laws and conceptions of intellectual property, which were formulated within the structures of print cultures. See, for example, copyright lawyer Lawrence Lessig's book *Remix* on how remix culture and current copyright laws are at odds.
2. ***entail using code to control the presentation and distribution of media.*** Reading a newspaper on a laptop or cellphone screen means not only that the newspaper's words

and pictures have been digitized but also that they have been shaped by programming code to appear as they do onscreen arrangements; they have also been shaped by code to travel through digital networks. Coding also is used to determine what you are allowed to see by media owners: For example, do you have to register and set up a password to read a particular newspaper?

3. ***depend on digital networks.*** Without the wireless and wired networks linking our computers together, we could not share the data that we do. Webpages would be meaningless if we had to print them and mail them to each other; Google would not be possible if Google's programmers were not able to set up the code that searches through the world's networked hard drives in order to index the webpages stored on them; collaborative writing environments like wikis wouldn't exist because we would be unable to share, at a distance, the documents on which we work together. "Interoperability" is the term often used to name how different systems—computer hardware and software, differing networks—can work together to enable such work.

4. ***are faster than print media***. A text to your friend can bring you a response much faster than paper-and-envelope mail would (even were you writing in England when there were four daily mail deliveries in some cities), and it is not unusual for an afternoon's surfing on the Internet to bring us information from across the globe in what feels to be almost instantaneous time. The number of calculations your computer carries out as you surf the Internet, do your taxes online, or even play as simple a game as Tetris is considerably more than any human could carry out on paper in a day.

5. ***enable different kinds of interactivity than print media.*** Print media has its own forms of interactivity: Novels can engage our imaginations through their descriptions, setting us

up to dream up new inventions or dating possibilities; we do not have to read books from front to back but can dip in at any page to read in any order we might like. Because of digitization and coding and their speed, however, new media can change in response to our actions in ways that print cannot: In addition to how a story online can spark our imaginations or how we can click the links of an online magazine in any order we want, an online test (for example) can be programmed to change in response to our answers, such that it can—without making us aware of it—take us through a review of the information if we are struggling or to harder questions if we are doing well. My actions in a computer game are very likely to bring out different results than yours (especially if we are playing Rock Band). In addition, networking means that I can have collaborative or shared interactivity with others—as in massively multiplayer online games like *World of Warcraft*, whether in the same room or across the country.

6. ***are becoming ubiquitous.*** Manovich does not mention this feature of new media, but it is necessary to acknowledge that digital objects are no longer machines that sit on our desks: As the physical components of computing devices become smaller, new media can appear across a wider range of environments than print texts. You probably have a cellphone and perhaps a separate mp3 player, and your car may show you its minute-by-minute mileage in a game-like display. You may have a digital video recorder attached to your television or perhaps last Christmas you gave your mother a picture frame that cycles through the digital photographs of your last visit. As Byron Hawk and David M. Rieder note in their introduction to an edited collection on “small tech,” our uses of these smaller devices is “signaling a move from traditional, visual software interfaces to the ad hoc interfaces created by gestural objects in material ecologies” (xiv): We use our hands not only to call others on our phones but also (for one example), while out walking in the city, can point the phone's camera at restaurants we pass to learn how others rate the restaurants, as (for example) The Urban Spoon application on iPhones has this capacity to show—through Augmented Reality—labels over the facades of restaurants we see through our phones' cameras. Such interactions among small devices, our bodies, and our environments are spreading as we develop and use devices for isolating and studying DNA, work with ambient video, or experiment with using sound projections to create learning environments for people moving through historical sites. Hawk and Rieder's arguments imply that technical communicators will have to develop different and focused strategies for learning about and using different small tech devices, should they be appropriate for a particular audience and context, because each device fits into our social and cultural lives differently.

Why do these characteristics of new media matter? In describing the characteristics I have noted some implications for technical communicators; in the next section I tease out these characteristics still further to consider them in different combinations: Instantiated in different combinations, the characteristics of new media have been used to shape new communicative possibilities, possibilities that in turn shape how technical communicators can think about developing effective new media texts in line with their purposes and values.

New Media Developments That Affect the Work of Technical Communicators

The characteristics I laid out above for defining new media texts play out in different ways as those who develop new digital technologies and texts emphasize and combine various of the characteristics. Below, I examine—from simplest to most complex—how the characteristics listed above are changing the designing, planning, and publishing landscape for technical communicators.

Multimodality

Sometimes people will use the terms “new media” and “multimodality” interchangeably, for multimodality is one of the first features of online texts noted by communicators working on computers; new media is not the same as multimodality, however. “Multimodality” is just one result of the first characteristic of new media I noted above—the digitality of new media—and is a way of naming our ability easily to mix pictures, sounds, animations, video, and alphabetic text on digital screens. (Each of those kinds of ways of presenting information—pictorial, audible, alphabetic, etc.—is a communication mode). Multimodality has existed before the computer—you experience it every time you see a page in book that mixes alphabetic text with photographs or you see a movie with a soundtrack—but digitization made such mixing much easier than it was with print technologies. At least three aspects of digital multimodality require heightened attention from technical communicators.

First, audiences who use computers regularly have come to expect multimodality. This can be as simple as an audience expecting that the texts they receive demonstrate more attention to the visual layout of information on printed pages, using color and photographs or giving more attention to typography. But audiences can also come to expect that such texts—especially when delivered on digital screens—will range across the available modes, mixing (for example) video with animation and incorporating sound. RJ Jacquez, Senior Product Evangelist at Adobe Systems for Technical Communication and eLearning, notes this in a recent interview when he claims that their online experiences “have raised users’ expectations” and that “users’ expectations should drive the direction we take as technical communicators": he argues that we should therefore make our communications "engaging" for audiences, using " video, hands-on interactivity, blended learning and the idea that we learn by doing" (qtd. in Ellison 11).

Second, implied by what I have written in the preceding paragraph, technical communicators can now choose among a wider range of modes for presenting information in line with their purposes. Will it make more sense to present instructions step-by-step in video or on paper? Will presenting an audience with the possibility of hearing instructions from a gentle-voiced reader make the instructions more effective than if the instructions can only be read by the reader? (See Kim et al. for a thoughtful discussion on shaping multimodal documents for particular audiences and contexts.)

Finally, because audiences for certain technical communications might now expect more engaging texts and because technical communicators can choose from among a range of modes for the documents they produce, the design process can ask more creativity and openness of approach from technical communicators. As S. Scott Graham and Brandon Whalen argue in an article about the complexities of designing new media texts, "designing and developing new media communication can be a dynamic, creative, intuitive, nonlinear (and sometimes childlike) process, which might explain why so much of new-media communication is dynamic, creative, intuitive, nonlinear (and sometimes childlike)" (66). Technical communicators may need to learn to use design strategies from the creative professions for framing approaches to communication situations and for developing creative directions to address those situations. (For assistance in starting to learn such approaches, track down two books that are now considered classics, John Chris Jones's *Design Methods* and Bryan Lawson's *How Designers Think: The Design Process Demystified*.)

Single-sourcing and Content Management

When different kinds of information can be digitized, they can be treated equally in storage and display systems. For example, a company can have a database in which it stores all the alphabetic text written for its documentation systems, with the text separated into various chunks, each chunk marked or indexed by the topics it covers; all digitized photographs, videos, and charts can similarly indexed and stored. To make a new document, a communicator can pull up all texts (alphabetic or not) indexed for a particular term, to see what already exists and so avoid duplication of efforts. Once any information is digital and then indexed and stored as I have just described, it

> can automatically and simultaneously appear in user manuals, help files, and press releases that can in turn be automatically altered to appear in print, on the Web, or on mobile devices. Once initial designs are created, fonts, colors, and layout are added on the fly for the specifics of each genre and/or medium, and with, for example, a simple change to a style sheet, aesthetic changes can easily be applied to past as well as future documents, making it easy to maintain organizational consistency. (Clark 36)

Under such systems, webpages can be built on the fly in response to user queries, as happens every time you search for a book on Amazon.com or look up a movie in The Internet Movie Database. This ability to use the same information in different documents is called “single-sourcing”; managing the information that is single-sourced is called “content management.”

Single-sourcing and content management enable efficient uses and re-uses of information by communicators across a company’s divisions, but they require those who index the information to mark it not only with the most obvious index terms but also to imagine future uses for which the information will be appropriate. They also require decisions to be made about just how small the stored chunks of texts should be: Should only page-lengths of information be indexed, or paragraphs, or sentences, or some combination? In addition, those composing new content for such databases must seek standardized features—such as tone of voice or level of complexity—for *all* their writing.

For technical communicators, content management—because it separates text from its presentation—creates particular challenges. Technical communicators have been accustomed to developing and shaping individual documents to address the needs of particular audiences in particular contexts; content management systems that enable communicators to work with existing chunks of information require, at their most stringent, that only existing information be poured into a template with no modifications for who will use the information or where. While this can work exceedingly well for organizations like Amazon.com and The Internet Movies Database, this can be trouble for a document that is intended to address audiences with differing or very specific needs. In addition, content management systems can make writing seem to be nothing more than the creation of bits of context-less content rather than the construction of complex and rhetorically aware documents. (See Anderson, Clark, or Hart-Davidson et al. for further discussions about single-sourcing, content management, and the roles of technical communicators.)

Web 2.0

Quoting from Wikipedia seems absolutely appropriate to me here for providing a definition for what happens when software designers experiment with interactivity over digital networks:

> The term "Web 2.0" (2004–present) is commonly associated with web applications that facilitate interactive information sharing, interoperability, user-centered design, and collaboration on the World Wide Web. Examples of Web 2.0 include web-based communities, hosted services, web applications, social-networking sites, video-sharing sites, wikis, blogs, mashups, and folksonomies. A Web 2.0 site allows its users to interact with other users or to change website content, in contrast to non-interactive websites where users are limited to the passive viewing of information that is provided to them. ("Web 2.0")

Applications that enable users to interact over networks set up conditions that should engage technical communicators in at least three ways: collaborative writing environments, user-generated information, and, simply, the existence (and continuing development) of a range of such applications that require rethinking a communicator's potential relationships with audiences.

Technical communicators can use applications like wikis and other collaborative writing environments to develop documents together at close or far distances. In either case, communicators need to learn how to negotiate over the purposes, arrangements, and presentation of the texts on which they collaborate. This is no different than in any collaborative writing situation, and is an aspect of any distributed working environment, and the challenges of such collaborations and of working in distributed working environments are well known and well discussed in technical communication: See the chapter in this collection on collaboration, or see the Summer 2007 *TCQ* special issue on distributed working edited by Clay Spinuzzi.

What is potentially new to technical communicators, however, is collaborating not with each other but with their audiences on documents or help systems. As Society for Technical Communication Fellow Rich Maggiani writes, “A collaboration through social media, properly undertaken, results in the truest form of audience-centered content. And isn’t that what technical communication is all about?” (20). Maggiani describes how a technical communicator might use online forums, wikis, or blogs to “to capture the collective knowledge of the community” (20), and, in the process, Maggiani acknowledges that such ways of working shift the position of a technical communicator from a generator of content to a facilitator or moderator: “I would moderate all of these social media interactions, and I would be responsible for managing, collecting, evaluating, and including the most relevant comments and feedback. This is where my expertise as a technical communicator would most come into play” (20). Similarly, RJ Jacquez, the Senior Product Evangelist at Adobe Systems for Technical Communication and eLearning whom I quoted earlier in the section on multimodality, discusses using Twitter to stay in touch with those who use Adobe’s products, and—based on his experiences—considers a future role of “content curator” for technical communicators who would range across social networking sites, “constantly finding groups and information, organising data and then pulling out the most relevant content on a specific issue and distributing it to the members of that group” (12); Jacquez writes that this

> information facilitator should keep an eye on conversations around their products and services and should be able to gather all this information. If they weren’t thinking about something that came up two months after the Help system was

> released, perhaps this is a good time to grab that data, send it out to their followers on Twitter or their friends on FaceBook, and use it next time they update the Help system. (12)

When technical communicators use social networking software to take advantage of their audiences' knowledge, then, not only do communicators and audiences collaborate, but the role of technical communicator can change to being one of managing user-generated content.

For such management or facilitation to work, it should be obvious that technical communicators not only need to know the range of social networking software their audiences are likely to use and, importantly, they need to know how to use the software rhetorically to encourage users to want to contribute their knowledge and to want to interact with technical communicators and each other—and technical communicators will also need to accommodate the desire for instantaneous response that uses of such software encourage in users.

Gaming and Immersive Environments

The speed and interactivity of digital systems enable different kinds of games and simulations, for pleasure as well as for education and training; on networked digital systems the same game or simulation can be experienced by multiple people at great distances. Games can be such immersive environments that players lose sense of where they are physically and instead focus all their attentions within the play environment and experience physical and emotional responses as though they were bodily within the environment. Gaming's engagements and immersive qualities offer technical communicators possibilities for study and challenge them to incorporate the possibilities of gaming—and of audience expectations resulting from gaming—into technical communications.

In an article on how groups work together in the massively multiplayer online game "World of Warcraft," Lee Sherlock examines how players used in-game chat features as well as "out of game" writing environments tied to the game—blogs, wikis, FAQs, message boards—to learn about gameplay and to organize their actions within the game. One aim of Sherlock's study is to use the complex game of "World of Warcraft" as an example environment for addressing questions posed by technical and professional communication theorist Clay Spinuzzi about how digital work systems can support and incorporate workers' innovations. In considering the relations among players' freedom to shape the game and the actions of the game's publisher to control the game, Sherlock notes that "what appears to be an open system of information generated by players to assist in gameplay activity is tied to a complex constellation of legal, economic, and political factors" (283), although players were able to use the range of writing systems available to them to develop, critique, and incorporate innovations for game play; to Sherlock, players' tactics in using the available writing systems suggest possibilities for worker-empowering digital working environments in general but also for the design of technical communications.

Because games can provide varying learning environments for players, research into the learning possibilities of games has grown exponentially in recent years. James Gee of Arizona State University, for example, has published widely on gaming and learning, and argues that "good video games" take advantage of thirty-six learning principles such as *identity* (players take on appealing characters or build them for themselves), *self-knowledge* (players learn not only what is being taught by the game but also about themselves and their own capabilities), "*psychosocial moratorium"* (players can fail with few consequences, and so are motivated to risk and explore), or *discovery* (learners are not told what it is they are to learn but can experiment and discover). Gee argues both that games are useful for education and that education should be more like good games because it would then be more engaging and fair.

Similarly, some who design digital interfaces for online professional environments argue that such interfaces should take advantage of the principles of immersive gaming. Marc Sasinski, for example, an Experience Designer who writes for an international group blog on interaction design, argues that "everyday users are now bringing mental models" from gaming to their expectations about all digital interfaces and that designers need therefore to incorporate principles from gaming in their "day-to-day design work." Although the techniques Sasinksi recommends that designers should incorporate overlap with those recommended by Gee, Sasinski recommends them not only because of the learning they encourage but also because of the emotional connections they encourage: "One could even argue that the interactive component [of digital gaming] introduces another dimension altogether, thereby perhaps even making it more emotional as compared to a passive experience like watching a film or reading a book." Sasinski adds to that observation by claiming that, because audiences have come to expect gaming principles to carry over into other online experiences, the "challenge of course, is that the next-generation of experiences will not only need to be both useful and appropriate, they'll also need to engage users more than ever before." These observations about how games work encourage technical communicators to consider what expectations their audiences bring about gaming to any technical communication situation and then to design communications that take advantage effectively of gaming potentials to meet those expectations.

Technical communicators considering gaming approaches for communications should also be aware of "alternate reality gaming" (ARG), which "uses the real world" rather than computer screens for play ("Alternate reality game"): Designers of such games can make use of cellphones, email, blogs, or whatever media to which they know their audiences have access, to set up puzzles or other playing situations that extend across neighborhoods, cities, or countries. One example of an early ARG, a 2004 promotion for the *Halo 2* game, is *I Love Bees*, whose playing and purposes have been well described by its lead designer, Jane McGonigal, in her article "Why *I Love Bees*: A Case Study in Collective Intelligence Gaming." In no small part, McGonigal sees such gaming as helping players experience and learn how to participate in a changing media environment in which decisions and knowledge are constructed through collective actions, as in Wikipedia or the World Economic Forums' Global Risks Prediction Market. Such sites, McGonigal claims, "use digital networks to connect massively multi-human users in a persistent process of social data gathering, analysis, and application. Their goal: to produce a kind of collectively generated knowledge that is different not just quantitatively, but also qualitatively, in both its formation and its uses" (199); participants understand themselves as "playing a singular, meaningful role in the network, with valuable individual microcontributions to make to the massively scaled effort" (201). Although many ARGs, like *I Live Bees*, have engaged players in solving fictional problems for commercial ends, there is a developing genre of "Serious ARGs": *World without Oil*, for example, was designed to help players imagine an achievable and livable future without oil, and *The Black Cloud* was designed to help high-school students learn about indoor air quality ("Alternate reality game"). The possibilities of such games challenge technical communicators not only to consider such involved gaming situations for large-scale communication contexts but also to consider how collective intelligence as a concept and as a practice are shifting audiences' understandings of themselves within digital environments.

Technological Decisions That Are Rhetorical Decisions

In a book about our interactions with computer games and simulations, Ian Bogost observes that "Computers run processes that invoke interpretations of processes in the material world" (5). For example, in a game that asks players to run an international hamburger chain, the game's procedures set limitations on what players can do as they try to manage a complex web of "the third-world pasture where cattle are raised as cheaply as possible; the slaughterhouse where cattle are fattened for slaughter; the restaurant where burgers are sold; and the corporate offices where lobbying, public relations, and marketing are managed" (28). Bogost argues that this game "makes a procedural argument about the inherent problems in the fast food industry, particularly the necessity of overstepping environmental and health-related boundaries" (31): Because players play bound by the procedures set up by the game, they learn how these procedures work in the world as well as on the computer. Bogost argues that these observations about what he calls "procedural rhetorics" apply to all games, and that attention to procedural rhetorics can help us both develop stronger games as well as to analyze the persuasion of games. Bogost is asking us to attend not simply to what we see of the game on a screen if we wish to understand the game's rhetoricality; we must also attend to the procedures that the game's designers have chosen to represent in the game through how the game has been coded. In playing this or any game, Bogost argues, the procedures that quietly structure game play work on us, persuading us toward a particular view of how things work. In asking us to attend to a technical aspect of games in order to see their rhetoricality, Bogost's efforts parallel those of other writers and scholars who ask us to see how other decisions that appear to be technological only can be deeply rhetorical.

Copyright lawyer Lawrence Lessig, for example, whom I mentioned earlier in connection with remix culture, has argued that what seem to be simply technological decisions have much deeper consequences. Discussing the decisions made by two different universities about how people on campus would access the university's network, for example, Lessig argues that a decision at one campus to allow open and anonymous access was a decision based in First Amendment thinking; the other campus required users to register their computers first, with no room for anonymous contribution and with, potentially, full tracking of a user's actions. Lessig's point is that these two networks "differ in the extent to which they make behavior within each network regulable. This difference is simply a matter of code—a difference in the software and hardware that grants users access. Different code makes differently regulable networks. Regulability is thus a function of design" (2006, 34). Lessig expands Bogost's arguments: For Bogost, it is the procedural coding of games and other software with which we interact that is rhetorical; for Lessig, the coding of any technology embeds values and so encourages certain kinds of attentions and behaviors. Lessig does not speak of rhetoric, but rhetoricians will understand that any circumstance in which a designer/composer/technician can choose among different strategies for encouraging audiences toward different values is rhetorical; as Lessig writes, "Too many miss how different architectures embed different values, and that only by selecting these different architectures—these different codes—can we establish and promote our values" (2006, 77). (For variations on this discussion, and elaboration on how code, hardware, and software are not neutral but embody values, see Chun or Galloway.)

Obviously, technical communicators need to be alert to the values and related rhetorical effects of their technical decisions or of the technical decisions of those with whom they work—and this charges them another responsibility, as technical communiator Rebekka Anderson describes in an article on content management. Anderson argues that while content management systems “may streamline information development and communication processes, they will not therefore necessarily improve the information products and communications since the needs of the producers and consumers of the information are subordinated to the process of information development” (68): When decisions about content management are made solely for the sake of efficiency, that is, “quality tends to be defined from a technocentric perspective that focuses not on user comprehension and usability but on the consistent integration and accuracy of content across an enterprise. In other words, the focus is on the information, not the people who might actually wish to use it” (74). For Anderson, this situation requires more than technical communicators advocating for users and documents designed for particular purposes; instead, she argues that

> as long as technical communication scholarship lacks visibility and accessibility, focuses exclusively on end users and rhetorical problems, and fails to make strong business arguments for rhetorical work, those making critical business decisions will continue to view [content management] as a technical solution to the sociotechnical and rhetorical challenges of empowerment, collaboration, quality, usability, and technology adoption. (63)

Anderson’s article is an argument for technical communicators who work with new media to understand what they do within the large contexts of culture, society, and work I have been attempting to develop in this chapter—and to advocate in their workplaces on behalf of users over technology.

A Rhetorical Heuristic for Technical Communicators Working with New Media

Rhetoric is a method for understanding how communications of all kinds do what they do. It is a method for analyzing texts, to help us consider the various strategies used in constructing a text and whether we wish to be persuaded by it. Rhetoric is also a method for helping those who compose texts think in depth about the audiences for whom a text is made, the contexts in which the text and audiences circulate, and the purposes for which the text is designed; with such understandings, composers can make decisions about what strategies to use in producing a text.

Illustration 1 shows a diagram of a fairly traditional rhetorical understanding of a technical composing process; the quoted words come from the United States Department of Labor's description of what technical communicators do ("What's the Difference"). I use this diagram, with its three parts, to provide a three-part framework for the questions I am about to offer, questions technical communicators can ask if they work with new media; I use this diagram to support further the claims I have been making throughout this chapter, that working with new media is not simply about learning all the new software that comes out but is, in addition, being alert to how these new communication technologies shift relations among technical communicators, the documents and other texts they produce to achieve their ends, and their audiences. Keep in mind that the questions I offer here supplement the questions and heuristics offered in the other chapters of this book; for example, the questions below about ethical considerations in working with new media should be used in addition to the questions of the chapter on ethics, for the questions in that chapter apply to any technical communication context and the questions here focus on ethical considerations in working with new media.

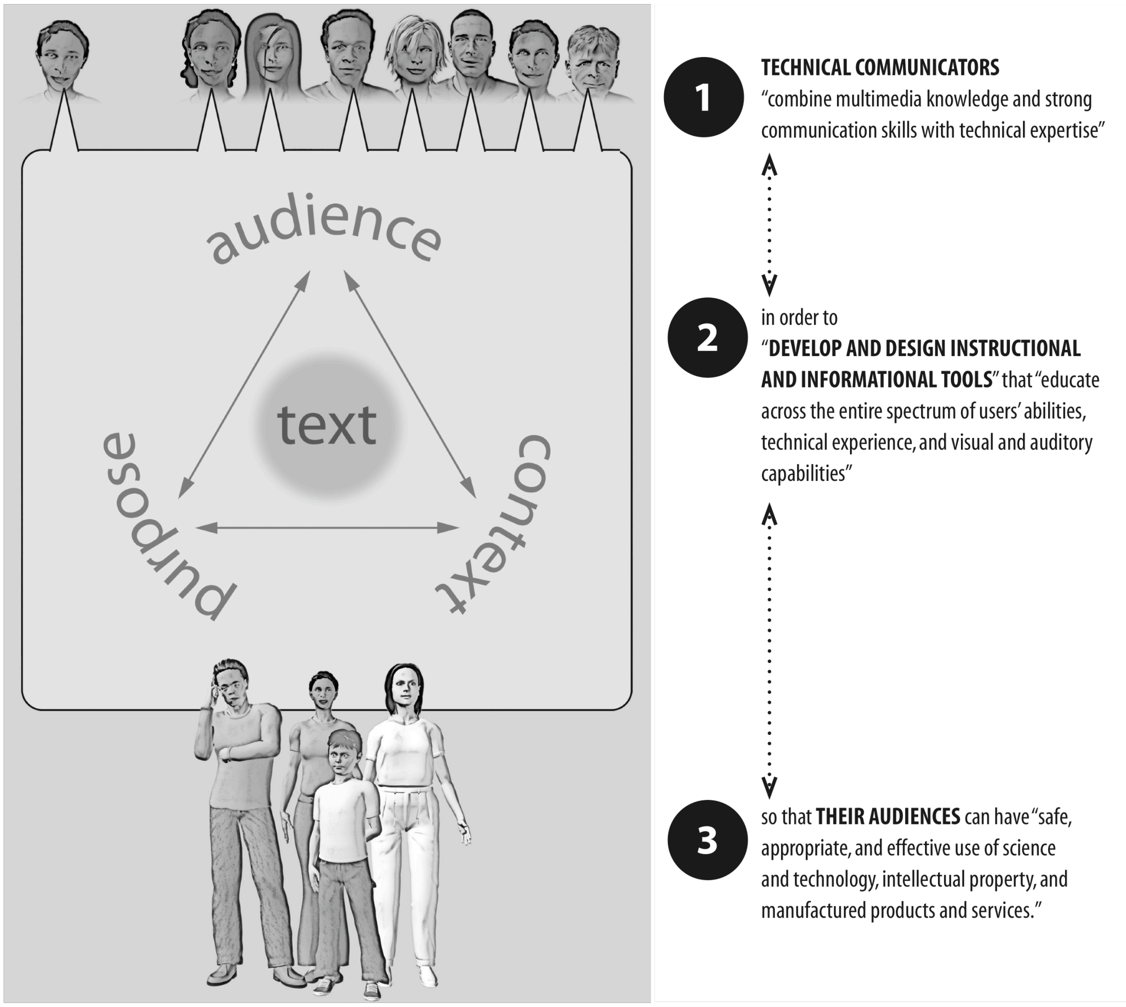

Figure 1. title?

Note, too, that the design process sketched in this illustration may look linear and imply that questions are asked once; instead, composers move back and forth among the stages of the illustration, using information gained at one stage to rethink what they have learned at other stages. As you move through the questions below, for example, you might note that some questions repeat concerns from other areas; this redundancy is intended, to keep you from fixing too early on approaches that always benefit from further consideration.

Questions for Technical Communicators Working with New Media

- Can one technical communicator carry out all the abilities needed for a new media project, or is a team needed? The following abilities are needed for most new media projects, and team members may bring multiple abilities: rhetorical knowledge; multimodal and interactive design abilities; writer/content developer; instructional designer; subject matter expert; project manager; person who is good at attending to the social needs of the team; people with the technical expertise to produce the new media; tester; those who can advocate, in the sponsoring organization, for the rhetorical work of the project in the ways described by Anderson above.
- If you are working at a distance from team members or from the organization sponsoring the work, how will you develop comfortable working relations with others? How will you develop decision-making processes? What software will you use for collaboration, and what sorts of collaboration does the software encourage?
- Given that the abilities needed on a project are not as clearly differentiated as they may first look, how will you negotiate who makes the final decision about the domain under which questions and problems are addressed? For example, following up on the arguments I have been making throughout this chapter, who will decide whether a question about the functioning of a webpage is technical or rhetorical?
- How will you negotiate developing style sheets for the document(s) you produce?
- How will you establish processes for tracking changes, storing texts, and making backups of work? Who will be responsible for backups? Where will backups be kept, and how

will they be named so that it is clear which are the current documents to be worked on and which earlier versions?

- Will you be developing new content for this project, or using existing content? Do you have the resources for developing the new content? Does the existing content meet your needs, or will you need to supplement it?
- Will you be developing a project from scratch, or will you be using existing templates, or some mix?
- If you are working with existing templates for producing texts, how will you establish a sense of ownership and pride in the work to stay motivated? What leeway is there to modify the templates for your particular purposes?
- What support do you need from the organization(s) with which you work to stay knowledgeable about new media technologies and their possibilities for technical communication? What responsibilities do you have to yourself to stay knowledgeable about new media possibilities, and what resources and time are reasonable for you to commit to these ends?

Questions for Developing and Designing Instructional and Informational Tools

This part of this process for working with new media is primarily conceptual, as technical communicators research and think through the needs, knowledge, and contexts of those for whom they are developing communications and as they fine tune their understanding of their communicative purposes for their audiences.

- **audience considerations**

Later I will ask you to consider how you might work with the real people who use the document(s) you produce, but the considerations immediately below are about how you, as technical communicator, need to conceive of your audience's qualities and abilities in order to employ your expertise as a communicater. As you move through these questions, keep in mind this chapter's arguments about audience expectations for digital communications to be multimodal and to be both aesthetically and emotionally engaging.

- What personal relations do you wish audiences to establish with the document(s) and the technology being used? For example, do you wish audiences to be able to personalize the document(s) through being able to make choices about interface colors or an avatar? Should the document(s) and technology provide users with immediate response, or will they need to ecourage audiences toward more patient uses?
- What emotional relations do you wish to establish between the audience and the document(s) ? Should the document(s) seem friendly, authoritative, playful, challenging, or…?
- What sense of the person or people behind the document(s) do you with the audience to take from the document(s)? Do you wish the audience to see you or the company responsible for the text as distant but friendly authorities, people who are similarly trying to learn, funny know-it-alls, or…?
- How might your document(s) empower users rather than keeping them in a passive relation with the technology being used or taught?

  - How might your document(s) encourage audiences to engage and collaborate more with others? Should the document(s) be designed to be used by one person at a time or multiple people?
  - Given your purposes, should the document(s) you produce engage audiences through their bodies and movement (such as suggested by small tech or ARGs, as described above) or primarily through the visual interfaces of screens?
  - Should your document(s) address your audience anonymously or as avatars with chosen names, or should it address your audience as they "really" are, using their real names and characteristics?
  - What sorts of help will the audience need in learning what you are teaching? Do they need explicit instructions up front, or can you embed context-sensitive help into the document(s)?
- **considerations of purpose**
  - What genres of new media texts—blogs, games, help systems, social networking systems like Facebook, and so on—will most help you achieve your purposes?
  - What arrangements within the document(s) will most support your purposes? Should your audience move through by means of a decision tree, for example, or should there be an index? Should there be a guide of some sort?
  - What are the emotional purposes of your project? What emotional relations should your project encourage between audiences and the document(s) and technologies you are using?
  - What aesthetic considerations will help make your document(s) as engaging as possible for your audience?

- How will you describe your purpose? Although many communicators will conceive their purpose along the lines of "The audience will learn software package X," a more useful statement of purpose will be along the lines of "Our audience, completely new to software X and shaky about using computers to being with, will gain a comfortable and friendly initial competence with using features A, B, and C of software X through a gentle and playful approach that will put the audience at ease and help them understand they cannot make any mistakes." Notice how such a statement of purpose immediately starts to suggest the look and feel of the documents to be developed.
- What are the most creative responses you can brainstorm for your purposes? Although you might not implement any of them, such brainstorming can help you develop more appropriate solutions to your communication situation and also help you address audience expectations for new media document(s).
- Does your purpose encourage you to stay within the temporal and financial constraints of the project? Do you/your team have the abilities to develop the project, given your abilities?

- **considerations of context**
  - Where, with whom, and using what device(s) will your audience encounter the document(s) you are producing? What do these contextual situations tell you about your audience's mood and attention level at the time they use your document(s)?
  - Will the document(s) be used in multiple contexts by the same audience? For example, in the scenario with which I opened this chapter, those tending the flood

control infrastructure might need document(s) to support routine maintenance, but they might also need document(s) at the highly stressful times of emergency. Be sure to brainstorm a range of contexts in which you can imagine your audience needing to use the document(s).

- Will the document(s) be used across contexts by different audience members? For example, will people be in different countries or states, at homes and offices, late at night and at noon, on cellphones and desktop computers? What do these different possible contexts of use tell you about the different needs and expectations audiences bring?
- What does the place of use tell you about your available technologies? For example, if you are developing document(s) for other countries, do you know the level of cellphone use or computer access? What does this tell you about the size of screen for which you need to develop, or audience expectations about interactivity?

- **considerations of the text itself**
  - Should the text be presented as a single document or multiple?
  - Are you considering what you are producing as a document or a simulation? As a game or video? An experience or environment?
  - Will you use one or two modes or multiple?
  - Can your audience access the document(s) easily, both in terms of having access to the necessary technologies but also in terms of knowledge for using the document(s).

  - If it suits the document(s)' purposes, can they be shared easily among different audience members?
  - Will these document(s) be used once or repeatedly?
  - What is the maximum size of the document(s), in terms of download and storage, such that you will not overstretch your audiences' patience or abilities to work with the text?
  - Do you have the resources—human, technical, monetary, temporal—to produce what you envision?
  - Can you justify producing digital rather than print document(s), in terms of time, cost, environmental impace?

The "Real" Audience

These are the people who live and breathe and who will use your document(s). If you can interview them or a reasonbable subset of them before and during the project, and engage them in collaborating and testing, your project is more likely to succeed.

- What can you learn from your audience to help you in designing?
- What sorts of audience research—interviews, observations of their technology uses—will most help you learn what you need to design and develop effective document(s)?
- Where will you engage the audience in your designing and planning?
- How can your communication help people use new media to "serve their own cultural, political and social visions" (Srinivasan 497)?

Applying the Heuristic

Now that we have analyzed how communicating with new media entwine us with more than just new technologies, let's return to the view of the future with which I opened this chapter, to use the heuristic I offered above to respond to these questions: *If you were the technical communicator responsible for developing training materials for the people charged with maintaining the County Flood Control's networked visual overlays, what sort of materials would you develop?*

Imagine that you have been assigned as the technical communicator on this project, as part of a team including a technical specialist who knows the county's drainage system and the state requirements for such systems, a programmer, a support person who will keep track of documents, and a project manager (who is managing four other projects at the same time). In an initial face-to-face discussion, the programmer suggests immediately that it would be easy simply to make accessible to those working in the field the already existing documents about the technical aspects of the flood control system; in fact, the programmer says, she just finished work on another project in which all existing technical support documents were indexed into one system, so that it will be easy to enable technicians in the field to call up the index and so to call up all existing documents virtually using the systems embedded in the work clothing required by the County. The project manager quickly agrees, saying that the indexing project was aimed precisely to save the company money by making all documents accessible in this way; the training the team should develop, the manager says, is simply the training about how to get to and use the index.

You agree that the field workers need to learn to access and use the new index, and that you should develop training for that—but you also wonder (realizing that you need to take on the role of rhetorical advocate in this project) whether other kinds of training and perhaps some new documents might be necessary, given the contexts of the field and the knowledge most field workers have. The heuristic above suggests that you need to learn about your audience and the contexts in which they work and will use whatever training you produce; the project manager agrees to provide you time to learn more about the field conditions and the field workers' knowledge.

Over the next month, you first talk with several field workers—both experienced and new to the job—to get a general sense of their working conditions and of the knowledge they bring so that you can develop a broader survey; because you learn just how independently the technicians in the field work and the differing conditions they encounter, you include in the survey a question that asks, "What are some of the oddest circumstances under which you've had to make fixes in the field?"

From carrying out the survey with all the field technicians, you are able to return to the project team to report that, 1) The experienced field workers have a lot of knowledge of how the drainage system works, knowledge that is not incorporated into any current documents but that the workers share informally; 2) The work in the field is usually routine checking and maintenance but that fires, floods, and earthquakes occur regularly enough that technicians have to learn how to access and apply training materials under stressful conditions; and 3) Because all sorts of people can pass through the back country where some of the most crucial parts of the drainage system is placed, field workers have to be prepared to deal with and learn from odd situations (as when one worker recently stumbled on several teenagers illegally accessing the system who then lectured the technician on the security lapses and poor technical quality of the system).

Based on having done such research into the contexts and audiences for the training materials, you present arguments to the project manager for the following materials and purposes—and (in some cases) additions to the development team; note how the heuristic's considerations about purpose, context, audience, and text weave together:

- *Materials for learning how to access the index*: Given that the field workers will need to access the index quickly and frequently in the field, the training for using the index should consist (you argue) of videos the workers can access from anywhere at anytime. (You argue that video makes more sense than print because the workers will learn best from demonstrations of the short process rather than having to read text; in addition the videos can be presented in a quick but friendly tone so that the workers think of the index positively.)
- *A social networking site for the field workers*: Because the experienced field workers have been sharing information informally, and because this information is so rich, you argue that this information should be made available to all the workers—but that, because this is information that changes and develops in response to what happens in the field, this information needs to be available in ways that workers can not only access but can add to. Also, because it became clear to you that the workers were proud of this knowledge, you also argue that the social networking site should be "owned" by the workers so that they would continue to use and add to it: Although (you argue) the County should supply hardware resources for hosting the site and should provide technical support for keeping the site running smoothly, the workers should be involved in the design of the site and workers should choose who among them would be a lead person in advocating for the site and keeping it active.

- *A simple game-simulation of how the system works when there is fire, a flood, or an earthquake.* Although developing a simulation would be expensive (both because developing games is expensive and time consuming but would also require adding to the production team at least one more specialist, in game design), you argue for a simple simulation whose value would be recovered from future savings; as evidence, you offer at least one case you learned about through your research: In the last fire and flood season, a quarter-mile section of piping had to be replaced because a worker, acting quickly after the fire, made a choice about the existing pipe that meant the pipe was later vulnerable and so destroyed during subsequent flooding; the cost of that replacement alone would cover the cost of developing the game. (In southern California, fires destroy the ground cover plants that normally suck up rain; if there is no ground cover, then floods can result.) In addition, you argue that the game could be marketed to other flood control districts, turning the game into a potential revenue generator for the district. The game would engage players in "experiencing" a fire, flood, or earthquake; having then to access technical documents quickly (which also helps the field workers learn how to use the indexed document system) about some part of the system; having to make quick decisions about the pipes and conduits of the system; and seeing the results. Having experienced working under such regular but unpredictable stresses, the workers would be better preprared to use well under real conditions the technical materials available to them.
- *A social networking site for the public to give feedback and advice to the County*. Although such a site is technically not training materials for the field workers, it could help the County develop better relations with the people it serves as well as potentially

learn from others. This site could be linked to the workers' site mentioned above, so that the workers' knowledge base (both about what the public observes but also what the workers learn about the public) could expand.

The project manager quickly approves the first two kinds of training because they can be developed within the current budget and schedule of the team, and requests further research from you into the actual costs and development time of the game-simulation, in order to request those resources from further up in the institution.

Conclusion

Being a technical communicator in our time of new media means being an advocate for the rhetorical conditions under which technical communications are produced and used, and the heuristic I offer here (used in connection with the other heuristics offered in this book) should help you begin to develop your abilities to think about new media rhetorically in work and other contexts. It is impossible, of course, to list all possible questions you should ask as you pursue projects and helping audiences become more confident and competent users of technology, but the more you apply the questions offered here the more you will learn how to ask more subtle, context-specific questions.

Discussion Questions

1. Pick any technical object you use frequently: a cellphone, a laptop computer, an mp3 player. What different kinds of knowledge do you need to use the object? To use the object well? (Think about a lightbulb: You need to know where to buy them, how to screw them in to a socket, when to replace them, how to turn them on; this means that, in

addition, you need to have at least a minimal understanding of electricity and wiring, of money, of the uses of light, of how stores work, etc.) List all the social systems—like those of power companies, stores, etc.—to which the use of the technology ties you.

2. Pick any technical object you use frequently: How would you life (and all our lives) be different if the object didn't exist?
3. Pick any technical object you use frequently: How would you redesign the object for people who uses sense differently than you do? For example, redesign your cellphone so that someone who didn't see well could use it.
4. Research an institution in which you might work as a technical communicator in the future. What technological knowledge do you need to bring to the institution? What new media does the institution currently use, and how do those technologies contribute to the working environment of the institution?
5. How will you stay informed about new digital communication technologies in the future? Do you think you or institutions for which you work should be responsible for keeping you informed about them and trained in their use?
6. How well are you prepared to develop creative and engaging technical communication? What more do you need to learn to help you develop such materials?
7. How well are you prepared to be a facilitator of technical communication and knowledge (as described above), learning from audiences and helping them learn from each other, in addition to or instead of being the person who makes knowledge for others? What more do you need to do to help prepare for this? Do you think such facilitation is appropriate, given your own experiences using and learning about the technologies you use now?

8. Imagine that you need to create documents to help parents of children with cancer learn about a new treatment. Brainstorm the range of emotions parents might feel in such situations, and develop several different statements of purpose in which you take into consideration different emotions the parents might be feeling and how the documents you develop might address those emotions. How does imagining the different emotions they feel encourage you to imagine developing different materials for the parents?
9. Why should technical communicators become rhetorical advocates? What abilities do you need to acquire to become an advocate for producing the best technical communication in support of the audiences who use those communication]]

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Chapter 17: What Do Technical Communicators Need to Know about Collaboration?

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Summary

As a student, you've probably been collaborating with your peers for a long time. However, you may not have given much thought to what collaboration actually means or how to work more effectively in a group or on a team . This chapter introduces you to strategies that will help you become a more successful collaborator and group leader, as well as produce high-quality work as part of a team. The chapter begins with a realistic extended example from the healthcare field that describes how a technical communicator—Cassandra—learned to work more effectively on a team of co-workers on a new project. Learning what collaboration is and what it is not will help you understand the ways it affects technical communication practices. A literature review then provides insight and tools that you can apply for more effective collaboration. Finally, the chapter concludes with a heuristic that can guide you to greater success in your collaborations.

Introduction

Building Collaboration in the Workplace: Cassandra's Experience

Cassandra was used to working with a number of people in her research-based organization: lead scientists, project managers, information technology personnel, and administrative assistants. After a major project was funded, she was assigned to a five-member team. Each person in the team brought a different skill set and would be assigned a different project role with different responsibilities.

The project's primary goal was to provide support for Korean women who had just been diagnosed with breast cancer by pairing them with small support groups of female breast cancer survivors. These survivors, working as volunteers, provided several kinds of assistance: emotional support, information about breast cancer diagnosis and treatments, and help locating resources such as childcare during medical appointments. Under the direction of the lead researcher, or principle investigator, Dr. Samantha Smith, the project team planned to develop culturally appropriate and bilingual (English/Korean) patient recruitment materials, in-take and tracking forms, and informational sheets about breast cancer.

When Cassandra and Samantha learned that the project had been funded, they were both excited. They had submitted the proposal three times before, but it had not been funded (not at all unusual in the healthcare field). As a well-known breast cancer researcher, Samantha was the subject matter expert, while Cassandra was her technical editor. In the proposal, Samantha had named Cassandra as the technical communicator on the new project, along with three other staff members: a study coordinator, a database administrator, and an administrative assistant. Thirty volunteer breast cancer survivors would also be recruited to participate in the support groups, and a minimum of 300 patients would be enrolled during the two-year project period.

Key Collaborators

Cassandra: technical communicator

Samantha: breast cancer researcher

Patricia: study coordinator

John: database administrator

Diana: administrative assistant

Cassandra had already cultivated strong working relationships with Samantha; John, the database administrator; and Diana, the administrative assistant. Cassandra and Samantha had previously written several proposals, and she and John had collaborated on many reports. Diana routinely provided administrative support to all staff.

The study coordinator, however, would be a new hire. This person would recruit and train the volunteer groups, enroll new patients, and serve as the primary liaison between study participants and the staff. The coordinator would need to develop strong personal relationships with the patients and communicate relevant information to the staff to help ensure that the staff could develop effective materials. The group hired Patricia, a bilingual (English/Korean) breast cancer survivor for the position. She brought the perspective of someone who had not only survived breast cancer but also was intimately familiar with the target culture.

Shortly after Patricia was hired, the team met in the conference room to discuss each person's role and to draft a long-term work plan. Samantha would oversee all aspects of the project; all staff would report directly to her. Diana began listing the project's major tasks and the person(s) responsible on the conference room whiteboard. The team would hold biweekly meetings, she explained, while individuals would also interact in smaller groups to help make the complex aspects of the project more manageable.

- Cassandra, Patricia, and Samantha would jointly create the project recruitment materials.
- Samantha and Patricia would compose draft documents, which Cassandra would then revise and edit.
- After completion, John would create a patient-tracking database, and Diana would enter new patient information into the system as well as update patient records.

During the biweekly meetings, each small group would report its progress to the team as a whole. The biweekly meetings would allow each small group to gain a broader perspective on its work via input from the other group members. Samantha encouraged each person to offer constructive and substantive suggestions and feedback on all aspects of the project during these meetings.

Samantha then addressed the software tools needed to accomplish each task. Using a word processing program, she and Patricia would draft all materials, which Cassandra would then revise and edit. Some of the materials—such as the patient recruitment brochure—would need to be created using desktop publishing software. Cassandra was taking a class in InDesign for just this purpose. John would use the database management system that he routinely used for other projects to create data entry screens for Diana. John would also train Diana to use the database management system.

The staff members worked in the office during regular business hours and were available for in-person or over-the-phone collaboration. Samantha, on the other hand, saw patients at her clinic several miles away three times a week. The team decided e-mail would be the best method for contacting Samantha.

As the team discussed the project's goals, each individual's tasks and responsibilities, the available settings, and the required tools, Cassandra realized that her relationships with each of her co-workers and with Samantha in particular would change. Working with each person individually required particular adjustments in communication. John, for example, was always direct and seemed to prefer business-like interactions. Samantha, on the other hand, had previously assumed a personal style. Cassandra had met most of Samatha's family and had been to several social events at her home. However, Cassandra knew that Samantha now needed to assume the role of the "boss." She needed to move beyond their personal relationship and build a working relationship with the other members of the team.

How important is collaboration?

As the extended example above illustrates, many types of work involve collaboration. Collaboration will be a vital part of your professional life, regardless of your career. According to researchers, "Recent estimates conclude that group-based work methods exist in nearly 70% of U.S. firms" (Lowry 2006, 632). Not only is collaboration a central part of the majority of workplaces, it also constitutes as much as 75-85 percent of workplace writing (Burnett 1991; also see Lunsford and Ede 1990).

Three assumptions about collaboration provide a starting point for this chapter's discussion:

- ***Collaboration is rhetorical***. Successful collaborators consider the *contexts* in which they're working, identify *purposes*, seek and select appropriate *content*, are attuned and responsive to their *audiences*, and care about the nature, organization, and support of *arguments*.
- ***Collaboration is a process***. Successful collaborators understand that they are part of a group whose members must interact cooperatively, plan together, be collectively responsible for the completion of high-quality work, and maintain a schedule. On your team, each collaborator has a dual responsibility: completing her/his own work as well as possible and helping others on the team complete their work as well as possible.
- ***Collaboration is multimodal***. Successful collaborators understand that their processes (and often their work products) are multimodal—that is, collaborators engage in written, oral, visual, and nonverbal communication across a range of print and digital media.

These three assumptions weave their way through the extended definition that follows. Being aware of these assumptions increases the likelihood that your collaboration, whether in a classroom or a workplace, will avoid pitfalls that make some collaborations unproductive.

Defining collaboration

Before we define what collaboration *is* and consider Cassandra's experience in more detail, let's describe what collaboration *is not*. It is not having each group member write a separate section of a long document and then cobbling the document together at the end. It is not giving a group presentation where each speaker is only responsible for discussing his/her individual contribution on the overall project. It is not simply using computer-mediated communication (for example, Facebook, My Space, YouTube, Flickr, or various kinds of blogs, instant messaging, chats, or forums) to communicate with friends or colleagues. It is also not being assigned to a work group that leaves you doing all the work.

Collaboration is intentional, sustained interaction toward a common goal. At its core, collaboration involves substantive *interactions* between and among *people* who have shared *goals* and exchange information and knowledge as they work toward those goals in a variety of *settings* and with a variety of *tools*, either because the task size or *complexity* is too great for a single person or because the task will benefit from multiple *perspectives* (cf. Nunamaker, Dennis,Valacich,Vogel, & George, 1991 who pose a similar but less-elaborated definition).

- ***Interactions***. Collaborative interaction is sustained and extended over time, anywhere from a few hours to many years. When you collaborate, identify the kinds of interaction you anticipate—specifically, the ways in which you expect to contribute and the expectations you have of others regarding the frequency, depth, and breadth of interaction. Consider the role and level of responsibility of each collaborator. Articulating and agreeing on tasks and processes virtually always ensures more effective collaboration.

- ***People***. You and your collaborators are committed to the same task or project, but each person brings different backgrounds and perspectives, and each person plays different roles. The people in your group are not necessarily equal in subject-matter experience, relevant expertise, or organizational rank. Especially with tasks that require differentiated work, hierarchies usually remain firmly and visibly in place—as on some manufacturing assembly teams with workers and supervisors, all of whom contribute in various ways to the product. At other times, hierarchies are difficult to discern, as when a lead engineer, architect, or researcher manages and makes final decisions about the overall project but also acts as a team member, continuing to work in the trenches with the rest of the team. Working together may diminish though not necessarily eliminate hierarchical differences, and even when hierarchies aren't plainly visible, they probably still exist.
- ***Goals***. Collaborators share common goals that are determined among the collaborators themselves or mandated by an external or internal source(s). Buy-in, or commitment to accomplishing the goal, usually increases when collaborators share a common representation of the task, which is unlikely to happen unless collaborators talk explicitly about their individual representations and negotiate differences in order to reach a collaborative representation.
- ***Settings***. Collaborators work in a range of face-to-face and distance settings. You might work with a colleague in the next office or half-way around the world. Effective collaborators consider several factors about their workspace: accessibility, convenience,

safety, physical and psychological comfort, access to technology and other useful resources, sufficient and appropriate workspace for varied activities, and privacy for productive work.

- ***Tools***. Collaborators use a broad array of tools, depending on the project and the available resources. Typical tools include technology for communicating regularly (e.g., telephone, email, videoconferencing), web-based applications for conveniently sharing and working on drafts (e.g., Google Docs), and software features that make collaboration easy (e.g., the Track Changes feature in MSWord). Collaborators need to be creative in their adaptation of software features to improve their interactive activities. For example, PowerPoint and KeyNote are not typically thought of as collaborative tools, but you can collaborate in drafting a presentation by using the Comment tool or adding text boxes for annotations.
- ***Complexity***. Some tasks are simply too large or complex for an individual. Certain disciplinary areas (for example, high-energy physics, which sometimes has teams in the hundreds) and certain projects (such as producing a corporate annual report or downsizing a major corporation; see Cross 1994, 2001) address problems that require input from a range of contributors with differing skill sets and areas of expertise. What are called "wicked problems" (typically national or global and so complex, multi-faceted, and multilayered that an apparent solution in one area typically generates new problems in other areas) always require collaboratively generated solutions. Climate change, water resources, starvation, and sexually-transmitted diseases are examples of wicked problems. Problems can also be complex on an institutional scale: a division responsible for information technologies in a large organization needs to manage the flow of

information. Since sharing information about the failure of a technological system in the organization might help in one area by letting people anticipate interruptions in their work but hurt in another area by creating an unmanageable volume of inquiries and complaints, each collaborator in the group must weigh options before deciding what information to share and how to share it. Simply put, collaborators can expect their interaction to involve several types of complexity: procedural, social, and intellectual (Galegher and Kraut, 1994).

- ***Perspectives***. Considering multiple perspectives and multiple voices often produces more effective solutions. These voices can change the form of the communication. Changes in language features such as vocabulary and syntax for particular purposes, audiences, or situations are shifts in *linguistic registers.* Changes that result in a multiplicity of voices seamlessly embedded in the communication create what Mikhail Bakhtin's refers to as *heteroglossia:* "another's speech in another's language, serving to express authorial intentions but in a refracted way." This refraction can either reinforce an author's perspective for an audience or provide that audience with critical distance.

Technical communication in the workplace involves each of these elements, and technical communicators like Cassandra often need to consider the interplay of these elements on a daily basis.

What can you learn about collaboration from research?

This review of a small selection from the large body of research literature on three categories related to collaboration can help you to understand it better and to engage more productively with your colleagues:

- *Cognition* (moving beyond individual cognition to team perspective) and *cooperative learning* (what people do to help each other and work toward collective success)
- *Small group processes* (challenges of group size and membership, space and place, social loafing, unproductive and productive conflict, leadership that balances motivation and facilitation)
- *Technology, or computer-supported cooperative work* (the ways in which technology affects interaction, development, and other aspects of collaboration)

This literature review synthesizes the main findings of the research and discusses them in the context of Cassandra's experience so that you can learn what attitudes and behaviors are likely to result in productive collaborative interaction.

Cognition and Learning

Recognizing the importance of thinking and learning in virtually all professional tasks, researchers have studied ways in which individuals function and learn in groups and the ways they help each other learn. Learning was a central part of Cassandra's experience. For example, Diana already knew many software programs—word processing in particular. However, Cassandra was unfamiliar with data entry. John's training was necessary for her to be successful in her new role on the team project.

Cognition. Cognition is a collection of mental processes that constitute thinking. Most cognitive psychologists agree that primary thinking processes involve being aware, knowing, comprehending, learning, storing, remembering, applying, reasoning, analyzing, problem-solving, synthesizing, evaluating, self-monitoring, and reflecting. Effective collaboration involves thinking in ways that enable group members to construct *shared meaning*. This sociocognitive process occurs across a sequences of messages (what researchers call "utterances") from multiple collaborators, which typically include references to the collaborative situation, to previous statements made by the collaborators, and to anticipated future utterances (Stahl 2006; Van den Bossche 2006).

Collaborators in the same group need to agree substantively on certain beliefs that are central to the collaborative goal, but their beliefs are never perfectly aligned because of differences in areas such as experience, intelligence, and values. Both trust and negotiation are central to the collective process that collaborators use to try to share beliefs critical to their common goal, which can be accomplished through face-to-face interaction as well through various computer technologies (Stahl 2005; Van den Bossche 2006).

Figure 1 shows one possible set of synergistic factors for reaching shared beliefs. Factors contributing to individual personal knowledge (depicted in the very light gray oval) evolve into the group's collective knowledge (depicted in the darker gray oval). Imagine that Patricia locates one version of a particular cultural artifact (say, a bilingual educational brochure) similar to one that her team wants to create for new patients. She reads the brochure, decides that she understands it, that it would be a good model for her current project, and that she can fully support its use. As she engages in these individual activities, others on her team are doing the same kinds of things. Samantha also discovers a brochure that she thinks is particularly well done. During a biweekly meeting, each collaborator articulates her/his perspective to the group and presents an argument supporting it. As long as collaborators agree that their thinking is aligned for the particular task at hand, they are moving forward.

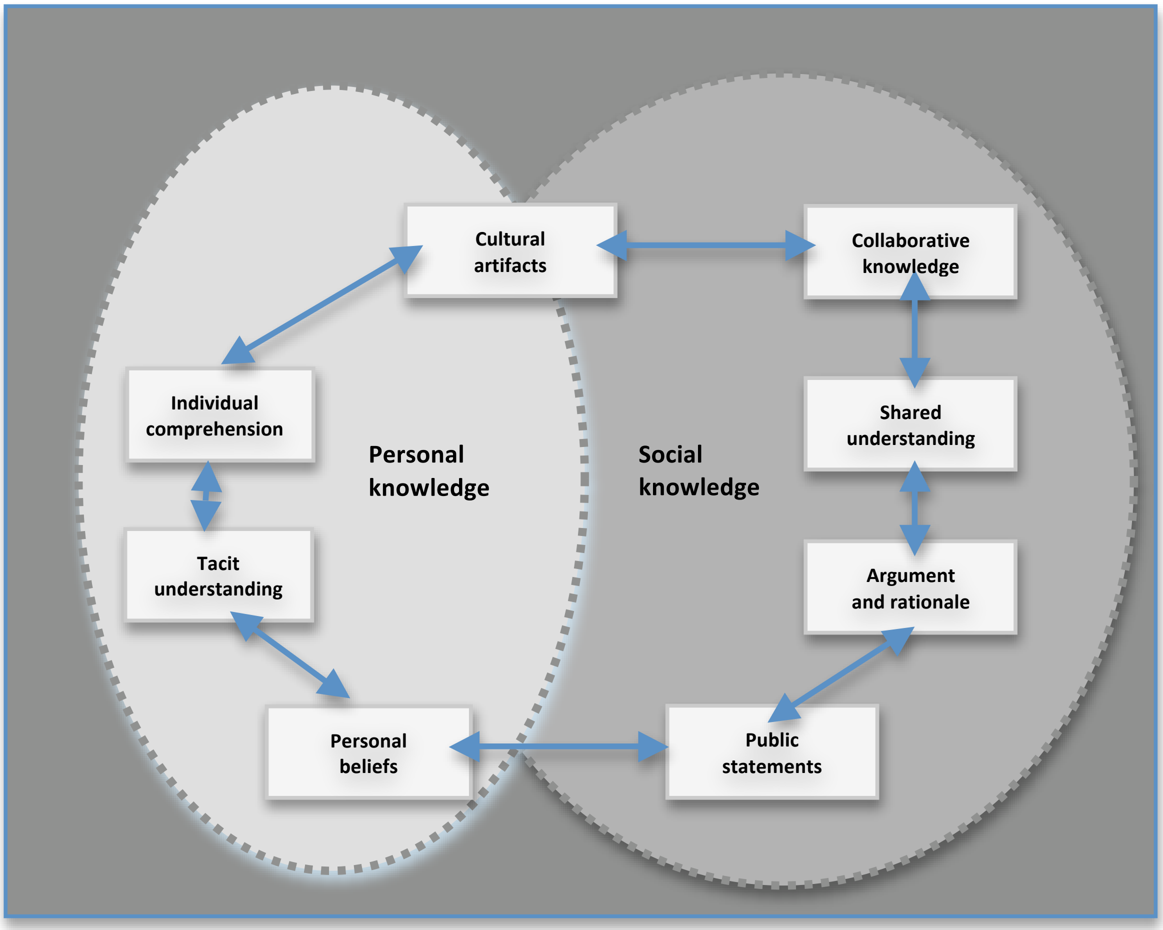

Figure 1. Interaction of personal knowledge and social knowledge to achieve co-constructed knowledge (Adapted from a model developed by Gerry Stahl. 2000. A model of collaborative knowledge-building. *Proceedings of the International Conference of the Learning Sciences 2000*.)

Cooperative learning. Cooperative learning involves people working together in small groups to accomplish shared goals. Small groups typically receive instruction from a teacher, trainer, or manager and then work on a task until all group members successfully understand and complete it (Johnson and Johnson 1998). No individual group member possesses all of the information, skills, or resources necessary to accomplish the goal alone. Cooperative learning depends on *positive interdependence*; thus, collaborators can reach their goals only if the other collaborators in the group also reach their goals. A critical question is how this interdependent learning occurs. One widely accepted view involves Vygotsky's "zone of proximal development" (1930/1978), the difference between what a person can accomplish individually and what the same person can accomplish when assisted by a more knowledgeable person. Stahl and his colleagues explain that "individual learners have different developmental capabilities in collaborative situations than when they are working alone" (2006, 8). Ensuring that every collaborator on a team performs at the highest possible level increases the likelihood of reaching the goal successfully. Let's say, for example, that Cassandra, Patricia, and Samantha also want to learn desktop publishing to help create the project brochure. They might all take a class together and work on the brochure as a group during class; their cooperation on a short-term learning goal helps to advance one of their project's long-term goals.

Small group processes

Research about small groups provides useful information about a range of procedural factors such as group size and membership; time, space, place, and related resources; social loafing; conflict; and leadership.

Group size and membership. Most collaborators wonder about the optimum number of collaborators. Decisions about group size may be based on the nature of the task and the available resources, but when Paul Benjamin Lowry and his colleagues studied the ways in which group size affects communication, they drew two important conclusions:

- "3-person groups maintained higher levels of communication quality than did 6-person groups....

- [The] communication variables of appropriateness, openness, richness, and accuracy were greater within the 3-person groups than in the 6-person groups."

While Lowry and his colleagues did not find that the quality of discussion significantly improved by "being in a 3-person group instead of a 6-person group," their findings suggest that "more complex projects may benefit from using much smaller groups" (2006, 657).

Not only can the size of a group affect the quality of the collaboration, but the differences among the people in the group can also be important. Dr. Naomi Kleid (2004), a long-time IBM employee as well as a professor, notes that classroom groups are usually carefully constructed to give students a productive experience. Factors that instructors consider include ability, workplace experience, software experience, gender, English proficiency, race, ethnicity, national origin, academic major, work style, personality, friendships, and shared social memberships. However, in the workplace, the criteria that managers can control differ significantly: in a list of these criteria, Kleid includes employee availability, "the most appropriate past experience, the best skills, and the strongest work ethic, which includes motivation, commitment, and productivity." Kleid explains that workplace professionals know that their tasks are important and that they may work together again. In our extended example, with the exception of Patricia, Cassandra had worked with each of her co-workers before and would very likely work with them again. Therefore, developing and maintaining strong and productive working relationships was crucial for all members of the team.

Time, Place, Space, and Resources. Time, place, space, and resources needed to get the work done (such as wireless access) in collaborative work are critical because they affect people's commitment and engagement. Nearly everyone has work that overflows the available time, but the "duration, intensity, and continuity of involvement" (Kleid 2004) of collaboration differ in classrooms and workplaces. In classrooms, the length of the task, its complexity, and the group's schedule are usually controlled by the semester and assignment schedule. In the workplace, time is more constrained, and collaborators have more competing demands, including other internal task deadlines, client/customer deadlines, and the limited availability of other team members, all of whom likely have competing responsibilities on multiple teams in various locations.

Collaborators working at a distance who report high levels of mutual involvement—more turn-taking, more talking than emoting, more referencing work products—often have greater success (Healey et al., 2008, 190). People who are collaborating at a distance want to believe that their collaborators are fully engaged in what they sometimes call "a 'third space' defined primarily by their sense of closeness," usually made possible by technology (e.g., phone conversations, e-mail exchanges, and/or shared documents). For many collaborators, "this sense of engagement breaks down...when it becomes apparent that...assumptions about the other speaker are ungrounded" (Healey et al. 2008, 174).

Many people have conventional senses of where work-related conversations should take place. When a collaborator is not at a workstation but is instead driving or otherwise engaged (signaled by background noises such as a toilet flushing, traffic honking, or birds chirping), collaborators may sense a lack of interest and commitment. In these circumstances, collaborators are not just in a different physical space but in a different mental place. Shortly after their project began, Cassandra and Patricia began holding daily conference calls with Samantha at her clinic. They could often hear clinic staff and patients talking in the background. When this happened, Cassandra and Patricia concluded that Samantha was not entirely engaged because her attention was being drawn elsewhere. After one particularly disruptive call, she and Patricia approached

Samantha about meeting at the office in the future. Samantha understood their concerns, but her schedule would not allow regular face-to-face meetings. In this instance, the constraints on Samantha's time trumped the group's need for a place more conducive to collaboration.

The spaces and resources that work groups use affect three important aspects of collaborative interaction: the formality of the collaborators, the "presence" of the collaborators (that is, "group members' recognition that other group members are actively contributing to the work at hand") (Bemer, 2009, 19), and the confidentiality of work in progress. Amanda Metz Bemer and her colleagues (2009) argue convincingly that the physical environment—both the space and the resources—affect productivity and attitude.

Social loafing. Social loafers (sometimes called free riders) are collaborators who don't assume their fair share of the work or who work less in a group than individually, a problem that more often affects distance/virtual teams than face-to-face teams (Suleiman and Watson 2008, 292). Larger groups often have more loafers than small groups because the lack of engagement and productivity are more difficult to identify quickly or easily. Groups with undefined tasks often have more loafers than groups with defined tasks because people may be unsure about what they should be doing (Suleiman and Watson 2008, 294-95). Sometimes social loafing is a result of people simply not thinking for themselves and going along with whatever others say, which is called *groupthink* (Janis, 1972). This tendency for a group to develop a singular mentality that isn't open to dissent or outside perspectives ignores the benefits of productive conflict.

Conflict. Many collaborators view conflict as something to avoid, but incorporating specific types of productive conflict into your processes can increase your group's interaction and improve the quality of your deliverables. Voicing disagreement and urging your collaborators to consider alternative perspectives can result in *substantive conflict* if the disagreements and alternatives focus on rhetorical elements such as context, argument, and purpose. Substantive conflict focuses on the intellectual content of the collaboration; on the other hand, insubstantial, unproductive conflict results from interpersonal disagreements or problems with group processes. To ensure that conflict is both substantive and productive, you should only voice disagreements and offer alternatives that are serious, relevant to the task at hand, and supported by strong reasoning and evidence. Otherwise, disagreements and alternatives seem gratuitous, insubstantial, and unproductive (Burnett 1993, 1994b).

You and your collaborators should work to avoid unproductive conflict, which can drain important resources, such as time, and weaken ties between group members. Several weeks into the new project, Cassandra realized she fundamentally disagreed with Patricia about the design of the patient recruitment brochure. Cassandra preferred what she believed was a more professional layout, whereas Patricia felt Cassandra's design choices lacked creativity. She suggested that Cassandra use brighter colors and more design elements. Although Cassandra was the communication expert on the team, she also knew Patricia had been hired in part because of her cultural knowledge and familiarity with the needs, attitudes, and beliefs of the target audience. She understood that her own design sensibilities might not be the same as her audience's, with which Patricia was more familiar. Samantha agreed with Patricia so Cassandra changed some aspects of the brochure. This type of productive, substantive conflict allows collaborators to consider alternatives and improve the quality of their final work product.

As you and your collaborators interact, consider the *attitudes* each member brings to the group. Members' attitudes include their self-confidence and their motivation as well as their sense of responsibility and their receptivity to planning and collaboration. Awareness of a collaborator's self-confidence, for example, can help you gauge how assertive you should be when responding to that collaborator's ideas. You can develop a *repertoire of verbal moves*:

- Mildly assertive behaviors—such as *prompting* a group member for clarification and *contributing information*—can spur substantive conflict.
- More assertive behaviors—such as *challenging* a collaborator with critical questions or opposing viewpoints and *directing* a collaborator to change an approach or artifact—sometimes work, but they can backfire if the collaborator isn't receptive (Burnett 1994a).

With strategically chosen verbal moves, you can help your collaborators learn new ways to improve their communication (Burnett 1993). During team meetings, Patricia seemed very confident and assertive. Cassandra often interpreted Patricia's attitude as overly critical. She decided the best strategy was to not respond to Patricia's criticisms at the meeting but to become more receptive to her suggestions and then discuss them with her in person.

Leadership. Collaborative interaction can be non-hierarchical—that is, a flat organization with no identified facilitator or leader—but lack of hierarchy and of defined leadership often leads to problems because no one is charged with encouraging a unified effort and facilitating the interaction, and no one encourages the collaborators toward their common goal. In general, collaborative groups function better with facilitators and leaders. Sometimes these are the same people, but not always.

- *Facilitators* typically manage group processes—for example, scheduling meetings; establishing and maintaining technologies for interaction (e.g., email lists, GoogleDoc sites); collecting, maintaining, organizing, and disseminating work documents (e.g., meeting minutes, documents drafts); recommending policies for group interactions, decision-making, and conflict resolution; and monitoring participation.

- *Leaders* influence the efforts of a team working toward a common goal. Their role is to be aware of the needs of the other team members and understand the context in which they are working (Denmark 1993). They plan, organize, and lead activities as well as function as bridge builders who “understand the creative power of partnership” (Bell & Patterson 2006, 14). They often broker partnering relationships between collaborators that include “keeping agreements, telling the truth, showing respect, and demonstrating a commitment to the relationship” (Bell & Patterson 2006, 14). Effective leaders help a group articulate a shared vision and accomplish it. The outcome of this collaborative effort is "greater than that which could be accomplished by any of the individuals acting alone" (Hartwig 2008, 3).

One view that integrates facilitating and encouraging group members toward a shared goal is called *knowledge leadership*. Knowledge leaders engage everyone in the group, encourage and offer constructive feedback, create a working environment that expects mutual trust and respect, model productive behavior, and encourage initiative (Hardy and Connect 2008, 19).

Is leadership the same in classrooms and workplaces? Not often. "Undergraduate students are uncomfortable with uncertainty, lack of structure, and negotiation (as are many people), but professionals know they must manage uncertainty, create structure, and negotiate differences" (Kleid 2004). Thus, some undergraduates look for a leader who reduces uncertainty, dictates explicit organizational structure, and simplifies negotiation.

In both classrooms and workplaces, leadership is often gendered (Yoder, 2001)—that is, women and men tend to have different styles of communicating and leading teams. Social constructions of gender influence many women to assume conventionally female styles of leadership and many men to assume conventionally male styles of leadership (Matusak, 2001).

Women's gendered style, while critical for getting work done, is often not acknowledged as "leadership." Women students and professionals are often shut out of publicly identified leadership roles because they are seen as less competitive, less hierarchical, less power-driven, and less commanding. Some groups also play into gender stereotypes by letting women manage collaborative details while men provide the public face of the team. As your group negotiates and defines the roles each member will play, be careful to avoid stereotypes and assumptions about gender. Not everyone practices the leadership styles associated with her or his gender. Furthermore, conventionally masculine and feminine styles can both be highly valuable in collaboration. In her experience, Cassandra noticed that Samantha changed her leadership style after the new project was funded. When the two had collaborated together on previous projects, Samantha used a less hierarchical and less commanding style, but when she assumed control of the larger group, she adopted a more gender-neutral style, placing greater emphasis on hierarchy while still fostering a non-competitive atmosphere.

Regardless of gender, a leader is likely to recognize limitations caused by reaching decisions too quickly; workplace leaders are likely to encourage some period of uncertainty to recognize that team tasks and membership should influence organizational structure rather than creating a one-size-fits-all structure and to recognize the value of negotiation for identifying otherwise neglected details.

Technology: Computer-supported cooperative work

Technology makes collaboration easy and productive, even when collaborators regularly meet and conduct the majority of their business at a distance. The disciplinary area called computer-supported cooperative work (CSCW) studies the ways in which collaborative activities are supported by computer systems. Figure 2 shows relationships between time and place that generate the need for various kinds of technology to support the collaborative interaction. The cells in Figure 2 show examples of technologies that respond to the various kinds of interaction: (a) same time/same place, (b) same time/different place, (c) different time/same place, and (d) different time/different place.

	Same Time Synchronous	**Different Time** asynchronous
Same Place co-located	touch screens and multi-touch screens, electronic meeting rooms, decision rooms, single display groupware, public computer displays, wall displays	e-message boards, photo management sites, team rooms, large public computer displays, shift-work groupware, project management tools
Different Place remote	conference calls, video conferencing, desktop conferencing, instant messaging, chats, virtual worlds, shared screens, multi-user editors	email, blogs, DVDs, asynchronous conferencing, meeting schedulers, group calendars, version control, forum discussions, wikis

Figure 2. Time-space groupware matrix describing representative examples of computer supported cooperative work. [Modified from version developed by Johansen, R. 1988. *Groupware: ComputerSupport for Business Teams*. The Free Press and frequently reproduced with various slight modifications.]

Some technologies in this matrix can be described as "web 2.0," referring not to a specific technological advancement, but to changes in user attitudes and behaviors and a noticeable increase in user-generated content. Web 2.0, which emphasizes technologies of sharing and collaboration, has resulted in the development of a range of web-based communities: blogs, social-networking sites, wikis, video-sharing sites, and folksonomies (which include social classification, social indexing, and collaborative or social tagging). However, simply using social networking software (e.g., Facebook), social bookmarking (e.g., digg or Delicious), or a real-time, multi-uesr editor (e.g., GoogleDocs) does not make someone a collaborator. Being a collaborator requires active contribution to shared goals; how you use a technology determines whether the work is collaborative.

Heuristic: How Can You Become a Better Collaborator?

To frame questions that can help you and your collaborators form strategies for making your collaboration as productive as possible, the matrix in Figure 3 combines elements from this chapter's definition of collaboration with the major categories this chapter identifies in collaboration research.