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Writing for the Technical Professions

FOURTH EDITION



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Kristin R. Woolever

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WRITING **FOR** THE Technical Professions

FOURTH EDITION

Kristin R. Woolever

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For my father,
Earl J. Woolever

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Preface

Increasingly, students and instructors in technical communication courses express concern that their textbooks don't correspond to real-world situations and requirements, and that they fail to present information that is accessible, concise, straightforward, and most important, applicable to life outside college courses. This edition of *Writing for the Technical Professions* continues to pay special attention to the real-world context in which technical communication is carried out and to the kind of books that professionals actually use on the job. Contemporary technical communication takes place in fast-paced industry environments, is often conducted by teams of collaborators, relies increasingly on electronic media, and is highly global in concept. This fourth edition focuses on exactly those areas: collaboration, the electronic workplace, and most critically, communicating globally.

Writing for the Technical Professions retains its emphasis on problem solving, particularly for tasks that technical professionals encounter daily. In content, approach, and tone, I have tried to keep the pages uncluttered, informative, thoughtful, and useful. The book is intended as a comprehensive but not overwhelming primary text for introductory technical communication courses, and its hands-on, pragmatic approach to writing and design make it a useful reference tool that students may want to keep with them into subsequent advanced courses and into the world of work itself.

This book may be best known for its unique format—tabbed and comb-bound, like a first-year composition handbook—which means that readers may easily access particular chapters, and also that the book can be opened flat to any section. Its format makes it perfect for using while writing or working on computer.

How This Book Is Organized

Writing for the Technical Professions is organized into three parts—two major sections, and a brief guide to language issues. (A more extensive guide to this book's organization is provided in the Introduction.)

- Part One, "Basic Tools," explores in depth the essential tools that students need for developing rhetorical strategies and techniques useful in most forms of technical writing. Its eight chapters cover planning, researching, organizing, designing and editing documents, collaborating, considering ethical and liability issues, and—new to this edition—communication across cultures.
- Part Two, "Professional Applications," puts these techniques to use in chapters that discuss specific types of professional documents and applications: memos, letters, and electronic correspondence; instructions, procedures, and policies; descriptions and summaries; abstracts; reports; proposals; electronic media design; marketing documents; and professional presentations. Also included in this section is a unique chapter on finding a job—not just preparing appropriate documents, but the process itself.

- "A Quick Guide to Language Issues" helps readers, especially those whose first language is not English, find answers to common, and troublesome, questions.

New to This Edition

This edition retains its emphasis on critical thinking and problem solving while adding content and useful features designed to meet the realities of today's workplace.

- **Sample documents** may be the most important element in any technical communication text—and this edition has more than ever before. This edition includes an even greater variety of both professional and student work, with examples throughout and clusters of richly annotated models at the end of each chapter in Part Two. For a directory of all sample documents, see the inside front cover.
- **Coverage of the electronic workplace** has been expanded to include a new focus on **creating effective blogs** in an updated chapter on **electronic design and media** (Chapter 15) and more material on **researching online** (Chapter 2). Today's technical professional works almost exclusively in an electronic environment—writing, corresponding, designing, and *Writing for the Technical Professions* recognizes this.
- **Task-oriented strategies for handling real-world situations** appear throughout and have been gathered in this edition into three useful categories: **Guidelines**, which provide brief summaries of strategies and techniques; **Checklists**, which allow readers to evaluate the necessary components of particular projects; and **Steps to...**, numbered lists that take readers step-by-step through specific processes. For a directory of all these, see the inside back cover.
- A completely new chapter, **Communicating with Other Cultures** (Chapter 7), explores the challenges of working in a global context, as most technical professionals now do, including suggested techniques and examples to help students excel in the global workplace.
- " A new section on **designing effective poster presentations** (Chapter 4) offers guidance for presenting ideas to a wider audience.
- **Technology Challenge** projects follow six chapters and engage students in hands-on use of the newest technologies needed for workplace communication.

Why Use This Book?

Technical communicators must develop a wide range of skills, among them problem solving and critical thinking, the ability to apply viable, effective, intelligently determined strategies and understandings to communication situations. These pages are filled with practical advice on understanding audience, purpose, and situation—the rhetorical context of communication—and on putting that understanding into practice in writing specific types of technical documents. When

writers know how to evaluate a rhetorical context, they can then take control of various communication tasks and make informed choices from the rhetorical options available to them.

All of this is crafted in a direct, collegial style that speaks to students and practitioners in accessible terms. This book addresses students as aspiring professionals, in language that is to the point, lively, and reflective of the language of the technical professions.

Through four editions, *Writing for the Technical Professions* has maintained a clear focus on what students really need:

- **Substantive, real-world examples and sample documents** from disciplines including engineering, the health sciences, software design, and biotechnology. Each chapter in Part Two features a wealth of examples from both professionals and students and concludes with a section of annotated sample documents. Students get an accurate sense of the scope, tone, and style of professional technical writing, as well as a look at the everyday work of many technical disciplines.
- **A recurrent focus on the electronic workplace.** Chapter 15, completely updated, discusses the characteristics and types of electronic media and approaches to writing and designing electronic documents. Substantive discussions of electronic research (including evaluating Internet sources), electronic job searches (including electronic and scannable resumes), and other technology-related issues are included wherever appropriate. A revised Chapter 9 focuses on using e-mail effectively, including tips for creating the right tone and using e-mail as a tool for conflict management.
- **An emphasis on project management and collaboration.** Chapter 6 focuses on collaboration not only on classroom projects but also in professional contexts (including individual roles, project teams, and project phases), and looks at the role and responsibilities of project managers, including scheduling, tracking, conducting meetings, and negotiating differences.
- **An emphasis on ethics and legality.** Increasingly, technological developments affect matters of individual, environmental, corporate, and global well-being, and those who work in the technical professions must be able to understand the ethical and legal implications of their decisions and actions, and of the language that conveys them. Chapter 8 highlights the ethical and legal dilemmas that individuals may face in the course of simply doing their jobs and suggests ways for assessing appropriate responses.
- **An emphasis on international communication.** This book underscores the increasingly global nature of technical communication through a section, "Tips for International Communication," that appears at the end of each chapter. Among the subjects discussed are translation glossaries, techniques for establishing cultural schemata, international style guidelines, use of color and icons, international business ethics, cross-cultural collaboration, and Web site development for international audiences. In addition, because we all now

work in an international context, a new chapter, Chapter 7, provides more strategies for communicating across cultural lines.

Writing for the Technical Professions also includes both useful resources and helpful aids to learning for prospective and practicing technical communicators. These include:

- **Profiles in Practice.** Appearing on each tabbed divider, these profiles are brief discussions with technical professionals, who share their perspectives on communication in the workplace. This feature allows students to see the real-world importance and application of the various strategies and techniques discussed in the text.
- **A Quick Guide to Language Issues.** This brief section provides an easily accessed reference covering specific usages that often cause particular difficulty, especially for readers whose first language is not English.
- **English as a Second Language advice.** The Quick Guide section also features extensive guidelines focusing on grammatical conventions that regularly cause difficulty for technical communicators whose first language is not English.
- **Quick Reviews.** Each chapter concludes with a bulleted list summarizing its main topics and instructional points, which serves as a quick reference feature.
- **Exercises.** Each chapter also includes a brief set of exercises designed both for individual and collaborative assignments. These exercises focus on reinforcing the content of each chapter and, for the most part, ask students to work with documents and texts that they have been developing in the classroom or on the job.
- **Community Action Projects.** Also at the end of every chapter are suggestions for how students can use the technical communication techniques discussed to develop real projects in their neighborhoods or communities. These action learning opportunities can benefit the community and provide valuable practice for novice practitioners. Learning by doing is often the best method—and "doing" in the real world can make the classroom work come much more alive.

Supplements

A comprehensive **Instructor's Manual** is available to adopters, and it offers a variety of help, including writing assignments with evaluation criteria, ideas for integrating technology into the course, ideas for a wide variety of assignment types, and much, much more.

MyTechCommKit offers book-specific resources as well as the best multimedia resources for technical writing in one easy-to-use place.

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KRISTIN R. WOOLEVER

Introduction

If you are reading this book, you are probably looking for some practical advice about technical communication. In the real world, technical professionals write almost daily, yet they are often unprepared for the kind of writing they must do on the job. They have taken courses in mathematics, engineering, and science but not enough down-to-earth communication courses that teach them how to write in technical environments. This book has practical advice for anyone who is—or who will be—working in the technical professions. It introduces the world of technical communication: the types of documents that technical professionals write and the planning, drafting, and editing processes that these professionals follow to get their work done.

What Are the Technical Professions?

The term "technical profession" applies to a broad spectrum of careers in today's changing workplace where technology is making astonishingly rapid advances and boundaries between companies, countries, and continents are blurring and jobs are being redefined. In the past, the term "technical" conjured up an image of a male engineer with his T-square and slide rule, who made his living by his prowess at mathematical calculations. Today the computer has replaced the slide rule, and the technical professionals include an expanding cast of characters: women as well as men, engineers and scientists of all types, computer programmers, MIS professionals, technicians, laboratory personnel, biotechnical workers—anyone whose job entails working with specialized skills and knowledge in the hands-on fields of science, engineering, and technology.

Not only images have changed in the world of technology; career paths have also changed. While technical professionals used to prepare for one area of specialization, find a job, and remain with the same company for the duration of their careers, today's professionals have to be more flexible. They often collaborate on "cross-functional" teams with specialists from marketing, design, production,

quality assurance, and documentation; their work may be "cross cultural," putting them in touch with people from all over the globe; they may be asked to develop marketing materials or give professional presentations; and their careers are less static than in the past, as they carry their skills from company to company, shifting their roles and responsibilities with the needs of the changing workplace. For these reasons, technical professionals must be able to adapt to new technologies and new environments and be able to deal with a wide variety of people and situations.

What Is Technical Communication?

Technical communication is writing that gets things done: It can convey useful information and implement specific actions, or it can provide updates on new developments and the progress of experiments and emerging technologies. For example, engineers and scientists working for Boeing must communicate their technology; so must the technical professionals working for pharmaceutical companies, the meteorologists tracking the weather, seismologists measuring the earth's movements, programmers and developers in the computer industry, and so forth. In the "information age"—a tag that represents today's world well—electronic communication provides immediate information about new inventions and products as soon as they are released. Technical experts find themselves routinely traveling in international circles, attending conferences, business meetings, and specialized training. It is not unusual for technical professionals to work on a project with colleagues from several international branch offices, keeping in touch via e-mail, fax, telephone, or video conferencing, and to be called upon by the media to provide commentary or explanations about the technical advances the public sees occurring at a sometimes frightening pace.

Technical communication plays a major role in this dynamic environment; professionals in this field may spend up to 50 percent of their time in communication tasks that fall broadly into these categories:

- Communicating expertise to clients, customers, and the general public
- Reporting technical activities to supervisors and others
- Writing proposals to gain funding for technical projects or to win contracts
- Marketing technical products or services
- Instructing lay people on how to use technical products
- Corresponding with business colleagues, clients, and customers around the world

Whether you work in a small start-up company or a multinational corporation, you must be skilled in conveying information to the people you work with, to the people who buy your products or use your services, and to the people living in the communities located near your work environment—engineering plant, technical development site, and so forth.

Who Is the Typical Technical Communicator?

Anyone who works with technology communicates information about it in several ways. Although there are specialists who are hired solely for technical communication (technical writers, documentation developers, information specialists, and so forth), a significant portion of every technical professional's job is presenting technical information in both written and oral form. For example:

- *An engineer* working in research and development sends e-mail to her supervisor and colleagues several times a day, followed by hardcopy memoranda, business letters, and faxes. She is responsible for submitting progress reports on the project she is assigned, and she is a major contributor to the final project report that her team must produce when their task is completed.
- *A technical writer* in an entrepreneurial company develops user manuals, but has also been asked to design fliers, brochures, and other marketing materials for his company's products.
- *A plant manager* is responsible for writing not only the typical reports and studies required by the executives in the head office, but also the performance evaluations for his employees and the policies and procedures needed for daily operations.
- *A scientist* working in a biotechnical laboratory must compose a proposal to the National Science Foundation to gain continued funding for the project she's working on. Without money, the lab and the project will fold.
- *A civil engineer* leading a large construction project must speak at a town meeting to explain the project and its disruptions to the lives of the surrounding community. He knows the town council is not happy about the cost or the length of the project, but he must convince them that the ultimate outcome is worth the inconvenience and the money.
- *A publications specialist* in a software company has been assigned to write the user guide for a new spreadsheet program. She must develop a needs assessment and follow through with a document specification, drafts of the document, and a final shrink-wrapped copy ready to ship when the software is finished.
- *An environmental engineer* is part of a team collaborating on several proposals in response to competitive RFPs. If his company wins the bid for any of the projects, he will be responsible for submitting Phase I and II field reports as the work progresses.
- *A communications specialist* for a manufacturing firm is promoted to the position "Webmaster," and is now responsible for designing and maintaining the company's home page on the World Wide Web. He has taken several courses in HTML and spends much of his time surfing the Internet, checking the competition, and looking for new design techniques.

These are just a few of the tasks technical professionals may be asked to do as a part of their jobs. No matter what aspect of technology you are working with, you must

be able to communicate your activities clearly and concisely to maintain your professional edge in a highly competitive environment. It's a fact that those who have communication as well as technical skills will progress further and faster than those who don't.

What Skills Do Technical Communicators Need?

Effective technical communicators need to have facility with language, of course. However, technical writing requires specialized skills because its aim is not just to communicate but, as mentioned previously, to get things done. To communicate well in the technical professions, you need to have critical thinking skills that allow you to be a good problem solver. You should be able to assess a situation, determine what are the most important issues and what are the subsidiary ones, and organize a document that presents the information in a clear hierarchy. In addition, you need to be aware of the persuasive nature of writing, so that you craft your documents to convince the audience to take specific action or to trust your point of view—even when you present the information objectively.

Objectivity versus subjectivity brings up an aspect of technical communication that many people overlook: the ethical dimension of the communication task. When you are writing to get things done in a competitive situation, and when advanced technology and large amounts of money are involved, the pressure to slant the truth can be significant. You need to consider the impact of the actions you are advocating or the claims you are making. Will they have a negative effect on people or on the environment? Are you sure your ethical standards are not compromised by what you say? Are you aware of the liability issues increasingly associated with technical communication?

How Can This Book Help You?

This book is a realistic introduction to the best practices in technical communication today. It is a clear guide to the techniques needed to communicate effectively in the technical professions; it provides step-by-step advice and strategies for writing specific types of documents; it is an easily accessible reference for the daily technical communication tasks; and it situates technical communication in social, ethical, and cultural contexts.

The book is divided into two parts. *Part One: Basic Tools* gives the essential strategies for writing technical documents: planning, researching, organizing, designing, and editing. You can refer to this part for detailed techniques that will form the foundation on which you can build any document that you are asked to write on the job. *Part Two: Professional Applications* provides step-by-step guidelines and strategies for writing specific documents and includes samples you can use as models. The writing process in most chapters is presented in the same order as the

strategies laid out in Part One, so you can return to the earlier section if you need more detail about planning, researching, organizing, designing, or editing as these techniques apply to **specific** types of documents. The following overview of the book will give you a better sense of how all the parts fit together.

Part One: Basic Tools

- **Chapter 1, *Planning***, takes a problem-solving approach to technical writing and gives practical advice for analyzing the audience, conducting a needs assessment, writing a usable outline, and creating a document specification.
- **Chapter 2, *Researching***, provides strategies for gathering information about a topic and gives specific documentation styles and examples, it also includes tips and cautions on using the Internet for research.
- **Chapter 3, *Organizing for Readers***, illustrates how to arrange information into hierarchies that make sense for the specific situation and for the particular audience.
- **Chapter 4, *Designing the Document: Format and Graphics***, gives the basic approaches to document design and to using graphics and discusses visual design principles, page design, and choosing and placing graphics.
- **Chapter 5, *Editing for Style***, discusses stylistic issues especially relevant to technical communication, focusing on the sentence level and explains how to write smooth transitions, how to write clearly and concisely, and how to keep the reader's attention through pacing.
- **Chapter 6, *Collaborating on Writing Projects***, provides techniques for working in teams on student and professional projects, including strategies for the individual contributors and the project managers and addresses issues such as tracking projects, establishing effective communication networks, conducting effective meetings, and managing conflict.
- **Chapter 7, *Communicating With Other Cultures***, explores cultural differences and suggests techniques for communicating in the global workplace.
- **Chapter 8, *Considering Ethical and Liability Issues***, discusses the social and ethical dimensions of technical communication, placing the act of communication in a context that allows choice and emphasizes the politics of the workplace and the pressures brought to bear on the writer. The chapter also focuses on liability and language in writing marketing materials, safety information, and employee information (such as performance evaluations and job offer letters) and discusses intellectual property law as it relates to copyright of Web materials and other electronic media.

Part Two: Professional Applications

- **Chapter 9, *Memos, Letters, and E-mail Correspondence***, illustrates the steps for planning, organizing, writing, and editing daily correspondence and includes notes on finding the right tone in e-mail and the role of e-mail in conflict management.

- **Chapter 10, *Instruction, Procedures, and Policies***, differentiates user instructions and procedures from policies and discusses common design techniques for increased readability for each.
- **Chapter 11, *Describing and Summarizing Technical Information***, discusses the difference between descriptions and summaries and explains how to describe and summarize information within a text.
- **Chapter 12, *Abstracts and Executive Summaries***, illustrates how to write the "front matter" of reports and proposals and discusses the essential differences between abstracts and executive summaries and indicates when each is appropriate.
- **Chapter 13, *Reports***, provides guidelines for writing formal reports and studies, including the direct and the indirect approach and discusses how to integrate mathematical equations and how to present statistics and visual information appropriately.
- **Chapter 14, *Proposals***, explains how to write effective proposals for small, medium, and large projects and includes approaches for teams as well as writers working alone and discusses how to establish persuasive themes and use language keyed to the client.
- **Chapter 15, *Electronic Media: Online Help, Web Site Design, and Blogs***, focuses on the differences between online and print media, and discusses strategies for developing online help and Web pages.
- **Chapter 16, *Fliers, Brochures, and Newsletters***, differentiates marketing writing techniques from technical writing and gives guidelines for developing three types of marketing documents: fliers, brochures, and newsletters.
- **Chapter 17, *Professional Presentations***, gives advice for planning and delivering professional talks, including techniques for using visual aids and delivering presentations electronically.
- **Chapter 18, *Finding a Job***, gives strategies for organizing and conducting a job search, including writing cover letters and resumes, and preparing professional portfolios (electronic and hardcopy), as well as tips for interviewing and following up interviews.

A Quick Guide to Language Issues

- A ***Quick Guide to Language Issues*** points out common grammatical trouble spots for technical communicators and includes a special section for English as a Second Language (ESL).

The organization of this book allows you to access the information in the manner most useful to you, not necessarily in a linear fashion. For instance, if you have been asked to write a proposal, you can go directly to Chapter 14. If you find as you're writing that you need to brush up on design techniques, you can consult Chapter 4. For advice on collaborating with your proposal writing team, you move to Chapter 6. For tips on designing a Web site or other electronic media, see

Chapter 15. In any technical writing situation, this book allows you to read about basic strategies, tools, and approaches; or you can go straight to the discussion of the document type; and you can consult various chapters for background about any issues or concerns you may need to bear in mind as you write.

Writing for the Technical Professions provides genuinely useful information for technical communicators. It is a guide to basic writing techniques, a "how to" manual for specific types of technical documents, and a sourcebook technical professionals can keep on their desks to help them in their daily writing tasks. It is a straightforward, uncluttered guide for technical communicators who want to get the job done.

Why Choose to Do a Community Action Project?

At the end of each chapter in this book, you will be challenged to volunteer for one or more "community action projects." Listed on those pages are suggestions for how you can take the techniques you learn in the technical communication classroom and apply them to real-world situations in the communities surrounding you. Why are these projects important? And why should you consider accepting the challenge?

First, these projects make the classroom material come alive as you see how they work in actual practice. Designing your own personal Web site can be fun and is a good way to learn various techniques, but designing a Web site for a real client shows you how to meet the needs of an audience outside of yourself and how to work within the budgets and constraints of an organization. In a technical communication course you study ideal techniques and best practices. When you're out in the field actually applying what you learn, you have to make choices on the fly and maintain high standards despite the obstacles that may be put in your way. As the old saying goes, "True learning comes by doing."

If you are working for a company or an organization already, you may be tempted to substitute the work you are paid to do for this project, instead of volunteering your services to another organization. If you yield to this temptation, you miss the key component of practicing your skills outside of the structured work environment. Not only does volunteer work allow you the freedom to experiment creatively outside your job-related duties, it also instills a strong sense of civic responsibility.

Second, completing a community action project benefits the local organization. Most of these community organizations are nonprofits and have limited funds to hire outside consultants. Your work for them can make a huge difference in their ability to reach their goals. Even a small project such as writing a user guide for employees or designing a brochure is a great service; it also looks great on your resume!

Third, working on such a project allows you to reflect on the relevance of your classroom learning. More than studying for a test or writing a research paper,

putting your new skills to work in the community encourages you to think about what you've learned and understand its value at a much deeper level than just "book learning."

The community action projects at the end of each chapter are designed to challenge you, but they are only suggestions. You may discover many more opportunities in the neighborhoods where you live. Taking the time to find them and volunteer your services is well worth the effort.

Basic Tools

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General Internet Resources for Part One

What Is Technical Writing?

http://www.hu.mtu.edu/hu_dept/tc@mtu

This useful overview is packed with additional links for technical writers.

Writer's Resource Center

<http://www.poewar.com>

This site contains tips for technical writers and useful information for any writer.

Technical Writing Jobs for Writers

<http://www.techwriters.com>

This site provides useful resources for additional training for technical writers, as well as job placement information.

Models, Processes, and Techniques of Information Design

<http://www.saulcarliner.home.att.net/id/>

This wide-ranging personal site provides a wealth of resources including guidelines, models, and links to other useful sites.

PROFILES IN PRACTICE

Relating to Readers

Bryan King

*Senior Technical
Documentation Specialist/
Project Leader
Lucent Technologies*

If you work for a company that deals in highly technical products, you might think that the more technical your writing, the better. That's not the key to success, according to Bryan King, a project leader and technical writer for Lucent Technologies, a company that produces hardware and software supporting telecommunication networks and services, and that includes the famed Bell Laboratories. "In our products," King says, "the more technical things get, the more need there is for communication."

The world of technical documentation changes quickly. Today's information, according to King, is "user-focused and **Internet-based**. The paradigm has changed from paper-based to online-based, except in some classroom situations." Organizing information rests on a simple principle: Support the user of the document. "Determine the user's goal on the screen, on the page, on the equipment. Anything that supports that goal is important information." Before using a company template that produces uniform appearance, writers sort information into manageable units and subunits that allow users to grasp a concept or perform a task. Beginning with high-level, or overview, ideas or processes and then moving into levels of detail, the writer's job is to keep constantly in mind the reader's need, and organize to meet it in each section. "There's more planning, analyzing, and organizing than writing," King says.

If that organization is well done, writing about even sophisticated systems need not be intimidating. "It's not technical at all" at its heart, says King, a **15-year** technical professional. "I think that's a misnomer. I'm a communicator. It may be technical or not, but the difference between being successful and not being successful is whether people can and actually do use your documents."

Any savvy traveler knows that planning ahead for a trip—especially a long and complicated one—makes the actual journey much more pleasant. Certainly surprises will arise and some of the unplanned side jaunts will be memorable, but the confidence gained by knowing where you're going and how you plan to get there probably relaxes you enough to allow you to enjoy the unexpected detours. It takes a special breed to appreciate "seat of the pants" travel. Most people don't.

So, too, is it with writing technical documents. When you have to compose a document—no matter how large—your first step should be to develop a plan. Like the traveler who scours the Yellow Pages for a good travel agent, pores over maps and hotel guides, and buys traveler's checks and foreign currency ahead of time, you need to think ahead so that you ultimately save yourself time and grief during the actual writing process. Effective planning at the front end of the process can shorten the overall time it takes to complete a project and go a long way toward ensuring the quality of the final product.

This chapter focuses on the planning process and the elements you need to consider as you begin the writing task. You'll find the essential steps for developing a workable rhetorical strategy, as well as optional techniques you may use if circumstances warrant them.

Developing a Rhetorical Strategy

The foundation for planning any document is the **rhetorical strategy**—the initial planning activity where you consider ways to make your communication effective. Before writing any document, you prepare a quick strategy that considers *purpose*, *audience*, and *writing techniques*.

Purpose: Ask yourself what your real purpose is for writing the document. What do you want to have happen as a result of this report, letter, manual, or proposal? What do you need? If you can answer these questions honestly and

fully, you may think of needs you hadn't noticed (and were unprepared for) in the document. Some documents actually ask you to include a purpose statement paragraph, and this preliminary work will serve you well in those instances. But even if such a paragraph isn't called for, defining your purpose in advance makes the writing task much more focused.

Audience: Who is your audience? What do they need or want from this document? What special concerns might they have? Thinking carefully about what your audience needs allows you to see the document from their point of view and to thus address as many of their concerns as possible.

Writing Techniques: Once you know what you want and what your audience wants, what kind of document will you create? How can you approach the planning stages in a focused way, thinking about organization, style, and design issues in the context of a well-defined set of circumstances?

As an example, Figure 1.1 illustrates a rhetorical strategy for a job cover letter. Notice how the writer took time to answer the questions pertinent to each category of the strategy. When he begins to write the actual letter, he will be able to write it much more quickly and with much more confidence than if he had plunged into the writing without first thinking through these essential elements. As you can see,

Figure 1.1

Rhetorical Strategy for a Job Cover Letter

Purpose:	To get the employer's attention so that I get an interview. To highlight my resume and separate me from the rest of the applicants. To convince the employer that I have the right background and qualifications for the job.
Audience:	J. J. Fahnstock, Technical Publications Manager. She wants someone with writing background and at least one year of work experience, C++ programming knowledge, and good team work skills. She also probably wants to hire someone who has worked with documents similar to those her company produces. Because the company is small, she may want someone who is flexible and can work with a variety of documents—and can also do some editing and some document production work. Is very busy and needs concise, professional letter.
Writing Techniques:	Begin with my experience as a writer, emphasize specific work I've done similar to Fahnstock's documents. Mention my ability to work with a team and do cross-functional tasks. Use confident tone. Keep letter to one page.

the more detailed your answers are in this planning stage, the easier your writing task will be.

When you have defined a rhetorical strategy for your writing task, you are ready to begin planning a document that will suit the specific situation. This chapter discusses various approaches to document planning, beginning with the practical view of technical communicators as problem solvers and then moving to more definitive planning techniques.

Problem-Solving Strategies for Technical Communicators

At base, writers in the technical professions are more than just conveyors of technical information; they are people who solve communication problems. For instance, an environmental engineering firm wants the contract for cleaning up a contaminated waste site in Connecticut. To win the bid, the company's project team has to write a proposal convincing the potential client that they are the best team for the job. That's a communication problem to be solved. The project team must determine the best strategies for persuading the client. If they get the contract, the engineers who do the cleanup will have to report on their methodology, P u s e of resources, final results, and compliance with legal regulations. That's another communication problem: how to organize and present the data effectively. During the job, many of the technicians and other field personnel will have to write interim reports, laboratory results, and feasibility studies detailing their work. The people who use the laboratory equipment, those who operate the specialized field machinery, and those who use the software programs to analyze results will depend on operator instructions to help them work the equipment efficiently. All of these tasks are complex communication problems that technical communicators must solve.

In each case, the writer has to build a bridge between necessary information and the audience. If the writing is disorganized, it won't communicate clearly and may even result in costly misunderstanding. If the writer uses inefficient language or designs information poorly, the audience will waste valuable time trying to read the information. And if the writer uses the wrong tone or emphasizes the wrong information, the audience may become exasperated or unfriendly. Even in small doses, hostility in the audience can cause major difficulties with a technical project. So the writer's job is really that of a problem solver, and the problem to be solved is *How to build the best bridge between the technical information and the audience.*

If you think of technical writing in these terms, you will approach your writing tasks more productively. By realizing that any technical writing project requires careful planning, you won't rush pen to paper or fingers to keyboard in a willy-nilly fashion that might only waste your time in false starts. You begin planning by defining the communication problem you need to solve and understanding all of its parts.

Most technical professionals are already trained as problem solvers in their technical disciplines. Engineers know how to solve engineering problems, physicians know how to solve medical dilemmas, and so forth. In most technical fields, the approach to problem solving is simple: Define the issue, view it in its various contexts, research comparable situations, apply technical expertise, generate possible solutions, test the results, and come to a well-supported conclusion. The same process will work for you as a technical communicator.

When you think of your writing projects in terms of problem solving, the parallel between technological methodology and writing methodology becomes clear.

Step
to ...

PROBLEM SOLVING

1. Define the issue. The simplest way to define the issue is to phrase it as a question. For a lab report, you might ask, "Does increased pressure on the cylinder distort its shape during rotation?" For an analytical study you might ask, "Is it more cost effective to build a highway overpass or to reconfigure the surface roadway?"
2. View the issue in context. Look at the question you have defined in step 1 in a larger context. How does it relate to other issues similar to it or surrounding it? How will your document add to or limit other documents written on the same or similar subjects? What will be the likely questions from readers? How does cylinder distortion affect the operation of the entire machine? Are other areas along the highway more feasible locations for an overpass?
3. Research comparable situations. Find out what else has been done on your topic or on similar ones. What do other lab experiments tell you that might contribute to your research on cylinder rotation? What did the most recent highway overpass cost?
4. Apply technical expertise. If you are a technical expert (such as an engineer or scientist), you can look at the cylinder experiment and use your knowledge to determine whether the cylinder will work in the machine you are building. If your expertise is budget control, you can determine whether building that overpass will be a fiscally sound decision.
5. Generate possible solutions. List all of the potential solutions to the question you asked in step 1. Make sure to include every answer that is logical and possible. Jot down possible outlines or other organizing plans for the final document. Your writing skill will enable you to organize the document in ways that most effectively give readers the information they need.
6. Test the results. Try out the various solutions you generated. Ask colleagues for their reactions, run the ideas by a local citizens' group, give the document plan to an editor or to a potential reader. Do the solutions make sense? What elements need revising?
7. Come to a well-supported conclusion. Consider all the evidence you have gathered. You should be able to see in this evidence the support you need to come to trustworthy conclusions about how to proceed. The careful planning you have done will ultimately save you time—and often money—as well as the embarrassment of an ill-conceived technical project or document.

Instead of viewing the writing process as mysterious and intimidating, you can approach it in systematic stages that ensure much more effective results.

This is not to say that writing doesn't take talent—it does, surely—but writing talent alone is not enough. Writing in a technical environment requires more than just a burst of creative energy. It necessitates collaborating with many groups and working within a series of deadlines. Doing that well means considering many different needs and planning ahead meticulously.

Analyzing Your Audience

A major component of the planning process is analyzing the needs of your audience. When busy executives have only a few minutes to read a report, they don't want to wade through pages of dense prose to find the one or two important items they need. Decision makers want key information placed up front, and they want the rest of the document in an easy-to-read format that saves them time. Similarly, users of equipment want to know how to assemble and operate a machine—they don't want to read a lot of background theory or marketing hype. Finally, no readers want documents that are written in language that either patronizes them or sails over their heads. You must learn to gauge the technical expertise of your audience and to write at a level exactly suited to their needs.

It's also important to realize that technical writing styles and requirements differ from profession to profession and often from company to company. Although the standards for good writing are universal, groups that work together in specialized areas develop their own subset of standards for communicating with each other. Engineers use professional language different from that of scientists, and health professionals such as nurses, physical therapists, pharmacists, and doctors have their own expectations of how technical documents should be written. Understanding the expectations of these different "discourse communities" allows you to tailor your prose to communicate more effectively with the members of that community. Taking the time in advance to research your audience's expectations is a critical step, even when you think you already understand what everyone needs and wants.

A common mistake some writers make is to assume they understand their readers without taking the time to be sure. "I know what these people want; I work with them every day." Or, "I've used this product so often myself I know exactly what the users need." Or even, "The audience is so broad I can't possibly pin down specific characteristics; it's just the general public with no special qualities." In each of these instances, writers can produce better documents if they check their assumptions. Readers' needs are often surprising. Keep in mind, too, that documents are usually read by more than one audience: the *primary audience* is the reader you write directly for and the *secondary audience* is the reader(s) who need(s) to read it to contribute to some other aspect of the project. For instance, a medical treatment report goes to the doctor first, but the attending health professionals (nurses, therapists, and so on) may need to read it as well.

Creating an Audience Analysis Grid

Before sitting down to establish specific plans for a document, take time to research the eight questions shown in the grid below, which accurately defines the audience.

	Primary Audience	Secondary Audience
1. Who will read your document?		
2. What are their job functions?		
3. What are their levels of expertise and experience?		
4. What do they need from the document?		
5. What is the "bottom line" information they need?		
6. Do they have any biases or prejudgments?		
7. Under what conditions will they read the document?		
8. With what other relevant documents are they familiar?		

1. Who Will Read Your Document? Be specific about your actual readers. If possible, name them and picture them in your head as you sit down to compose. Write as if you are talking to them rather than to a computer screen or a yellow writing tablet. By picturing them, you place your words in a more real situation and are more likely to address their needs.

As mentioned above, you will often have *multiple audiences*, some primary (the people for whom your document is specifically intended) and some secondary (other people who may have reason to read all or part of the document). For example, your engineering report may be read by people who need to analyze the details of what you've written and by those who need to know only the conclusions and recommendations. If you think about this in advance, you can make decisions about the document that can accommodate both types of readers. You can decide whether it would be better to "frontload" the document (see Chapter 3, pp. 57-64) by putting the recommendations first, or to begin with the background discussion.

Tip: *It's important to note that nearly all documents have multiple audiences—you may not even know some of the people who will read your work. Always design documents so that someone not familiar with you or your project can understand the content.*

You can also decide how detailed the abstract should be and whether you also need an executive summary for those who need to know only the basics. (See Chapter 11 for a discussion of abstracts and executive summaries.) With information about all of your potential readers, you can better decide what to emphasize and what to downplay, what organization and what page design is most appropriate, and so forth.

2. What Are Their Job Functions? Understanding the nature of your readers' jobs can tell you more precisely what they are looking for in

your work and how they **will** use it. For example, if you know that your readers are decision makers, then your material will focus on recommendations for action. If your readers are primarily technicians, you might feature procedures and analyses.

3. What Are Their Levels of Expertise and Experience? Find out as accurately as possible the technical knowledge of your readers. You don't want to use terms they might not understand, nor do you want to explain to them things they already know. Along the same lines, if you know that the audience members are seasoned in the job, you can perhaps include advanced or anecdotal information they will understand because of their long experience. If they are new to the position, you may want to write longer introductions and give more background material.

4. What Do They Need from the Document? Different readers need different things from your work. Some may want details; others may want just the basic points. In some cases, your audience may have a specific **agenda—money**, for example. How much will the project cost? How can we get the most for our money? If you feel you are the low bidder on the project, you should find a way to feature the cost savings throughout the document, instead of burying it only in the budget section on the last page. The key here is to put up front what the users need.

5. What Is the "Bottom Line" Information They Need? If you had to say one thing that your audience needs more than anything else from the document, what is it? Be sure to make this information the most emphatic and easy to find.

6. Do They Have Any Biases or Prejudgments? The answer to this question gives you an essential sense of your readers' emotional attitudes toward your work. Are they inclined to believe you, or are they potentially hostile to your ideas? What are their fears? Their hopes? Knowing such attitudes in advance allows you to couch the information in terms and in a format that will soften the negatives and enhance the positives. For example, if you are recommending to management that they spend more money for employee benefits (such as subsidized parking or subway passes), it would be a good idea to know whether the company is in good enough financial shape to accommodate such requests easily. If money is tight, **management** is likely to be a hostile audience, and you need to lead them carefully to your point of view by emphasizing the ultimate payoff in employee satisfaction and productivity. On the other hand, if you have been asked to research the most cost-effective methods for putting your company's product information on the Internet, your audience will be eager to read your recommendations. No soft-pedaling is necessary.

7. Under What Conditions Will They Read the Document? In busy offices, people often work in cubicles with phones ringing, coworkers gossiping, and other distractions. These readers need documents that don't require peace and quiet for intense

concentration. Other readers may have both the luxury of time and a quiet office space. This group would be happy to delve into the details of extended discussions. Documents for the first group should be “skimmable” and formatted for quick understanding, while documents for the second can contain longer paragraphs and more extensively developed and explained logic.

8. With What Other Relevant Documents Are They Familiar? Does your audience often use or read similar documents? Is there a standard format that everyone expects to see? By understanding your readers' expectations, you can choose to conform with or to break the mold—depending on the effect you want to create. Once you determine what other documents your audience is familiar with, you can refer to them with confidence, knowing that your audience will know what you're talking about.

Finding Information About Your Audience

Completing your audience analysis grid may take some time, but the extra effort will pay off. You can write directly to your audience's needs and thus avoid having to make changes to your document later. But how do you get the necessary answers? Several methods work: questionnaires, telephone calls, personal interviews, e-mail surveys, and so forth. If you are writing a user guide for a product, any usability testing that has been done—for example, preliminary tests to see how easy a product is for customers to use—should provide you with essential information about your audience. (You might consider conducting some usability testing yourself if none has been completed.) It's also a good idea to check for other sources of user feedback that already exist (from customer support, from reader response cards, and so on). Many companies conduct ongoing market research on their customers and may thus provide you with rich data about your audience.

No matter how you collect the information, an audience analysis is an essential preliminary step to writing, a step that will show in the quality of your finished document.

Specific Planning Techniques

Once you have completed your audience analysis grid, you must decide how to proceed with the planning stage. This process depends on the size of the document, the time you have, and the number of people involved. In some cases, you may have a long document with many writers and editors collaborating. In others, you may have a short document with no collaborators and a tight schedule. The rest of this chapter focuses on specific planning techniques you can use to make your tasks easier. Each technique is presented briefly with an overview, a series of steps, and a brief conclusion. You may decide to use all of these suggested procedures or only some of them, but in every instance using at least one or two will make writing the final document much easier.

Outlining

Like many writers, you may dread the task of creating an outline. You probably remember from your early school days the painstaking process of learning how to outline—a process overrun with roman numerals, precise and multiple levels of headings, indentations, numbers, and letters. Overwhelmed by such strict rules, you probably quit outlining at your first opportunity (or have done it as rarely as possible).

Nonetheless, beginning to write a text without first constructing some type of outline is much like starting a trip without a map. If you have a destination in mind and would like to arrive as quickly and efficiently as possible, a map makes the journey a lot more direct. If you know your subject and where you want to go with it, a quick outline can point you in the right direction and warn you about potential detours well in advance. In other words, outlining can save you time in the long run—and the process does not have to be so formal that it's a burden.

The Process of Outlining

An effective outline involves live simple steps: *list, categorize, prioritize, write, check.*

1. List Your Ideas. Use this step as a way to brainstorm about your topic. Take a blank sheet of paper and generate a list of all the ideas you have about your subject. Jot them down in random order. For example, an engineer asked to write a report on the cleanup of an environmental site might jot down these ideas:

wetlands permitting, mobilization, site preparation, marking of wetlands, establishment of erosion and sediment controls, surface soil sampling, trenching and test pitting operations, waste sampling, drum removal, demolition, waste containment and sampling, site stabilization, demobilization

2. Categorize These Ideas. Once satisfied that your list is complete, spend some time thinking about how to divide these thoughts into broad categories. Try out several categories until you find those that include as many of your ideas as possible, then group the ideas under pertinent headings.

That same engineer might then categorize her list this way:

<i>Contaminant Removal</i>	<i>Preparation</i>	<i>Sampling</i>	<i>Site Stabilization</i>
<i>drum removal</i>	<i>permitting</i>	<i>controls</i>	<i>demolition</i>
<i>waste analysis</i>	<i>mobilization</i>	<i>trenching</i>	<i>additional</i>
	<i>marking</i>	<i>test pitting</i>	<i>containment</i>
	<i>wetlands</i>	<i>soil sampling</i>	<i>demobilization</i>
		<i>waste sampling</i>	

3. Prioritize the Categories. Which category is most important and should come first in your final document? Which should be second? Third? Arrange the groups in various orders—chronological, spatial, most to least complex (or vice

versa)—until you are satisfied that the sequence will make sense to your audience and will allow you to make your points logically.

The most sensible order for the site cleanup categories is a chronological one:

Preparation, Sampling, Contaminant Removal, Site Stabilization

4. Write a Complete Sentence for Each Category Heading. Take each preliminary heading from step 2 and develop it into a complete sentence. This will focus your thinking and ensures that you have clear points to make, not just a series of random ideas. Under each of these "point headings," arrange the ideas from your original list in logical order. At this stage, you may decide to add or subtract some of your subideas as you refine the outline. You may also choose to put these ideas into complete sentences as well, although doing so is not essential.

- a. *In compliance with the AC-1 Site Stabilization and Source Characterization program, Perkins Engineering, Inc., prepared the contaminated wetlands for testing.*
 - *wetlands permitting*
 - *mobilization of equipment*
 - *marking of wetlands*
- b. *Perkins Engineering completed the necessary soil and waste sampling, including waste characterization analysis on the buried drums and environmental chemical analysis on the soils surrounding the drums.*
 - *establishment of erosion and sediment controls*
 - *surface soil sampling*
 - *trenching and test pitting*
 - *soil and waste sampling*
- c. *Perkins removed approximately 450 of the 300 buried drums.*
 - *defining drum removal zones*
 - *additional waste characterization analysis*
 - *drum screening*
 - *entries on the drum log*
- d. *After the drums were removed and the testing completed, Perkins recontoured the site as near as possible to the original ground surface contour and began the demobilization process.*
 - *demolition of construction structures*
 - *site ~~recompacte~~d recontoured*
 - *removal of unnecessary equipment*
 - *decontamination of construction equipment*
 - *cleaning and repacking of the decontamination pad*

5. Check the Outline for Balance and Logic. Now that you have the basic outline completed, make sure that each point heading has a sufficient number of ideas un-

der it to warrant its standing alone. If some do not, you may want to combine them with the stronger points or do some additional research to add ballast to those weaker points. Check to make sure that the order of the points is optimum. Will this arrangement meet your audience's needs? Does it get you where you want to go? You may even want to let other people see the outline before you move forward to the drafting stage. They may make valuable suggestions or catch errors you haven't seen.

The Perkins engineer using the outlining process checked her outline and was pleased to see that her point headings proceeded logically and that each had a sufficient number of subpoints. Even those subpoints seemed to be in a logical order. Her audience, the Environmental Protection Agency, would understand clearly and easily that her company had taken the correct precautions and had completed the site cleanup according to government regulations. All that was left for her to do was to flesh out the report, using exactly this order and these major point headings.

How different it would have been if she had been too much in a hurry and had done little planning except to jot down a quick outline like this one:

Subject: Site Cleanup

- I. Preparation*
- II. Soil sampling*
- III. Removal of contaminants*
- IV. Site stabilization*

This bare-bones approach conveys little or no information and is not organized in complete thoughts. The engineer still has plenty of thinking to do. Taking the time to produce a complete outline—even an informal one—would have given her many advantages: she would have organized the major components of her document, generated subsections, tested her logic, and filled any gaps in research—all before the first draft of her actual work product. If she had not done this preliminary planning, she might have written five or six pages before discovering that she had no idea where she was going.

Although completing an outline first may seem like an unnecessary step, it provides a valuable checkpoint for everyone involved before the document is well under way. Most technical communicators view this procedure as an ultimate time saver.

Storyboarding: Making Planning Concrete

When writers work in teams, as they often do in business and industry, they need techniques to help them collaborate. Storyboarding is one such technique that makes document planning a group project. Because it is a process originally developed for the film industry, it makes the planning effort highly *visual* and allows many people to have input simultaneously.

In the early years of the movie business, writers, directors, and producers often blocked story lines in advance by sketching the components of a scene on large boards that they could place on the wall and discuss as a group. During these

creative sessions, participants would actually move the boards around to try out different plot structures, and they would erase and rearrange the components on the individual boards as they revised the film's story line. Although technical communicators are not creating "stories" in the same sense as these screenwriters were, the technique works extremely well as a collaborative tool for any group writing project.

To create effective storyboards, you must first have completed the preliminaries of defining your audience and planning the basic content of your document. You must also have written a brief outline of the project, breaking out the topics into similar structures. These can be chapters, or subsections within chapters, or chapter groups, or whatever reflects balanced components of the document.

You can then create a separate "board" (posterboard, flip chart, erasable whiteboard or blackboard) for each topic in the outline, as shown in Figure 1.2. It's important to treat each topic in exactly the same format so that the boards have enough symmetry to make rearranging the parts easy. The components of each are as follows:

- A heading that clearly indicates the topic
- A brief summary of the component's text, written in the style and tone of the final document
- Notes about the topic (questions, suggestions, examples, and so on)
- Suggested visual aids

When the boards are finished, the entire project team can participate in a preliminary review meeting. The group posts the boards around the room so everyone

Figure 1.2

A **Storyboard** Panel

Heading: The Process for Removing Buried Toxic Waste

Summary: Removing toxic waste buried in drums is a four-part process

- Defining zones for drum removal-
- Analyzing additional waste characterizations
- Drum screening
- Entering data on the drum log

Each of these steps requires careful coordination and documentation.

Notes: -Include checklists for activities necessary for each part.
 -Indicate a clear order for activities.
 -Mention compliance guidelines for federal requirements.
 -Do we need specific federal regulations listed?

Visuals: Add a graphic checklist with boxes for checkmarks; provide a sample form for the drum log.

can see how the whole project fits together. If the organization seems questionable, the team can simply rearrange the boards, creating a new organization on the spot. Then they can begin discussing each board separately. Does it contain accurate and sufficient information? If it doesn't, the team can insert it. Is the style appropriate? If it isn't, the team can change it. Do the suggested examples make sense? If they don't, the team can replace them with new ones. And so on.

This procedure transforms planning into a dynamic group process that encourages collaboration and prevents problems that may arise when reviewers (who haven't been involved previously) get their first look at a document during later stages in the writing process. With storyboarding, everyone in the project partici-

Writing a Document Specification

The main purpose for writing a **document specification** (a "doc spec") is to create an up-front agreement about the document's contents and the schedule for its completion. As its name suggests, it *specifies* the particulars of the document and serves as a sort of contract and set of guidelines agreed upon in advance by management and writers. It describes the product to be delivered and the time frame for delivery. In some companies, formal doc specs are required; in others, the process is more informal.

Writing a document specification allows you to compile all of the preliminary information you have collected during the planning stages into a plan of action. Once you have carefully thought about your audience and have a good grasp of the document's contents and organization, you are ready to formalize these decisions into a clear statement of intent that can be circulated for approval. If you are working in a team, this is the stage where you have a team meeting to collaborate on the specification. (See Chapter 6 for more on collaboration.)

If you are writing in a large corporate environment—or even in a company employing just a few people—developing a doc spec and distributing it to all interested parties clarifies your role in the project and makes your work easier. The spec alerts all related departments and individuals to the nature of the project and its time and budgetary requirements: It makes your tasks visible to the rest of the company.

Depending on time constraints, you can write the specification in a few pages, or you can generate a more comprehensive plan that includes significant detail. Some large companies have doc spec "templates" that all writers follow to ensure uniformity in corporate written products. In small companies, the spec may be a memorandum that looks quite informal but still contains the vital information so that everyone involved with the project is alerted to relevant needs and schedules.

The document specification should serve as your road map and should include as much information as possible about the text itself and about the other

constraints affecting the writing process. For example, an effective doc spec may include the following parts:

- Sign-off sheet
- Identification of the document
- Table of contents and overview
- Audience definition
- Relationship to other documents
- Writer's requirements
- Resource personnel
- Constraints
- Production information
- Schedules and milestones
- Budget

See the Checklist: Document Specification Components for details about each of these.

CHECKLIST Document Specification Components

Whenever you create a document specification, make sure that you include everything on this list that is appropriate for your document.

- Sign-off sheet. Who is responsible for this *project*—its implementation and its funding? List the names and contact information for everyone who needs to sign off on this specification in a cover memo, and make clear that initialing the memo signals approval of the specification.
- D Hardware " " or document identification. Provide the title, revision number (if this is not the first version), company name, and names of the team members.
- Table of contents.
- Definition of **audience**. Who will read this document? Including this information supports your decisions about both what the document should include and who should sign off on it.
- Relationship of this document to other documents. How does this document relate to other documents, both internal and external? If your company has a history of writing winning proposals, and this document is similar to those, say so. If it is part of a larger document set, explain. And if it is going head-to-head with a competitor's document, explain what makes it *different*—and better.
- D Requirements. What will you need to complete the document? List all equipment, information, and support that will make your job easier.
- Resource personnel. Who will be involved? List the team, and include all the people who need to provide edits, do testing, provide quality assurance or technical support, and so on. Use specific names, not just job titles; this will alert people that they need to participate and take ownership.

- Constraints. What potential problems might cause you to miss deadlines or have to revise the specifications? Be as specific as possible.
- D Production information. What will the document look like? List details: number of pages, production path (desktop, printer), paper stock, typeface, number of colors, binding, graphics, whether there will be tabs or pullouts. In large companies, you may only need to specify the type of document, because each document already has a style template; in smaller companies, you will need to spell everything out.
- Schedules and milestones. How long will the process take? Provide time estimates and delivery deadlines for each stage—in a timeline or other visual presentation, if you can manage. Keep in mind that the schedule serves as a promise to everyone that you will meet your deadlines and complete the project within a certain time frame. It also lets other people know when you need their input. It's always smart to build in some margins—extra time in case some part of the process takes longer than you had planned.

► **Tip:** *If you are a student, include in this section the cost of the materials you're using, the equipment, and the hourly wages you would be paid if you were working on a project for an employer.*

Considering the Ethical Dimensions of a Project

In addition to planning the best ways to organize and write the document so that it communicates effectively, another element to consider is the ethical nature of your project. As a technical professional, you may be tempted to view your activities as purely technical puzzles—not as issues affecting people's lives, the environment, and the economy. In reality, much of the work done in business and industry has profound effects on the quality of life in the surrounding communities and can have a more global impact as well, depending on the nature and scope of the project. For example, if you are an engineer involved in the construction of a highway overpass, you may be faced with many ethical decisions during the course of your work: Will families who live in the intended path of the overpass need to be relocated? What quality of materials will you use—those that are inexpensive but less durable and potentially hazardous, or those that are more costly but will ensure safety? Will your budget include figures that are unrealistically low? How will you communicate facts and figures of the project? Will you slant these data so that they seem to support your proposal, or will you present them realistically?

These and other questions occur daily in the lives of technical professionals, and the answers you give to them will define your moral sense and establish your reputation among your colleagues and clients. It's important to realize the ethical dimensions of your work and to be prepared for such critical dilemmas so that your decisions about all projects meet your moral as well as technical standards. You

need to examine your own code of conduct so that you have a strong foundation not only for recognizing ethical choices when you are confronted with them but also for developing a network of trusted colleagues you can turn to for insight and guidance when these issues arise. (For more discussion about ethical issues, see Chapter 7.) Remember that as a technical professional, your actions are not carried out in a vacuum; you touch the lives of many others. You are a human being first, a technical professional second.

Tips for International Communication

If you are planning a writing project for an audience in another country, or if your finished document will be translated into another language, you have the extra

► **Tip:** *Even if your company has been doing business with a particular country for years, it's useful to reexamine the target audience periodically to update your knowledge of long-term customers. Change occurs quickly and often in today's business world.*

challenge of writing for readers whose culture and language may differ greatly from yours. For example, if you work for an electronics firm or a computer company that exports products, the manual you write will need to be translated into the languages of the countries where the product will be marketed. Planning for these culturally diverse readers requires more than the standard problem-solving strategies.

No matter how global advanced technology has become, the people who use that technology are products of the places where they were raised. You must thus always consider the ways in which your audience's expectations may differ from

your own and avoid making assumptions about your readers based on your own background. Remember that there are many variables that create reader expectations, and all countries—even those that seem quite similar to each other—have their own unique set of cultural conventions about written documents. Effective communication means more than translating from one language into another; it means taking into consideration all of the factors that contribute to how the audience reads and understands what you write. The procedure used to adapt a document to a specific country or culture is what professional communicators call "localization." Even when documents are translated competently for foreign markets, if they aren't localized for the target audience, the resulting misunderstanding can generate losses in revenue as well as prestige.

Two planning techniques are especially useful in the localization process:

1. **An international user analysis:** Similar to a storyboard, this type of analysis is a highly visual procedure for charting differences and similarities among target markets.
2. A **translation glossary:** This list of preferred translations is essential for those who know that their work will be translated into other languages.

Creating an International User Analysis

In her book *International Technical Communication*, communication specialist Nancy Hoft suggests that localizing documents for other cultures requires you to consider seven main categories of differences: political, economic, social, religious, educational, linguistic, and technological. Within these categories, you may want to consider such things as:

- *Political*: Trade issues, legal issues, political tradition and symbolism.
- *Economic and social*: Age, business etiquette, family and social interaction, discrimination and prejudice, popular culture.
- *Religious and educational*: Literacy, common body of knowledge, learning styles.
- *Linguistic*: The target language, official national languages, writing style, reading orientation (i.e., from left to right, or right to left).
- *Technological*: Availability, compatibility.

If you focus on these categories when planning your documents, you can better understand how an international audience is likely to respond to your document. One way to focus on these areas is to generate an international user analysis grid that allows you to collect data in an organized and objective fashion. (See Steps to ... A User Analysis Grid.)

Steps
to ...

A USER ANALYSIS GRID

1. Create a grid with the seven categories across the **top**. The grid allows you to compare, contrast, and synthesize data easily (see Figure 1.3). Each category is specifically designed to address an area of cultural diversity among nations and product markets, not individuals. You may want to add other categories that make more sense in your situation.
2. Down the left-hand side. Place the terms "similarities" and "differences." For each category, compare the target country to your own. Doing this will force you to examine your assumptions about the other culture.
3. Tape the grid to a wall or prop it somewhere that others can see it and contribute to it. Much like storyboarding, this technique encourages collaboration and keeps the project visible, at the forefront of everyone's thinking.
4. Fill in each block of the grid as completely as possible. You may need to do some significant research to complete this step. Build time for research into the schedule. Consider having members of your international team or some of your colleagues in the target country review the data. They may identify missing or inaccurate information.
5. If you are writing for many different countries, create a grid for each one and compare them. It's easier to synthesize data if you have your material consolidated on a grid than if you have it in loose-leaf binders or in other scattered formats. Comparing one grid with another may also jog your mind to add information you might not have thought of otherwise.

Figure 1.3

International User Analysis Grid

Target Country: _____ Last Revised: _____

Target Language: _____

	Political	Economic	Social	Religious	Educational	Linguistic	Technological
Similarities							
Differences							

As you fill out the grid, you will need to research the cultures and countries you are targeting. Some sources for researching international communication are as follows:

- Standards organizations in each country (comparable to the American National Standards Institute in the United States), such as the Japanese Standards Association, the European Computer Manufacturers Association, and the Canadian Standards Association
- International organizations such as the United Nations, the General Agreement on Tariffs and Trade (GATT), the International Labor Organization (ILO), the International Standards Organization (ISO), and so on
- Government offices, chambers of commerce, professional and trade associations, such as the Institute of Electrical and Electronics Engineers (IEEE) and the Society for Technical Communication (STC)
- The Internet
- Sources within your company or group, such as employees or students from the target country

Once you have completed the grid (or grids), you should have a fuller picture of the target audience and know how to write and design the document to best meet their needs. It's a good idea to keep these grids handy for reference and to keep them updated. After your document has been released, you can do a quick follow-up study to determine how accurate you were in your initial audience research. Mark any changes on the grid to give yourself a continuing log of reader expecta-

tions and responses. As a result, any subsequent documents for that audience will be much easier to write.

When to Provide a Translation Glossary

Most translators agree that documents are easier to translate when they are deductively organized with summaries, headings, and topic sentences. The chief linguistic and cultural problems that translators of scientific and technical texts encounter are specialist terminology, idioms, and other culturally related elements. Simply stated, words carry with them more than their denotative meaning; they are culturally bound and convey connotations as well as literal meaning.

The translation glossary is a useful planning technique for writers who know that their work will be translated. Such a glossary contains the preferred translation for various terminologies in the document. (Your company may have a style guide that gives the preferred translations, or you may determine your own preferences after researching the target culture.) As many international communicators have learned the hard way, without a glossary even the best translators may use literal translations that later have to be changed—or, worse, they may use terms that slip through and cause embarrassing linguistic situations when the final document is read by its international audience. For example, the term "interface" may come out the other end as "between heads," a meaning hardly appropriate for any audience. Although translators may be experts at word-for-word translation, unless they are able to look at the document as a whole and understand both what the writer meant and how the target audience will perceive the meaning, miscommunication may result.

Several examples reveal the kinds of embarrassment that may occur when companies fail to localize the terminology in their international documents. In a document dealing with the uneasy political situation in Eastern Europe, the term "coexistence" was unfortunately translated from English into Czech as "cohabitation." In an infamous faux pas, General Motors released their successful Nova model in Spain, where the name translated to "No Va," which means "Does Not Go." When Braniff translated a slogan touting its plane's upholstery, "Fly in Leather," it came out in Spanish as "Fly Naked." Pepsi's slogan "Pepsi Brings You Back to Life" translated into Chinese as "Pepsi Brings Your Ancestors Back from the Grave." And Clairrol introduced its new curling iron, the "Mist Stick," in Germany, only to find that "mist" is slang for manure. Amusing as these miscommunications seem in retrospect, they apparently cost the companies significant revenue and prestige.

If you know in advance that your work will be translated, keep a running list of terms that may cause trouble if translated literally. If you have completed the international user analysis suggested earlier in this section, you can check the grid to determine specific linguistic or cultural variables that may present challenges for translators. It's a help to translators to have a ready-made set of terms they can use instead of having to return to the writers for that information or forging ahead with verbatim and perhaps inappropriate translations.

Both the international user analysis and the translation glossary focus on the principle of localization: viewing the document in the light of culture and usage. These few simple planning tips for international communication may take some time and effort up front, but they can save you many headaches and potential embarrassment.

For more about communicating across cultures, see Chapter 7.

Quick Review

Preliminary planning is essential for technical communication. In the long run, these planning strategies prevent the waste of both time and money. To plan effectively, you should take the following steps:

- Use a problem-solving approach to the writing project.
- Analyze the audience, both primary and secondary.
- Write an informal outline expressing complete thoughts.
- Create storyboards for collaborative editing.
- Write a document specification.
- Plan for international communication by using an international user analysis grid and a translation glossary.

Exercises

1. Write a rhetorical strategy for a simple writing project—a letter or memo, a short paper, or an e-mail. Be sure to consider carefully your purpose for writing as well as your audience's needs and biases. The entire strategy should be no longer than one page. When you have finished writing, look back at your rhetorical strategy and make some specific notes about how it helped you to define the project. What parts of the strategy were the most useful? Which were the least useful? Why? How can you make such a strategy work the best for your writing process?
2. Complete a thorough audience analysis for the readers of a writing project you are doing for class or work. You may want to use the *audience analysis grid* (p. 14), or you may want to develop your own. At the end of the audience analysis, add a discussion of how the information you have collected about your readers will affect the way you write the document. For example, how will the information help you to organize the material, design the pages, choose a particular tone, and so on? Should you emphasize some parts of the document more than others? Are there some items you might have thought about including that you will now omit? Similarly, are there some items that you hadn't thought of including that are now part of your plan?

3. Define what "writing as problem solving" means to you. Do you agree that technical writing is a form of problem solving? What are the elements that contribute to such a problem-solving approach to writing projects? Are there types of technical writing where this approach will not work? Why or why not?
4. Target a particular culture (other than your own) for a technical communication project. Research the culture and complete an *international user analysis grid* (see p. 26) to help you communicate most effectively with this audience.
5. Create a planning portfolio for a writing project you have been assigned. Include in that portfolio any preliminary problem-solving notes you have made, an audience analysis, a needs assessment, an outline of the document, and a complete document specification.
6. If you are working on a group writing project, develop an outline for the project and then collaborate on creating *storyboards*. With one member of the group acting as facilitator, post the individual "boards" around the room and discuss any additions, deletions, or other changes to the document. Do not close the meeting until the group has reached a consensus. If there is time after the meeting—or even a day or two later—conduct a "postmortem" on the process. What worked well to facilitate productive discussion? What were the stumbling blocks? Would different ground rules have made the process easier?



Community Action Project

Knowing how to create a strategy for effective communication is a highly prized skill. You can use the planning elements discussed in this chapter to help others develop such strategies. By working with a community group or organization, you can test your own mastery of these planning techniques and do a service for the community as well.

Find a local organization that is looking to launch an advertising or informational campaign. Offer to help the members analyze their target audience and develop storyboards to get their message across powerfully. For example, a community recreation center may want to develop a brochure telling people about their facilities and programs. Another local group may want to attract people to a benefit auction. A park service may want to develop a visitor's guide—the opportunities are many.

Researching

Before you can write about a technical subject, you need to research it thoroughly and gather enough information to write with authority on the topic. No matter how well you write, edit, or design a document, if its information is not thorough and correct, the document will be inadequate.

Most students in college or graduate school think of research as a library project in which they must find as many sources on a subject as possible and synthesize that material into a cogent academic paper. In technical and scientific professions, the library is just one possible stop on the way to collecting sufficient information. There are many others. And in technical fields the nature of research may be different from academic work. For technical communicators, there are usually two kinds of research:

- Researching to solve a problem
- Researching to understand a product

Researching to Solve a Problem

This type of research closely resembles the traditional approach practiced in schools: you recognize a problem or an issue that needs to be resolved, and you gather the information necessary to find a feasible solution. For example, a large supermarket has gone out of business in the town where you live and you must determine the best use for the abandoned building and the lot on which it stands. Your first step is to gather information on a variety of topics: zoning laws, tax codes, accessibility issues, commercial potential, neighborhood attitudes, and so forth. You might then want to explore what has happened in other towns where similar situations have occurred. Perhaps local real estate brokers have some relevant data for you to consider. If there are interested buyers or investors, you'll need to talk with them and evaluate their proposals for transforming the empty building into a recreation center or a shopping mall. Some land developers may want to demolish the building and sell parcels of the land for condominium development or

low-income housing. Your job is to sort through all these ideas and then write a report recommending the best course of action.

Researching to Understand a Product

Not all technical writing demands traditional research from scratch. In one assignment, you may be given data already collected by someone else and be asked to turn that material into a manual or a report. For example, an engineer might give you a completed project file and ask you to write a final report to a client. Or a software developer may send you a product specification for a new product for which you must write the user's guide. In these and other cases, your first step is to gather enough information from technical resources so that you understand the material thoroughly and thus can explain it to the intended audience. If you aren't familiar with the technology of the project, you can't write about it. Talk with the developers to make sure your preliminary outlines and descriptions are technically accurate, try to find out the exact definitions of specific terms and concepts, and learn the history of the project so you can place it in a clear context for the audience.

Both types of research—to solve a problem and to understand a product—require significant planning and sufficient time to gather material. And both require that you have an intelligent and organized approach to the research task. It's not enough to spend hours and hours collecting every imaginable piece of information about a topic unless you are doing so systematically and for a defined purpose. Too many writers waste time gathering mountains of material, only to end up overwhelmed by the sheer volume of the data they have collected, much of it unrelated to their project.

A Systematic Approach to Research

Planning research, like planning a document (see Chapter 1), begins with the creation of a preliminary strategy. In some technical writing environments, writers move from project to project throughout the year and usually have developed an approach to researching that works well for them and their colleagues. Such an approach might specify a schedule of steps in the research process: conducting library searches, attending developers' meetings, contacting technical experts, and so forth.

When you find yourself researching something for the first time, you need to develop a strategy that will focus your information-gathering efforts. (See Steps to Completing Research on the next page.)

When you have generated a logical series of research questions, you're ready to begin gathering information. You may want to keep a separate file for the information you find on each of the questions so you can be as organized as possible when the research phase is over and you must transform your notes into an effective report, proposal, manual, or other document

Steps
to ...

COMPLETING RESEARCH

1. Define the problem clearly. Make sure you understand the issue at stake; write it down in your own words in simple and direct language. If you find you can't define the problem, come back to this step after some brainstorming, a process that allows you to see issues in ways you hadn't thought of before.
2. Brainstorm ideas. In a group meeting or alone at your desk, jot down every idea that comes to mind about the topic, eliminating nothing. Then evaluate the list and delete anything that is really off-topic.
3. Cluster ideas into categories. Collect the ideas on the list into units of connected elements. You might want to try **mind-mapping** (see Figure 2.1) if you are a visual thinker.
4. Organize the categories. Name each category, and arrange the categories in a logical order, then check them against the problem definition. Does each category make sense in light of that problem? Is each a legitimate area for research? Is anything missing? Can you combine some categories?
5. Develop research questions. Think about ways to phrase the category names into question form. For instance, instead of "Zoning Laws," ask "How will zoning laws limit the options for using the land?" Asking questions provides more direction in your research and helps you avoid wasting precious time. Make sure you investigate only material that directly answers your research questions—unless you discover a significant element you hadn't considered before. If that happens during your research (as it likely will), see if you can fit the new information into one of the preexisting categories. If not, generate a new category and create a question for it.

Finding and Evaluating Sources

Even with a great strategy for researching, you can still be stalled in the process if you don't know where to look for information or how to evaluate the sources you find. When you understand the basics of where to look and how to know if the material you find is a valuable resource, you can approach any research project with confidence.

Major Sources of Technical Information

Most technical information today is available in hardcopy and online—you'll need to decide which is the most convenient way for you to find the material you need. To get started on your research, you may want to browse through the sources listed below to see which ones fit the type of research you're doing.

Online Sources Most technical resources can be accessed through **online databases** available at the library or from your home or office computer. (Because URLs change, use a search engine like Google to find these resources.) The following are some of the database resources available:

- *Applied Science and Technology Index*: In-depth coverage of journal citations in the sciences, engineering, and technology.

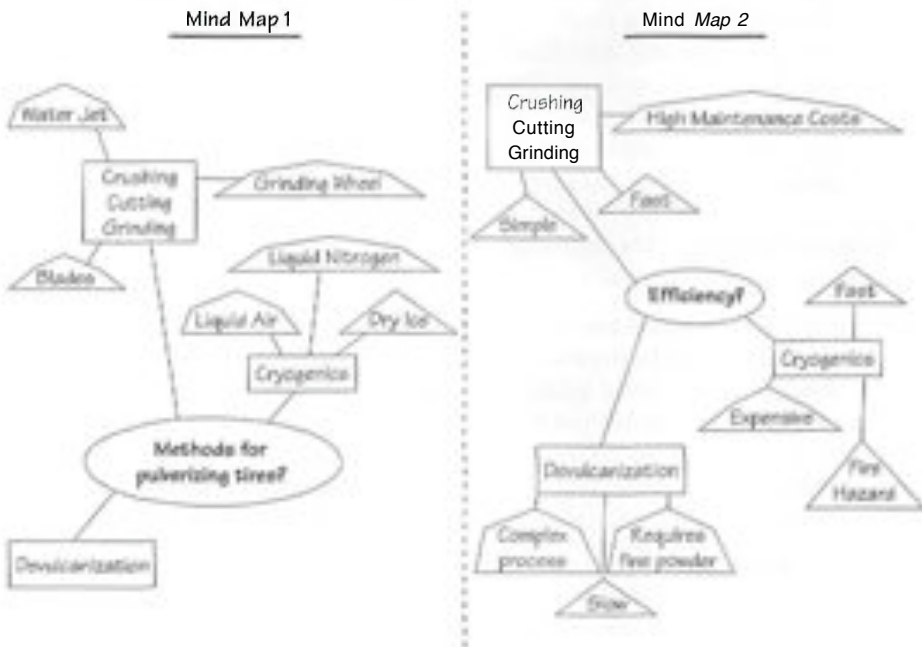
Figure 2.1

Mind Maps

Mind-mapping also known as "branching," "ballooning," or "clustering," is a visual technique that allows writers to see what they are thinking and make appropriate connections between thoughts. Although there are many variations, the basic process is as follows:

- a. Write the main topic you're researching in the middle of a large sheet of paper or other writing surface (a whiteboard or a flip chart), and draw a circle around it. Make sure that the paper is large enough to allow for extensive branches of thought.
- b. Think of subtopics and write these around the main topic, but put these subissues in boxes to differentiate them from the circled main idea. (Make an effort to express each idea in one or two keywords rather than long phrases.)
- c. Connect the boxes to the main topic with solid lines.
- d. Repeat steps (b) and (c), for each subtopic, generating supporting points for these ideas.

When you have finished the mind map, you will have a visual "map" of relationships among topics—your ideas will be grouped in visible clusters and levels.



- **Business Periodicals Index:** Journal citations in accounting, advertising, marketing, banking, computer technology, economics, finance and investments, industrial relations, management, occupational health and safety, and so on.
- **Compendex Plus:** A computer searchable version of *Engineering Index*.
- **Compact D/SEC:** Company data from annual and periodic reports filed with the Securities and Exchange Commission for almost all public companies.
- **Educational Resources Information Center (ERIC):** Covers education, counseling, human social development, and other social science subjects.
- **GPO Monthly Catalog:** Bibliographic citations for government publications such as books, reports, studies, serials, and maps. Published by the Government Printing Office.
- **Humanities Index:** Indexes English-language periodicals covering archaeology and classical studies, folklore, history, language and literature, performing arts, philosophy, and related subjects.
- **Medline:** Journal citations in clinical medicine, nursing, physical therapy, pharmacology, cardiovascular health, and so on.
- **Newspaper Abstracts:** Citations for articles from major newspapers (*Boston Globe*, *Chicago Tribune*, *Christian Science Monitor*, *Los Angeles Times*, *New York Times*, *Washington Post*) with brief abstracts or annotated headlines.
- **Nursing and Allied Health:** Indexes a wide range of English-language journals in nursing and allied health professions.
- **Psyclit:** Journal citations in psychology and psychiatry.
- **Social Sciences Index:** Journal citations in anthropology, economics, law and criminal justice, planning and public administration, political science, social aspects of medicine, sociology, and so on.

Hardcopy Sources The following are the major hardcopy sources of technical information found in most large libraries.

- **Guides to technical literature:** These include reference works that list individual **articles—bibliographies**, indexes, abstracts, journals, and so forth. Most of these guides are listed in three reference books: Ching-Chih Chen's *Scientific and Technical Information Sources* (MIT Press); Eugene Paul Sheehy's *Guide to Reference Books* (American Library Association); and Malinowski and Richardson's *Science and Engineering Literature: A Guide to Reference Sources* (Libraries Unlimited). Other hardcopy guides include the following:

American Statistics Index: Comprehensive guide to statistics published by federal agencies.

Chemical Abstracts: List of abstracts from journals.

Computer and Control Abstracts: List of abstracts from the computer field with many subfields represented.

Engineering Index: List of abstracts from journals.

Government Reports Announcements and Index: Comprehensive index to technical reports and federally sponsored contract research.

Index to International Statistics: Index to statistical publications of such intergovernmental organizations as the United Nations, World Bank, Organization for Economic Cooperation and Development (OECD), and International Monetary Fund. Abstracts are provided.

Index Medicus: Selective index to medical journals; interdisciplinary.

NASA Scientific and Technical Aerospace Reports: Index to reports.

For more general information you may also check the *Reader's Guide to Periodical Literature*, available in most libraries.

- **Professional journals**: When you find an article in one of the literature guides, such as the *Engineering Index*, go to the main catalogue to determine whether the library subscribes to the journal. If the library does subscribe, the catalogue should establish the journal's call number and location.
- **Books, monographs, conference proceedings, and review series**: All are listed in the library's main catalogue under the names of authors, editors, titles, subjects, and corporate authors. To find conference proceedings, you may need to know the conference title and date. Review series (such as *Advances in Bioengineering* or *Progress in Biochemical Pharmacology*) are listed under the series title.
- **Reports**: These may be listed in the library's main catalogue under author, corporate author, title, or subject, but they can usually be found as well in a separate reports checklist prepared by the library and arranged by report number or government number. Be sure to check the *Government Reports Announcements and Index* for a list of the government's reports on technical literature.
- **Dissertations**: These can be valuable sources of the latest information, but dissertations are expensive and difficult to acquire. The main guide to all dissertations in science and applied science is the *Dissertation Abstracts International. Volume B: The Sciences and Engineering*.
- **Standards and patents**: This vast area of technical literature can also be accessed electronically. Consult your reference librarian.
- **Product reviews**: Reading about other products (or earlier versions of the product you're working with) is a valuable source of information about the technology, user attitudes, and success rates of particular products. These reviews usually appear in trade magazines such as *eWeek*, *MacWorld*, and *Design News*.
- **Other reports, manuals, or proposals**: If you must write a document in a particular format or on a particular subject, it helps to see what other writers have done. You can gather especially good information about how to write your own document by looking at the competition's work or by looking at documents on file in your own company. If you are a student, check with your instructor to see if there are sample documents on file in the department.
- **Proprietary sources**: Most products or problems have a history of documentation located in-house. Your company's files may be the best, most up-to-date, and complete source on a specific topic.

People Sources As you do your research, don't ignore an obvious source of information: people. If you can identify individuals who may have valuable input for your project, ask them for their help.

- **Interviews:** In the technical professions, one of the best ways to gather current information is to go directly to the people who are the subject matter experts. You may find these people in industry, science laboratories, universities, and other locations where new research is going on. If you plan your interviews well, you can gather extensive material on your topic. This chapter discusses the interviewing process on pages 41–42.
- **Questionnaires and surveys:** If you want to know what an audience or a specified clientele thinks about a subject, send a questionnaire or survey to a sufficient sampling of people. The key to getting good information via this method is to ask the right questions and design the surveys well (see pp. 42–43).

Once you have the information in front of you, the next step is to decide if the source is an appropriate one. After many years of working in a specialized field,

CHECKLIST Evaluating Sources

- Is the source timely and current? Check the publication date of any written material you use. If the material is more than two years old, it may have been superseded by new ideas or by updates on earlier concepts. In medicine, technology, or similar disciplines, older publications often give a historical perspective on new developments, but they may no longer be authoritative sources.
 - Is it grounded in previous research? If the article offers no grounding in previous research and lists insufficient references to outside sources, the author may not be familiar enough with the work already done in the field. At the other extreme, if written material is choked with outside references, the author may have nothing original to say and may be simply rehashing what others have already said. Look for a balance of external references and personal experience.
 - Is it balanced and unbiased? A hallmark of poor arguments is their one-sided nature; good arguments usually include all possibilities and suggest why the author's view is the best alternative.
- D **Is the argument well-reasoned?** Be wary of articles that use emotion rather than logic to make their points. If an author depends on emotion as the primary persuasive element, it is probably because the argument's logic is weak.
- Is the source reliable? Consider the source of the information. Does its author or publisher have reason to slant the information. Note the credentials of the author or the interviewee, and look for people who are leading experts in the *field*—*authorities* who have published widely on the subject or who have had extensive experience working with the material. If possible, start with the top experts and then move to newcomers to the field who bring hard work and new ideas to the discipline.

most technical professionals develop a practiced eye for what is trustworthy in that field and what is not. To evaluate sources, scan introductions, tables of contents, indexes, and headings. Look for information about the authors' backgrounds that will help you understand their expertise and bias. The Checklist for Evaluating Sources on the preceding page provides specific suggestions.

The most effective way to learn to evaluate sources is to gather enough information on the subject to become an expert yourself. From an informed perspective, you can judge more easily the validity of others' opinions.

Tip: *One way to keep in touch with the current thinking on almost any topic is to participate in electronic discussion groups. You can subscribe to LISTSERV Internet discussion groups and/or to USENET news groups. In both groups, you can join electronic conversations, by means of electronic mail, with experts and novices on topics ranging from architecture to quantum physics. Keep in mind that the information found through this route is sheer opinion. Use these groups to spark ideas or discover interesting directions for new research. Don't use them as proof for any of your ideas.*

You will probably begin your research by accessing an electronic database or search engine like Google. Such sources can yield an overwhelming amount of information. Unlike published sources, which generally have been through a series of evaluations before publication and have been categorized and organized following a set of widely accepted rules, electronic information can be posted by anyone with access to a computer and an Internet connection. You will need strategies for evaluating both the usefulness and the credibility of the information. The next section, Guidelines: Evaluating Internet Resources, provides basic advice for this process.

In addition to the strategies outlined in the Guidelines section, you may want to pay attention to the domains that house the information you have found. Domains are the URL tags that identify the kind of server that houses a particular site. While no organization regulates Internet content for its reliability or accuracy, every domain type can offer hints about its source. That, in turn, will help you assess a site's content for its legitimacy. Common domain types are described in Figure 2.2.

GUIDELINES Evaluating Internet Resources

- Check the electronic address. As shown in Figure 2.2, there are a variety of domains that house Internet sites, and the criteria for posting sites within these domains vary. In general, sites housed in education (.edu), government (.gov), or organization (.org) domains may be more trustworthy than sites with the .com tag, which may have been developed by individuals or businesses with clear agendas and biases. However, evaluate every site, no matter what its domain, to make sure that it is trustworthy.

continued

Guidelines: Evaluating Internet Resources. *continued*

- Evaluate for probable usefulness. Database sources may be online versions of print sources (although some scholarly journals are now available *only* online); these database sources still need to be subjected to the criteria from the section Checklist: Evaluating Sources found on page 36. If you are using a keyword search through a search engine rather than a database, you are likely to be overwhelmed by the number of matches: many of these may be irrelevant, but you will need to open and read a substantial number before you can determine which keywords are turning up the most useful sources. Keep a careful log of sites that provide relevant information, since sites move frequently, and you may have trouble finding a site again.
- Evaluate for timeliness. Internet sites appear and disappear frequently. Check to see when a Web site was most recently updated (this information is typically included at the bottom of the home page). If the site has not been updated in a year or more, try to find more recent information.
- Evaluate authorship and sponsorship. Use the information in Checklist: Evaluating Sources on page 36 to make judgments about the reliability of the author or sponsor of a site. If a Web site has a single author, check that author's credentials: Has he published in this area? Does she have an academic affiliation? Additional Google searches will turn up information about both individuals and organizations and help you evaluate their trustworthiness as sources.
- Gauge the purpose of the site. Some sources are intent on selling products or ideas. Others may seem to be building knowledge—for instance, by acknowledging opposing views either directly or through links to other sites. Still others may be determined to scare readers with shocking statistics or anecdotes. Make sure that the site you are using is clear about its purpose, and that you understand its biases and hidden agendas.

Figure 2.2

Domains and URLs**.edu**

Typical sponsor: Educational institutions, colleges, or universities. Examples: University of Michigan home page, www.umich.edu; Purdue University Libraries home page, www.lib.purdue.edu.

Information: Tend to contain content that is informational or scholarly, or occasionally, content that advocates for specific positions and policies.

.gov

Typical sponsor: Government departments or agencies, federal government offices. Examples: U.S. Census Bureau, www.census.gov; Mammalian Gene Collection, an initiative sponsored by the National Institutes of Health, mgc.nci.nih.gov.

Information: While some government agencies still need to be examined for possible biases, on the whole, government (.gov) sites focus on informational, scholarly, or research-oriented data on numerous

subjects that impact public policy: from medical research to population demographics and statistics to immigration to political science data to environmental studies.

Note: Local government department or agency sites may have a variety of URLs. State or local government offices tend to include the state abbreviation, followed by *.us*. Examples: Florida Department of State, www.dos.state.fl.us, Illinois Criminal Justice Information Authority, www.icjia.state.il.us/public. As with federal government sites, local government sites tend to present informational, scholarly, or research-oriented data on a wide range of subjects, sometimes with an emphasis on issues that are specific to a particular state or region.

.org
Typical sponsor: Nonprofit organization groups, professional organizations, or in some cases, individual. Examples: American Red Cross, www.redcross.org; United Nations Children's Fund, www.unicef.org; Natural Resources Defense Council, www.nrdc.org.

Information: Nonprofit (*.org*) sites sometimes include scholarship, research, or informational material, but they often tend to present their content with the goal of promoting specific positions and policies. As a result, you will need to assess each site for the inclusion of accurate, well-documented research to back up any debatable claims being made. Note that such claims may even be presented as fact, so it is wise to be judicious. Some organizations are scrupulous in their attention to offering supporting evidence, accuracy, currency, and reliability; others are notoriously biased or inaccurate.

.com
Typical sponsor: Commercial (business) sites, for-profit organization, or corporations. Examples: Longman Publishers, ablongman.com; Amazon, amazon.com; Project Bartleby, www.bartleby.com.

Information: Commercial (*.com*) sites tend to be the most difficult to evaluate for reliability and should be examined very closely. Because commercial businesses are for-profit enterprises, most use Web sites to present the company's functions. However, more often than not, they do so with one main goal in mind: profit. Thus, much content functions as self-promotion, corporate branding, or advertising for services and items available for purchase (both by the main site's company and/or by other corporate sponsors). You may find some accurate, factual data on such sites—certainly those sponsored by credible organizations or print publications can be regarded as reliable sources—but a great deal of *.com* content will be geared toward a company's bottom line, not scholarship or reliable data. In addition, some *.com* sites seem like authoritative, unbiased sources, but the *.com* URL tag should prompt you to investigate the site. Identifying the company that provides a site's funding and checking the site links may clue you in to possible biases in the content.

continued

Domains and URLs, continued**.net**

Typical sponsor: While traditionally used for a network of sites, *.net* site hosts can vary from individuals to corporate Internet providers. Examples: Earthlink, www.earthlink.net; Anthro.Net Research Engine: Anthropology and Archaeology, www.anthro.net, American Music Resource, www.amrhome.net.

Information: Because network (*.net*) sites function as networks and databases that link to other sites on a given subject, they can run the gamut in reliability, from scholarly networks of vetted online sources to one person's idiosyncratic favorite links on that topic. As with *.com* sites, these sites tend to need more verification for you to be assured of their legitimacy as sources. As with other domain types, those affiliated with well-known, legitimate organizations or print publications are the easiest to verify.

.mil

Typical sponsor: The U.S. military (examples: Official U.S. Air Force site, www.af.mil; Official U.S. Marine Corps site, www.usmc.mil).

Information: Military (*.mil*) sites do offer a certain amount of informational content, but unless your research project has a specifically military-oriented focus, their usefulness will be limited. Because military actions are sometimes tagged as classified or covert for security reasons, there may be additional limits on the scope of accurate information you can find, particularly regarding events that are still taking place or were controversial. Likewise, keep in mind that some portions of these sites may include recruitment-oriented material, which is essentially advertising for military bodies as a possible career/employer.

Other countries: URLs vary but tend to include the country abbreviation (i.e., *.uk*: United Kingdom; *.fr*: France; *.ca*: Canada; and so on).

Typical sponsor: Countries outside the U.S. (examples: The British Museum, www.thebritishmuseum.ac.uk; Government of Canada Web site, www.canada.gc.ca).

Information: Because this category of sites can include all the other domain types described above—educational, nonprofits, commercial, and so on—it is best to proceed with caution. Unless your topic warrants use of extensive materials from international sources, you may want to limit your use of foreign Web sites to those that are easily verifiable as legitimate and reliable, usually those affiliated with credible sponsoring organizations or print publications (e.g., well-known and respected foreign museums, libraries, newspapers, and so on).

Planning and Conducting Interviews

Many projects require more than library or electronic research. A valuable source of information is the personal interview. When you talk to individuals who are the originators of a technology or who are the most quoted experts in the field, you are in touch with the most current information. Setting up an interview may entail making several telephone calls and exchanging messages via e-mail or regular mail to find a mutually convenient time and place for a meeting. But planning for an effective interview means more than arranging the meeting; you need to prepare a set of questions and to plan for what to do if the interview veers off track.

Preparing for an Interview

What you do before an interview starts can determine its success. To get the best results, outline the general direction of the interview, draft the questions you'll ask, and consider sending questions to the interviewee.

Outlining. Well before the interview, prepare a general outline for the direction you'd like the discussion to take. You will be more at ease and will probably elicit the best information from the interviewee. This outline does not have to be followed as an absolute structure for the interview; it simply allows you to think ahead about your questions and how they might lead into each other. Interviewers who arrive for an interview with no questions and no real sense of direction usually come away with equally disorganized chatter. The outline serves as organizer for the questions and as a checklist for the major points you want to cover.

Draft questions. Phrase questions narrowly enough to keep to the point but open-ended enough to allow the interviewee freedom to expand. Comments such as "Tell me about ISO 9000" aren't focused enough to elicit specific information. Equally problematic are questions like "Do you think ISO certification is important?" because they may encourage a simple "yes" or "no" answer. On the other hand, questions such as "What do you see as the benefits of ISO 9000 certification?" allow the interviewee to expand on his or her views.

Keep in mind that biased questioning is not an appropriate way to gain useful information. Make your questions as objective as you can, and be sure to balance the questions to explore all sides of the issue—not just the side you believe is the right one. "Don't you agree that . . ." is not the best way to proceed because it assumes an affirmative answer. "What are your thoughts about . . ." is an objective way to ask the question.

Send advance questions. If you take the time to provide a list of questions for the interviewee before your meeting, you will probably get more thoughtful answers. An added benefit of sending questions ahead of time is that it gives the person time to collect pertinent material and have it available for the interview, rather than having to search for the data at a moment's notice.

Be careful not to limit yourself to these questions in the actual interview, however. They should serve as the basis for the discussion, not as the total package. Also,

Tip: *Tape recording an interview is an effective way to be sure you remember all of the conversation, and it frees you to interact more genuinely with the person you are interviewing, instead of worrying about writing down everything the interviewee says. But keep in mind that recording someone's voice requires permission. Always ask before you turn on the tape recorder. And take notes, even if you are taping the discussion. Your notes will help you to remember the high points and the material you want to focus on later.*

don't send ahead the rough outline of questions you've made for yourself. This private list should be much longer and more detailed than the list of major points you send to the interviewee.

Following up on an interview. It's not likely that you will have anticipated all the information gathered in the interview. If it is a good interview, you will have learned quite a bit of new material that may take time to digest. As a result, you may need to get back in touch with the person to ask for clarification on certain issues or to request additional information.

If you plan to quote parts of the interview, get the interviewee's permission to do so. It's a good idea to send a copy of the quotation to the interviewee to confirm its contents. Perhaps the person will have had second thoughts or will want to edit some of the comments. If you quote someone without permission and without showing that person what you plan to print, you may be liable for legal action.

Finally, always send a thank-you note. Courtesy goes a long way toward maintaining goodwill and continued open communication.

Designing Questionnaires

A useful way to gather information from or about customers, clients, or intended audiences is to develop a questionnaire. For example, if you want to know what your potential clients might want in a product or if you want to sample the opinions of a select group of people, you can design a survey to elicit the information you need.

Design the questionnaire so that the questions are appropriate to the target group but not so specific as to preclude all members of that group having an opinion. (If your group is really diverse, you may need to design two questionnaires, but try to stick to one if possible. The idea is to get a variety of answers to the same questions from everyone involved.) Word the questions clearly so that all respondents will interpret the questions the same way. See the section Guidelines: Designing Effective Questionnaires for specific help.

WEAK QUESTION

IS it desirable to include conversion tables in this manual?

_____ Yes _____ No

GUIDELINES Designing Effective Questionnaires

- Word questions clearly. All respondents should interpret them the same way.
- Ask for only one piece of information in each question. Multi-layered questions often get inaccurate responses.
- Make sure the wording of the question doesn't imply the "correct" answer. You want to encourage unbiased results.
- Include a range of response options. Be careful not to limit the possible responses.
- Design the questionnaire so the results will be easy to tabulate. Avoid "why" questions because they lead to speculation rather than facts that can be tabulated.
- If you want to include open-ended questions that require the respondent to write opinions, put these at the end of the survey.
- Field test the **questionnaire**. Send it to a sample of people as similar as possible to the target population. This test will show you the trouble spots and allow you to edit the questions before you send out the final version.

► **Tip:** *When giving a range of options for respondents, put the positive option on the left side. Tests show that respondents tend to favor the left side of the survey because they expect the positive responses to be there.*

Survey Question

To what extent do you use conversion tables in this manual?

Always	Usually	Sometimes	Never
1	2	3	4

Do you find these conversion tables helpful?

Always	Usually	Sometimes	Never
1	2	3	4

Using Research to Support Your Document

When you have finished researching your topic, the amount of information you are confronted with may seem overwhelming at first. Your desk may be covered with note cards, photocopies, and computer printouts, and you may have several downloaded files stored in your computer's memory—all waiting to be incorporated into a final document. An easy mistake to make is to arrange all of the research you've collected into an organized package and assume that your job is done. If your assignment has been to do nothing more than research a topic and present the results of your search, then your task really *is* almost finished. All that remains is to

Steps
to

CREATING A WELL-SUPPORTED DOCUMENT

1. Define the goal or problem. You've done this task in the planning stages, but you need to revisit it here.
2. Review the results of research. Consider the material your research has generated. Is it complete? Are there new directions the research has suggested? Do you need to rethink the argument and perhaps continue the research phase until you're satisfied that you have fully explored the new areas? If the research is complete, you're ready to write.
3. Subdivide your presentation. Break down the problem into its various components and create subsections that contain specific conclusions supported by research.
4. State your focus. Organize each section by starting with the conclusions you've drawn, followed by the research that led you there. This strategy saves you from making each section only a descriptive list of your research with neither focus nor point.

EXAMPLE

A subsection for a discussion on the role of the physical therapist in elderly patient care may begin this way:

Mental status is a large influence in rehabilitation because it can change daily. With disorders such as cerebellar vascular insufficiencies, Alzheimer's, and other dementias, research has shown that the patient may be an active participant in treatment one day and totally passive the next. Four studies are seminal in illustrating this point.

5. Clarify the progression of **your** argument. Make sure you present the research you've done as logical steps toward the conclusions, instead of random, disconnected descriptions of the material. That means you need to use transitions that remind readers how the various sections connect to the larger argument, and you need to give frequent reader cues indicating how your discussion is moving in a clear direction.

EXAMPLE

The final sentence in the following paragraph points readers back to the main argument:

According to studies in America and Europe, an estimated one-third of all lighting in the U.S. is *wasted*—at an annual cost of about 30 million barrels of oil and 8.2 million tons of coal. Statistics like these support the argument that preventing light pollution makes economic, environmental, and political sense. But these figures may not be enough to allay fears of increased vandalism if lighting is reduced.

6. Check for clear synthesis. Your finished document should synthesize the research into a focused argument that communicates something not said by any of the individual pieces of your research. Only in the combination of the pieces is your point made.

type the material and organize it into logical categories (which you have already determined in the planning stages). But if you have been asked to research a topic and present supported ideas about it, then you still have work to do. You need to integrate your source material into a cogent argument or proposal.

A common error that novice writers often make is to string together quotations with no clear purpose or direction. Such documents are little more than lists of quotes cut and pasted together with no focus or original thought. Certainly the writer can say that the research has been done and displayed, but the situation is similar to that of a pastry chef who collects all the ingredients and spreads them out on the table without ever combining them into a pie. Your document is not complete until you've synthesized the research into focused and well-supported conclusions. (See Steps to Creating a Well-Supported Document on page 44.)

Avoiding Plagiarism

Another problem that researchers face when they have collected information from a variety of sources is the possibility of plagiarism—representing someone else's words or ideas as your own. When you've read extensively what others have written about your subject, it can be tempting to simply lift their words and ideas and weave them into your document. A common form of such plagiarism occurs when writers either misunderstand how to properly document their sources, or intentionally paste together direct quotations from several sources hoping that the mix of quoted material will disguise the fact that the information is stolen.

You have committed plagiarism when you:

- copy a phrase, a sentence, or a longer passage from a source and do not give credit to the original author;
- summarize or paraphrase someone else's ideas without acknowledging the source;
- allow someone else to write significant portions of your document for you without admitting to the help; and
- forget to place quotation marks around another writer's words.

To avoid the problem of accidental plagiarism, get into the habit of clearly documenting the words and ideas you obtain from other sources during the research phase. Be sure to put quotation marks around any direct quotations as you write them down in your notes and identify the originator of any ideas you plan to use, even if you plan to summarize or paraphrase those ideas in your own words.

Using Copyrighted Materials

The Copyright Act protects all original works. You violate the Act if you use the material without permission from the author or copyright holder—and of course you also must give credit to any source from which the material is taken. The following is a brief guide for using copyrighted works, although you can find more extensive information at the Library of Congress Web site (www.copyright.gov):

Works published before March 1, 1989, must contain notice of copyright protection © or they are in the public domain (which means they aren't

protected by the Copyright Act). Works published after March 1, 1989, are protected under the Act regardless of whether they contain such notice.

Any published work falls under the Act's protection, including electronic work such as Web pages. Reproducing Web pages or any other copyrighted material from the Internet requires you to get permission from the copyright holder. Remember that a Web site may include links to other sites that are also copyrighted and require permission as well.

The Act allows you to use small portions of copyrighted material without permission if it satisfies the fair use criteria listed in the Act (www.copyright.gov).

Summarizing, Paraphrasing, and Quoting

Taking notes from sources is not a mechanical process of copying from books and periodicals. Rather, as you read and take notes you assess and organize the information in your sources. Researchers generally rely on the techniques discussed below.

Summarizing When you summarize, you condense an extended idea or argument into a sentence or more in your own words. Summary is most useful when you want to record the gist of an author's idea without the background or supporting evidence. Here, for example, is a passage that is then summarized. (The parenthetical source citation is in APA style.)

ORIGINAL The age of semiconductor technology started in 1947, just half a century ago, when the first semiconductor device, a germanium-based transistor, was invented at Bell Telephone Laboratories. Since then, the miniaturization of devices has been continuous, and computers have become faster and smaller. Meanwhile, silicon has become the most popular device material, owing to its geologic abundance and suitable physical properties. Nowadays, the size of the typical device is halved even' three years.

—Susumu Saito, "Carbon nanotubes for next-generation electronics devices," *Science* 278 (3 October 1999), 77.

SUMMARY Semiconductor technology began in 1947 with germanium-based transistors and has since switched to silicon-based devices that become increasingly small (Saito, 1999, p. 77).

Paraphrasing When you paraphrase, you follow much more closely the author's original presentation, but you still restate it in your own words. Paraphrasing is most useful when you want to reconstruct an author's line of reasoning but don't feel the original words merit direct quotation. Here is a paraphrase of the passage above by Saito.

Paraphrase Since the invention of germanium-based semiconductor technology at Bell Laboratories in 1947, computers using semiconductors have become increasingly fast and small. With silicon now the

semiconductor material of choice, the size of the typical semiconducting device decreases by half every three years (Saito, 1999, p. 77).

Quoting Quote from sources in the following circumstances:

- The author's original satisfies one of these requirements:

The language is unusually vivid, bold, or inventive.

The quotation cannot be paraphrased without distortion or loss of meaning.

The actual words themselves are the focus of your interpretation.

The quotation represents and emphasizes the view of an important expert.

The quotation is a graph, diagram, or table.

- The quotation is as short as possible, and it includes only material relevant to your point.

When using a quotation from a source, copy the material *carefully*. Write down the author's exact wording, spelling, capitalization, and punctuation. Proofread every direct quotation *at least twice*, and be sure you have indicated all quotation marks prominently so that later you won't confuse the direct quotation with a paraphrase or summary.

Introduce each quotation from the research with a statement about why the quotation is an important, supportive piece for your conclusion, and be sure to follow the quotation with a further explanation of how it fits into the larger argument you're making. Don't just drop quotations into your text and assume they're self-explanatory.

EXAMPLE

Along with other factors mentioned previously, the psychological health of the patient can play a key role in recovery from hip fractures. Depression can be a major cause of the high mortality rate among elderly patients who have sustained such fractures (McKay 1992). A possible reason for this post-fracture depression is the high priority our country places on independence. In a recent issue of the *American Journal of Physical Medicine*, Janet Haas supports this theory:

Americans value independence and self sufficiency. They place a high premium on physical mobility as a reflection of dignity and identity as well. Emphasis on mobility, appearance and vocational training promotes these values (Haas 1995, p. 57).

Haas's comments shed some light on post-fracture depression. With hip fractures comes temporary loss of functional independence and the potential for permanent disability. Patients face the reality that they can no longer take care of themselves, and such loss of independence can be interpreted as failure in the eyes of society and, consequently, also in the eyes of the patients. An interpretation of

failure can lead to a reduction in self-esteem and produce serious depression (Haas 1995). When depression affects the patient's will to live, even the immune system can break down, leaving patients susceptible to a variety of diseases such as pneumonias or acute infections. In essence, patients may deem themselves failures and neglect the body until death (Duphrene 1995).

When Acknowledging Sources Is Unnecessary

It's also important to be aware of those times when acknowledging your source is *not* necessary. You do not need to document the following:

- Your own independent ideas and words
- "Common knowledge" (information known and readily available to most people, such as information in encyclopedias or other reference guides that do not contain original thought or individual arguments)
- "Common sense" observations (something most people *know*—for example, that radioactive material is dangerous)

Tip: If you are unsure about whether to credit the original source, play it safe and provide documentation.

Plagiarism in any form is theft. If you understand that rule and you understand that plagiarism is not only illegal but vastly unfair to the original author, then the dilemma of whether to take someone else's work and use it without crediting the author is an ethical choice you make from your own moral standards (see the discussion of ethical issues in Chapter 7). If you get caught, your ethical credibility is undermined and you may face legal charges. If you plagiarize and don't get caught, you have missed the opportunity to contribute your own ideas to the body of knowledge about your subject, and you have essentially agreed to live as a fraud.

Professional research requires careful, thorough documentation of all ideas and information obtained from other sources. Anytime you include in your document material that you've researched, you need to give proper credit to the original source. Unfortunately, there is no one standard method for citing sources.

Various technical and scientific disciplines require special documentation formats (or styles) in their scholarly journals and in professional documents, including student work. All the styles use a citation in the text that serves two purposes: it signals that material is borrowed, and it refers readers to detailed information about the source so that they can locate both the source and the place in the source where the borrowed material appears. The detailed source information appears either in footnotes or at the end of the document.

Aside from these essential similarities, the disciplines' documentation styles differ markedly in citation form, arrangement of source information, and other particulars. This book details the major documentation styles used in the technical professions and a guide for citing online sources:

- American Psychological Association (APA) style, used in psychology, educational psychology, and other social sciences: *Publication Manual of the American Psychological Association*, 5th edition (2001).
- Council of Science Editors (CSE) style, used in the biological and physical sciences and in mathematics: *Scientific Style and Format: The CSE Style Manual for Authors, Editors, and Publishers*, 7th edition (2006).
- Chicago documentation, which follows the style recommended by *The Chicago Manual of Style*, 15th edition (2003).
- Columbia documentation style for online sources: *The Columbia Guide to Online Style* (1998).

Several guides outline other documentation styles that are basically variations on those detailed here:

- American Anthropological Association: "Style Guide and Information for Authors"; www.aaanet.org/pubs/style_guide.htm.
- American Chemical Society: *ACS Style Guide: A Manual for Authors and Editors* (1997).
- American Institute of Physics: *Style Manual for Guidance in the Preparation of Papers*, 4th edition (1990).
- American Mathematical Society: *A Manual for Authors of Mathematical Papers*, rev. edition (1990).
- American Medical Association: *Style Book: Editorial Manual*, 8th edition (1998).

Follow the style your company or your instructor prefers.

APA Documentation Style

> **Tip:** The APA provides occasional updates of and answers to frequently asked questions at its Web site at: <http://www.apa.org/journals/acorner.html>.

The documentation style of the American Psychological Association is used in psychology, some other social sciences, and many of the health professions. The following adapts the style recommended in the *Publication Manual* of the American Psychological Association, 5th edition

Parenthetical Citations In APA style, parenthetical citations in the text refer to a list of sources at the end of the text. The basic parenthetical citation contains the author's last name and the date of publication; for direct quotations and other specific borrowings, it also contains the page number.

One critic of Milgram's experiments insisted that the subjects "should have been fully informed of the possible effects on them" (Baumrind, 1968, p. 34).

Baumrind (1968) insisted that the subjects in Milgram's study "should have been fully informed of the possible effects on them" (p. 34).

List of References The list of sources at the end of the text is titled "References," and includes full publication information on every source cited in a document. The reference list falls at the end of the document, numbered in sequence with the preceding pages. The sample below shows the elements and their spacing.

Cates, R. L., Rutter, C. ft, Karl, J, Linton, M., & Smith, K. (1992). Premarital abuse: A social psychological perspective. *Journal of Family Issues*, 137, 79-90.

Gross, A. (1996). *The rhetoric of science*. Cambridge, MA: Harvard University Press.

CSE Documentation Style

Writers in the life sciences, physical sciences, and mathematics rely for documentation style on *Scientific Style and Format: The CSE Style Manual for Authors, Editors, and Publishers*, 7th edition (2006). There are two styles of text citation: one using author's name and year of publication and one using numbers. Both types refer to a list of references at the end of the document.

Name-Year Citations In the name-year style, parenthetical text citations provide the last name of the author and the source's year of publication:

(Baumrind 1968, p. 34).

(Pepinski and DeStefano 1987).

Number Citations In the number style, raised numbers in the text refer to a numbered list of references at the end of the document:

Two standard references^{1,2} use this term.

According to one report,³ research into some forms of viral immunity is almost nonexistent.

Reference List For both the name-year and the number styles of in-text citation, provide a list, titled "References," of all the sources you have cited. Single-space each entry and double-space between entries. In the name-year style, arrange entries alphabetically by authors' last names. In the number style, arrange entries in numerical order—that is, in order of their citation in the text with the second line and all subsequent lines of each entry indented five spaces.

Hepburn PX, Tatin JM. 1995. Human physiology. New York: Columbia Univ Pr. 1026p.

2. Hepburn PX, Tatin JM. Human physiology. New York: Columbia Univ Pr; 1995. 1026 p.

Chicago Manual Documentation Style

In many technical professions, writers rely on *The Chicago Manual of Style*, 15th edition (2003). This guide details two documentation styles. One, used mainly in the humanities, calls for footnotes or endnotes and a bibliography. The other style, used more by scientists and social scientists, is called the author-date system and closely resembles APA documentation style.

Text Citation A text citation should give the author's last name and the publication date. The citation appears in parentheses within the text itself at the end of the sentence just before the end punctuation. (When two or more references are given together in the same parentheses, separate them by semicolons.)

(Pringle 1989)

(Pringle 1989, 44-45)

Reference List For the list of sources at the end of the document, arrange the sources alphabetically by the authors' last names and indent the second line and subsequent lines of each entry five spaces.

Pringle, L. *The Animal Rights Controversy*. San Diego: Harcourt Brace Jovanovich, 1989.

Columbia Documentation Style for Online Sources

The style manuals in many disciplines do not yet provide detailed guidelines for citing the many kinds of sources available on the Internet. In response, Janice R. Walker and Todd Taylor wrote *The Columbia Guide to Online Style*, published by Columbia University Press in 1998. The *Guide* offers models for documenting online sources in the sciences and humanities. Its Web site (<http://www.columbia.edu/cu/cup/cgos/>) offers an overview of these styles along with updates.

Researching Is a Technical Skill

The ability to conduct focused research is highly prized in business and industry—while disorganized, willy-nilly information collection can cost companies large sums of money and much wasted time. Whether you're gathering information about a product or trying to find the solution to an identified problem, researching is an essential part of technical and professional writing. Far from being the drudgery many people think it is, researching well can be an exciting task that gives you the freedom to be creative in discovering the best resources for a specified purpose. But to do effective research, you must begin with a clear notion of the issue you're dealing with and then proceed logically and thoroughly to gather all the information you need to draw sensible conclusions. *Focus* the issue, *find* the material, *synthesize* the information into well-supported conclusions, and *document* your sources.

Tips for International Communication

The World Wide Web is a major source of information about cultures and customs, both international and local. By typing keywords (general topics) such as "Japan" or "Germany," you can use search engines to find specific Web sites for a wealth of information. You can do the same for cultures within your own country. For example, here are a few Web addresses (URLs) for researching minority cultures within the United States:

African American culture: <http://www.indiana.edu/~aaamc/>

Native American, Latino/Spanish culture: <http://www.nativeweb.org/>

Don't be afraid to use the World Wide Web for research on international culture. For more about cross-cultural communication, see Chapter 7.

Quick Review

For technical communicators, there are usually two kinds of research: researching to solve a problem and researching to understand a product. Once you have determined the type of research you are doing, the approach to the research process is as follows:

- Plan the research by defining the problem clearly, brainstorming, clustering ideas into categories, organizing the categories, and developing research questions.
- Determine the best sources of information (hardcopy material, interviews, questionnaires and surveys, product reviews, or other documents).
- Understand how to research using libraries, the Internet, and interviews with technical experts.
- Avoid "cut and paste" research that offers nothing original. Your finished document should synthesize the research into a focused argument that says something not said by any of the individual pieces of your research.
- Document your sources using the format appropriate for your discipline.
- Avoid plagiarism (the act of stealing someone else's words and ideas and presenting them as your own).

Exercises

1. Plan and conduct an interview with an expert in the field you are researching. Be sure to prepare preliminary research questions and follow up with a letter of thanks to the interviewee. Write a synopsis of what you learned from the interview and how that information will help you to focus your document or further research. Explain what you would do differently if you were to do the interview again.

2. Prepare an annotated bibliography of seven to ten sources for a research project you're working on. (An "annotated bibliography" is a list of sources, cited in the documentation form most appropriate for your field, with a comment for each entry explaining its specific value to your research project.)
3. Design a questionnaire to help you gather information about your project. Be sure to test the questions on a trial audience before you actually send them to your real audience. When you're satisfied that the questions are ready, distribute the final version and collect the responses. Did the questionnaire give you the information you needed? What were its strengths? Its weaknesses?
4. In a group session, take a research topic and refine it into a clear problem you can approach systematically. Using a white- or blackboard—or large pieces of paper or a projected computer screen—follow the steps suggested in this chapter: (a) define the problem, (b) brainstorm, (c) cluster the ideas into categories, (d) organize the categories, and (e) develop research questions.



Community Action Projects

1. An organization in your city or town may need to conduct a survey. Offer to research the organization's needs and develop a questionnaire that will provide them with objective results.
2. Develop a set of "exit interview" questions for graduating students. The information gathered from these interviews can help to strengthen the academic program's offerings and the school's student services.
3. If you know someone who is writing a book or working on a documentary film, offer to research some aspect of his or her project. Collect the information carefully and provide full documentation for all sources.

Organizing for Readers

Once you have collected data for your document and completed preliminary planning and researching (see Chapters 1 and 2), the next step is to organize the material so it makes sense for readers. Sometimes the order is dictated for you. You may need to tailor your document to the specifications of an RFP (Request for Proposal) or a company's standard format. Even if you must conform to set guidelines, you nonetheless need to establish and maintain a clear organization within the given sections; if you are not so constrained, it's up to you to decide how to lead the reader through the material. In many ways, this task is especially difficult, because doing the research to get to this point is hard work—work for which you are trained as a technical professional—and you may be tempted to think, after so much work, that the real task is finished. Reporting the results in writing becomes an afterthought.

You may now face another potential problem: you become so involved in your project, so steeped in the material that you may assume similar involvement and understanding from your readers. If you think that readers already know what you know, you run the risk of writing your document in a type of shorthand, expecting readers to fill in the gaps. Usually they can't.

Either of these ways of thinking shortchanges your readers and the project itself. Unless you communicate your material clearly and well, the knowledge you have gained as a result of your project remains yours alone. But with a few simple techniques, you can turn prose that is "writer-directed" (in other words, prose that only you understand) into professional writing that is "reader-directed" (prose that will be easily understood by your readers). The key to doing so is to understand the basic principles of organizing technical information.

Setting Reader Expectations (Frontloading)

The audience for technical documents—reports, proposals, manuals, and so forth—is not reading for pleasure. The audience reads to understand the material and make decisions based on what they read. For example, an engineering supervisor may

need to know the results of a particular field test before moving ahead to the next phase of the overall project. A computer user may need to read the manual before using a new software program. The town council may need to evaluate several proposals before awarding a renovation contract. In each of these situations, the reader needs to read efficiently and not get lost or confused along the way. Such confusion wastes time and annoys most readers. Documents that are the most powerful, professional, and useful are those that keep the reader oriented throughout the material. To do this, you need to tell readers up front where they're going and provide road maps for the trip.

For example, think of this scenario:

A business acquaintance offers to take you to lunch to discuss a new proposal. He picks you up at your office door at noon and the two of you settle into his Volvo and away you go. After about 20 minutes you begin to fidget and look out of the car windows uncomfortably. You're hungry; you're not sure if you have time to go so far for lunch; and you don't even know when you'll get to the restaurant or what kind of food they'll serve. Maddeningly, your companion is absolutely silent about where he's taking you. Perhaps you shouldn't have accepted his invitation after all. By the time you finally arrive at your destination, you're not in a particularly good mood.

But what if the scenario were changed:

You and your companion settle into the Volvo and the driver says, "I know a great Tex-Mex restaurant in Porter Square. I'll take Storrow Drive to Fresh Pond Parkway and be there in about 20 minutes." You relax. In fact, you check out the window every so often to see the road signs—yes, there's Fresh Pond Parkway coming up—and you begin to think about burritos and nachos. Only a few minutes more. What a great idea for lunch. It will be a pleasure to talk business with this guy.

The same etiquette you use in business encounters applies to technical communication. If you realize that you are leading readers on a sort of trip through your document, you will be more likely to guide them well and not leave them always wondering where they're going. This kind of organizing is called deductive organization or front loading, and it has three main characteristics:

- The main idea is stated up front.
- The introduction contains a road map.
- There are signposts and reader cues along the way.

Considering Your Audience

Frontloading a document requires that you choose whether to put your conclusions/recommendations at the beginning or to lead with a more general statement of the main topic. The choice you make has a great impact on how readers react to the document. A rule of thumb is that if readers are likely to be hostile to your

conclusions, save them for the end and try to lead readers gently toward agreement with your findings. But if readers will be supportive, put the conclusions at the beginning of the document and then repeat them in more detail at the end. In either case, state clearly up front what the main purpose is. For example, "After thorough research, the Task Force on Computers recommends that the company purchase Excelsior Computer Systems for the following reasons. . . ." or "The Task Force on Computers has researched the following systems: Excelsior, NuNet, Ace Works, and Quickscape. . . ." The first example assumes a busy audience who will support the recommendations; it therefore leads with specific conclusions. The writer in the second example expects to do some convincing and plans to explore the options with the audience before stating the well-supported recommendations.

Stating the Main Idea Up Front

In the beginning of most documents, effective writers tell readers what the document's main point is and why it's important. Doing so creates a context for readers to understand the details that follow. Consider the lack of context in the following legal document:

ORIGINAL

Palsgrafv. Long Island R.R. Co.
 Court of Appeals of New York, 1928
 2448 N.Y. 339, 162 N.E. 99

Plaintiff was standing on a platform of the defendant's railroad after buying a ticket to go to Rockaway Beach. A train stopped at the station, bound for another place. Two men ran forward to catch it. One of the men reached the platform of the car without mishap, though the train was already moving. The other man, carrying a package, jumped aboard the car but seemed unsteady, as if about to fall. A guard on the car, who had held the door open, reached forward to help him in, and another guard on the platform pushed him from behind. In this act, the package was dislodged and fell on the rails. It was a package of small size, about 15 inches long, and was covered by a newspaper. In fact it contained fireworks, but there was nothing in its appearance to give notice of its contents. The fireworks when they fell exploded. The shock of the explosion threw down some scales at the other end of the platform many feet away. The scales struck the plaintiff, causing injuries For which she sues.

What happens when you read that information? Most people read to the end and then have to return to the top and reread the passage once they realize what the main point is. Without a context, the many details described in the scene seem unimportant and are hard to remember. For instance, why should we care about the various characters in the situation? And why is the package's exact size of note? But once we realize that there were fireworks involved and someone was injured, the whole story takes on different meaning and we have to go back to the beginning to

put the details in that framework. It would have saved a great deal of time if the writer had done that for us. For instance, the document might have started this way:

REVISED Plaintiff is suing Long Island Railroad Company for injuries she suffered on the defendant's railway platform when heavy scales struck her. The scales were dislodged by the shock of an explosion caused when a passenger dropped a nondescript package containing fireworks on the rails....

The same techniques apply to technical communication. Stating your main purpose at the outset saves your readers time by setting their expectations and creating a context for the details that your document provides. For example, the following letter to a town council reports the results of an engineering firm's analysis of a town's wastewater treatment plants. Can you identify the main point of the letter?

ORIGINAL

E. J. Johnson Co.
CONSULTING ENGINEERS

February 4, 2004
Mr. Paul Ladakakos, Chairman
Town Council
Old Orchard Beach, ME 04064

Subject: Town of Old Orchard Beach
Wastewater Flow Capacities at Pump Stations

Dear Paul:

As a result of your request, the Johnson Co. has analyzed a series of interim modifications to the West Grand Avenue Pump Station that would increase its flow potential. Thirteen options were reviewed but, in general, they are minor modifications to four options. These are:

1. Modifications of an existing pump and associated piping.
2. Replacement of an existing pump with a larger unit.
3. Installation of a booster pump in an ancillary structure.
4. Construction of a supplement force main.

The Johnson Co. met with the treatment plant staff, the town manager, and the council chairman to present the options and their associated costs. All options were reviewed in detail with the following considerations: (1) the increased station capacity; (2) the construction cost; and (3) the equipment and modifications that would be useable under the improvements that have been deferred temporarily.

The option of replacing one of the existing pumps with a new, larger pump was chosen, and the Johnson Co. was directed by the town to perform the detailed design for the modifications to the West Grand Avenue Pump Station.

The Johnson Co. was also asked to review the capabilities of the Old Orchard Street Pump Station, assuming the construction of an 18-inch-diameter force main. A review of the system hydraulics indicates that the capacity of the Old Orchard Street Pump Station will double with both of the existing pumps operating at high speed.

With the construction of the new force main and the West Grand Avenue Pump Station, the surges within the town's sewer system noted at present should be relieved. However, we recommend that further pump station modifications must be constructed at some point in the future. These modifications are necessary to provide additional flow capacity, but more importantly, the existing pump stations should be upgraded to provide better control, operation, and monitoring.

Should questions arise on review of this information or if additional details are desired, please contact me at 1-800-442-6020.

Sincerely,



Chris Ryder, P.E.
Grief Project Engineer

What's the main point of this letter? On first reading, you might assume that the review of the thirteen options is the main point, or maybe the meeting with the treatment plant staff and the town manager. Not until you reach the third paragraph do you realize that the real purpose of the letter is to inform the town council that E. J. Johnson Co. and the appropriate town officials have chosen one particular option and are moving ahead with the renovation. Frontloading that information would have allowed readers to focus on the important material and put less emphasis on information about the thirteen options and the various costs associated with them. Instead, the council chair has to wade through a lot of detail, wasting valuable time and goodwill.

To avoid such inefficiency, make sure you clearly state the main purpose of your document at the beginning, both in the heading's subject line and in the introductory first paragraph of the letter. For example, the above letter could have begun this way:

BEIER Dear Paul:

At your request, E. J. Johnson Co. has evaluated all of the options for increasing flow potential in the town's wastewater systems. After completing their evaluation, Johnson Co. representatives met with the town manager, the council chairman, and the plant treatment staff to present the options and their associated costs in order to come to a decision.

This revision gets the main reason for a letter up front. Mr. Ladakakos now knows that the letter is about the options and the resulting recommendations from the

meeting, but something is still missing. The writer needs to give the reader a clear sense of where he's going in the letter. In other words, he needs to provide a brief road map to his document.

Providing a Road Map

After clearly stating the purpose of a document, you should set reader expectations by briefly indicating how the information is organized. Doing so orients readers to the contents ahead of them and puts them at ease. Such a road map need not be elaborate or lengthy; it should simply suggest the order of the rest of the document. In the above letter, for instance, the writer might have provided a road map like this:

BEN BETTER Dear Paul:

At your request, E. J. Johnson Co. has evaluated all of the options for increasing flow potential in the town's wastewater systems. After completing their evaluation, Johnson Co. representatives met with the town manager, the council chairman, and the plant treatment staff to present the options and their associated costs. The following recommendations resulted from that meeting:

- Replace the pump at the West Grand Avenue Pump Station with a new, larger pump.
- Construct an 18-inch-diameter force main at the Old Orchard Street Pump Station.
- Implement in the near future system modifications to provide better control, operation, and monitoring of the pump stations.

➤ **Tip:** *Although the bulleted list works well much of the time in technical documents—especially as a road map to set reader expectations—don't get carried away with using bullets. In fact, overuse of bullets makes them less effective because they no longer seem emphatic. Try to establish a sensible pattern for when to use bullets and when to use more explanatory prose to give readers a sense of direction.*

In this revision, the writer not only indicates the main point but, by providing a bulleted list of recommendations, also sets reader expectations about the organization of the information. After reading this frontloaded introduction with its road map, Mr. Ladakakos knows the conclusions the engineers and town officials have come to and expects that each of the three recommendations will be explained in detail in the order listed: first a discussion of the pump at the West Grand Avenue Pump Station, then the details of the new force main, and finally the other system modifications. With these expectations in place, he can read the rest of the letter quickly and understand it easily. No time is wasted, and the writer has gained the council chair's confidence.

Here's another example of an effective road map in a frontloaded technical report:

The Design of a Filament-Winding Machine

The design team's objective is to design and prove the concept of a machine that will wind a filament around a graphite plate. The machine must wind the filament in perpendicular layers and apply fifty layers of filament within a practical amount of time. After developing three early concepts, the team has integrated the best elements of each into the final design, a machine that rotates a plate around one axis to wind the filament and then rotates the same plate around a second axis to align the next layer. The three early concepts that led to this final design are rotating arms, rotating plates, and robotic arms.

In this example, the design team has given the readers clear signals to orient them in the document: a goal is stated in the first sentence and the road map suggests that the report will progress through the various early concepts to illustrate how the team arrived at the final design. Anyone reading documents so clearly organized at the outset will feel confident in the writers' professional expertise as well as their writing ability.

Reader Cues

Once readers understand your purpose for writing and expect you to lead them, provide signals along the way for them to check their progress as they read. Two closely related signals are prose cues and graphical cues.

A prose cue is a statement or phrase that tells readers where the writer is going next. For example, in the revised E. J. Johnson letter, the writer signals readers what's coming: "The following recommendations resulted from that meeting." For that matter, the words "For example" in this same paragraph tell readers what to expect. In short, any time you write a statement of direction, you are creating a prose cue for readers.

A graphical cue is a design element such as a bullet or indentation that directs readers' eyes to information or signals how that information relates to the material around it. For example, the bullets in the revised E. J. Johnson letter signal readers that the three bulleted elements deserve special attention.

You can combine prose cues and graphical cues to make even stronger signals. For example, following the bulleted list in the E. J. Johnson letter, the writer could have added, "Detailed explanations of each of these three options follow." Both prose cues and graphical cues are discussed in later chapters (prose cues in Chapter 5 and graphical cues in Chapter 4), but it is useful to think of them now in terms of their major organizational function: setting reader expectations early. Guiding the reader is an essential part of organizing information, and the better your signals, the better readers will follow your lead. (See the list of examples below.)

The following lists are not exhaustive, but they do give examples of reader cues:

Prose Cues

for the following reasons	as shown below
as follows	this section outlines
the process requires three steps	if . . . then . . .

Graphical Cues

bullets	rules
italics	headings
indentations	numbers

Another word of caution is appropriate here. As with any technique, overuse dulls the effect. Good writers understand when reader cues are necessary and when too many of them clutter the page. The best advice is to use common sense. If you think readers could use some help to navigate complex information, provide the necessary signals. But if the information is straightforward and your prose is clear, don't add these signals just for the sake of having them; doing so may only get in your reader's way.

Dividing Information into Units (Chunking)

The overall organization and readability of a technical document, whether it's a letter or a long report, is enhanced when you divide the information into manageable pieces or "chunks." No one wants to read prose that looks like an undifferentiated mass of information with no discernible parts. Such text seems hard to comprehend. Consider the following paragraph from a public health report on water contamination:

Document

Preliminary Public Health Assessment of Flint Pond and Flint Pond Marsh

resulting

Recent sampling in Flint Pond and Flint Pond Marsh suggests that contamination levels have decreased since the previous sampling by NUS. Using the older NUS data Abco has found no unreasonable risks to human health associated with dermal contact and incidental ingestion

of fish from Flint Pond or the adjoining marsh. Abco was particularly concerned about ingestion of certain fish at Flint Pond. Using both NUS and DEQE data, Abco assessed the risks due to several contaminants, including arsenic, cadmium, mercury, and lead. Exposure to contaminants in sediments from the pond and the marsh from direct dermal contact does not present an unreasonable risk to human health. The presence of arsenic in the sediments, however, required serious consideration because calculated incremental cancer risks were greater than 1×10^{-6} when the EPA Cancer Assessment Group potency values were applied. Because of the conservative assumptions used in the exposure estimations and the scientific **controversy** surrounding the **appropriateness** of treating arsenic as a systemic carcinogen, these risk levels were not considered to be significant. In all cases, the estimated cancer risks were less than 1×10^{-4} . Consumption of fish from Flint Pond over 20 years does not present an unreasonable risk to human health. In a highly conservative approach, Abco considered the risks due to arsenic and cadmium based on levels found in one turtle sample. No arsenic and cadmium have been detected in any fish specimens. The

excess lifetime cancer risks to adults associated with consumption of 15 g/day of fish contaminated at these levels were 7×10^{-5} for arsenic and 3×10^{-5} for cadmium. These calculations assumed a 20-year exposure prorated over a lifetime.

Even though this passage is relatively short, few readers would want to read it or want to read further in the report because the writer presents the material in one large unit, instead of breaking it down into more digestible "chunks." If the passage were reorganized and chunked into clearly marked subsections, it would seem more readable and easier to understand. Like this:

BE Recent sampling in Flint Pond and Flint Pond Marsh suggests that contamination levels have decreased since the previous sampling by NUS. Using the older NUS data, Abco has found no unreasonable risks to human health associated with dermal contact and incidental ingestion resulting **from** swimming in Flint Pond or the adjoining marsh or the ingestion of certain fish at Flint Pond.

Dermal Contact Risks

Exposure to contaminants in sediments from pond and the marsh from direct dermal contact does not present an unreasonable risk to human health. The assessment addressed the risks associated with exposure to toluene, benzene, TCE, and arsenic. No unreasonable risks to human health were found. The presence of arsenic in the sediments, however, required serious consideration because calculated incremental cancer risks were greater than 1×10^{-6} when the EPA Cancer Assessment Group potency values were applied. Because of the conservative assumptions used in the exposure estimations and the scientific controversy surrounding the appropriateness of treating arsenic as a systemic carcinogen, these risk levels were not considered to be significant. In all cases, the estimated cancer risks were less than 1×10^{-4} .

Incidental Ingestion Risks

The realistic worst-case scenario for direct contact is that children swim 32 times per year for 10 years. Abco has found that no unreasonable risks are posed by the inadvertent ingestion of 100 mL of contaminants during swimming 32 times a year. Daily intakes were lower than acceptable for noncarcinogens and excess lifetime cancer risks were less than 1×10^{-6} for carcinogens.

Fish Ingestion Risks

Using both NUS and DEQE data, Abco assessed the risks due to several contaminants, including arsenic, cadmium, mercury, and lead. In a highly conservative approach, Abco considered the risks due to arsenic and cadmium based on levels found in one turtle sample. No arsenic

and cadmium have been detected in any fish specimens. The excess lifetime cancer risks to adults associated with consumption of 15 g/day of fish contaminated at these levels were $7 \times 10E-05$ for arsenic and $3 \times 10E-05$ for cadmium. These calculations assumed a 20-year exposure prorated over a lifetime. Consumption of fish from Flint Pond over 20 years does not present an unreasonable risk to human health.

Conclusions

The Abco data suggest that the levels of organic contaminants have decreased since the NUS sampling. Thus, current risks are possibly even lower than the risks identified in the earlier assessment. In all cases, Flint Pond and Flint Marsh appear to present no unreasonable danger to public health.

The addition of subheadings and the provision of clear units of information make the passage more readable. Note that chunking involves writing an overall introduction that's frontloaded, including a road map listing the divisions to follow. Readers then expect the subheadings that come **next**—in this example, "dermal contact risks," "incidental ingestion risks," and "fish ingestion risks." Readers can follow this document **easily**—**first** by skimming the headings and seeing how they relate to one another, then by reading the text itself.

At some **point**—**whether** you are beginning to draft a document or are rereading a completed draft before beginning to revise it—you will probably ask yourself this question: How do I know where to subdivide? Unfortunately, one answer doesn't fit all situations. Sometimes the divisions are obvious: a list of projects or steps, a series of items, and so forth. But often you must impose subsections to aid readability. Good technical communicators learn to view information in terms of its possible components. Think in terms of your reader. How can the material be broken into chunks the reader can digest easily? What subheadings (reader cues) would help guide someone through the information? In many cases, you can subdivide the whole into components by choosing one of the following five organizational strategies:

Organizational Strategy	Application	Type of Document
<i>Chronological</i>	To trace activities of a job or project	Field report
<i>Spatial</i>	To describe physical parts of a whole	Mechanical description of an object
<i>Priority</i>	To emphasize order of importance	List of proposed projects within a set budget
<i>Comparison/contrast</i>	To show similarities and differences	Proposal to renovate an existing design
<i>Cause and effect</i>	To explain a process	Lab report

CHECKLIST Subdividing

- D Does each subsection have a good reason for standing alone? Each subsection should have integrity as a separate unit.
- Do the subsections relate logically to the larger **section**? Their subheadings should have a clear connection to the main section's heading.
 - Are the subheadings parallel in structure and informative enough to indicate the content **of** the sections?
 - Does the order of the sections make sense? Usually they should be arranged chronologically, spatially, or in order of importance.
 - Are there too few or too many subsections? Too many subsections cause the prose to look like an outline rather than completed text; too few make the text look overly dense and forbidding to read.

See the Checklist: Subdividing above for further help.

By clearly dividing your prose into readable units, you enable your audience to see how the subsections are natural divisions of the larger whole. As a side benefit, chunking your prose clearly also helps *you* to see how the various components of your document work together. You may find the storyboarding techniques discussed in Chapter 1 helpful as a way to test various arrangements of the components. Or you may simply jot down a quick outline to see the different hierarchies you can create. Whatever method you use, finding natural divisions and labeling them with effective subheadings allows you to check the logic of your information and presentation. Well-organized prose is no accident; it is the result of careful planning and attention to your readers' needs. But its benefits are worth the effort.

Organizing Sections

Each section demands its own organization, too. Although busy writers may be tempted to let the subheadings be the only organizing factor in these units, each section should incorporate the same effective organizing techniques that are applied to the whole document. In other words, organize the subsections on a smaller scale by using the same principles you use for the overall project: frontloading, road maps, and reader cues. In addition, make sure to add a specific conclusion to each section. These mini-conclusions provide checkpoints for readers, making each unit a completed thought.

Note how the second Flint Pond example uses these techniques. The section on dermal contact, for instance, frontloads and has a mini-conclusion, even though the subsection itself is short:

Dermal Contact Risks

Exposure to contaminants in sediments from the pond and the marsh from direct dermal contact does not present an unreasonable risk to human health. The assessment addressed the risks associated with exposure to toluene, benzene, TCE, and arsenic. No unreasonable risks to human health were found. The presence of arsenic in the **sediments**, however, required serious consideration because calculated incremental cancer risks were greater than 1×10^{-6} when the EPA Cancer Assessment Group potency values were applied. Because of the conservative assumptions used in the exposure estimations and the scientific controversy surrounding the appropriateness of treating arsenic as a systemic carcinogen, these risk levels were not considered to be significant. In all cases, the estimated cancer risks were less than 1×10^{-4} .

You may wonder whether it's necessary to apply all of these organizational techniques to a document as a whole and then again to its individual sections: Isn't it redundant to keep repeating similar information? How your audience reads your document should answer this question. If the text is **long**—a report, a proposal, a feasibility study, and so on—**readers** usually do not read it in sequence or all at one sitting. Instead, they may skim the table of contents or the headings to locate the parts that interest them and read only those sections. Because people tend to read technical documents in this way, each subsection needs to be able to stand alone to some extent. It should have an introduction that orients readers who haven't necessarily read the previous section. And it should come to a conclusion that allows those same readers to feel a sense of completion, even if they don't plan to read more of the document. On the other hand, some readers will read the whole text from beginning to end. You don't want to appear repetitive to them.

Good technical communicators understand that different people read documents differently, so writers try to accommodate various audiences. The overall introduction to the text frontloads and gives a detailed road map, allowing readers to choose their own navigational path. Subsections, likewise, are frontloaded and have road maps, but on a smaller scale. Those who read the entire document use these organizational techniques as reminders of the overall plan, while those who read only single sections use them as their main orienters. With practice, you learn how to apply these techniques subtly, so that the sections within your document are clearly organized without containing unnecessary reader cues and signposts that annoy readers.

The sample short report at the end of this chapter (pp. 76–78) uses all of these organizational techniques, but it does so gracefully. Notice how the writer gently but firmly leads the reader without seeming to be repetitive. The same techniques work for even longer pieces. The guiding principles for organizing documents of any size are (1) to think in terms of chunked components and (2) to organize on the small scale the same way you do on the large scale.

Paragraphing Effectively

The building block for logical communication in prose is the paragraph. As you learned in elementary school, each paragraph must have *unity* and *coherence*—that is, the paragraph must be about one main idea and the sentences within it must link together clearly. In technical communication, graceful paragraphing may be hard to achieve because writers often must describe lengthy processes or explain complex, interrelated facts that cannot be easily subdivided. Equally often, technical communicators may be so eager to get complex information down on the page that they aren't mindful of paragraphing at all, and the message becomes muddled. Then it's the reader who suffers.

Effective paragraphing in technical prose is not a random happening. It requires an understanding of logical units and the skill to make information cohere for the reader. Two techniques may help you to write better paragraphs:

- Think of each paragraph as having a unifying idea that makes a point.
- Connect each sentence logically and securely to the one preceding it.

Consider how these techniques can improve the following paragraph written by a scientist:

ORIGINAL

Silicone rubber is used in the construction of many biomedical components (catheters, contact lenses, shunts, stents, vents, prostheses) because it is biocompatible, easily machined, and relatively durable. However, it has poor blood contacting properties, particularly high friction and thrombogenesis, the main cause of low patency of silicone rubber medical components. Thrombus buildup is a serious complication with potentially life-threatening consequences.

What is the unifying idea of the paragraph? At first it might seem to be "silicone rubber," but keep in mind that unifying ideas need to have some sort of logical point. "Silicone rubber" doesn't carry any logical point; it is merely a descriptive label. When you reread the paragraph and consider all its information, you see that the unifying idea is that silicone rubber has limitations that could be life threatening. Identifying this idea allows you to reconstruct the paragraph to feature its main point:

BETTER

Although silicone rubber is used in the *construction* of many biomedical components (catheters, contact lenses, shunts, stents, vents, prostheses) because it is biocompatible, easily machined, and relatively durable, it also has properties that can make its use hazardous. Its poor blood contacting properties, especially those of high friction and thrombogenesis, can cause thrombus buildup, which is a serious complication with potentially life-threatening consequences. These hazardous properties are the main reason for the low patency of silicone rubber medical components.

Notice that the revision has clarified not only the internal logic of the paragraph but also its links to other paragraphs. Internally, the sentences are set in the context of silicone rubber's potential hazards because the first sentence sets up that framework: The first sentence begins with "Although," indicating that the previous paragraph was probably about the positive aspects of silicone rubber, but also intimating that the positives are not the entire story. Readers learn right at the outset of the paragraph that, despite its benefits, silicone rubber can be dangerous. The next sentence picks up on this idea of danger and explains the reasons for the hazard. Finally, the last sentence draws the unit's idea to a close by saying that because of these hazardous properties, there are few patented medical components made of silicone rubber. The paragraph now seems to be coming from somewhere and leading somewhere, instead of floating independently as a vague description. The final sentence—about the low number of patents issued for these products in the medical field—suggests a topic to be taken up in the next paragraph or section.

The paragraph has become a logical building block in a discussion, not just a set of loosely connected sentences. (See Chapter 5 for more on writing effective transitions.)

Even in paragraphs with more technical content, these same procedures work well. For example, the following paragraph seems highly technical and confusing. Nonexperts in this field would conclude that it's hard to read because they don't understand the scientific processes under discussion:

ORIGINAL Contact angle measurements with water on samples of ion textured copper showed dramatic changes in surface energy with texture; the contact angle nearly vanishes. Other textured metals behaved somewhat differently, including aluminum and beryllium, with slightly reduced wetting, and titanium, with only small increase. Surfaces that have only been ion implanted, but not textured, also tend to decrease contact angle, but it is a more modest decrease, typically about 20 degrees. Ion beam polishing is also often used to thoroughly clean surfaces, which by itself changes droplet contact angles. The effects of ion beam cleaning, implantation, and texturing seem to be additive, at least for water on copper. In Phase II, contact angles will be measured with all of the candidate working fluids in addition to water to resolve the questions remaining about wetting and enhanced heat transfer.

But even highly technical material can be made accessible if the writer features the unifying idea clearly and connects the sentences to emphasize that idea's logical links. Here's a revised version:

Revised To determine whether the effects of ion beam texturing, implantation, and cleaning are additive, we tested contact angle measurements with water on samples of ion textured copper, aluminum, beryllium, and titanium. The measurements on the ion textured copper showed dramatic changes: the contact angle nearly vanishes. The other metals

behaved somewhat differently: slightly reduced wetting in aluminum and beryllium, and slightly increased wetting in titanium. We noted that surfaces that have been ion implanted but not textured also tend to decrease contact angle, but typically only about 20 degrees, and surfaces that have been cleaned with ion beam polishing show changes in the droplet contact angles. These tests indicate that the effects of ion beam texturing, implantation, and cleaning do seem to be additive, at least for water on copper. In Phase II of this project, we will measure contact angles with all of the candidate working fluids to resolve the questions remaining about wetting and enhanced heat transfer.

In this new paragraph, the main point (the reasons for doing the tests) is given right at the start, providing a context for and unifying the rest of the details. Readers interested in the results of this testing will want to read on in the paragraph to find out what happened, because the paragraph has become a miniature story of sorts: here's what we're trying to find out . . . this is what we did . . . this is what we learned. Such an organization within the paragraph creates a logic that's easy to follow and actually draws the reader into the prose, no matter how technical the content.

If you learn to think of your paragraphs in these terms, you can present even the most complicated information in logical blocks supporting a larger structure.

Tips for International Communication

Organizing technical documents for readers in other countries requires you to step outside of your own culture and recognize differences between the way we organize information in the United States and the way people in other countries expect information to be arranged. The key to effective organization is to understand reader expectations. But it's also important to realize that within one country many cultures coexist (think of the United States, for example).

Many textbooks suggest that writers do a thorough cultural analysis of the target country and then communicate in the style appropriate to that culture. While this advice is generally useful, many writers think that there are such things as the national culture and the corporate culture. Sometimes, the corporate culture and the national culture within a single country are different. Certainly, knowing national customs and expectations helps you to communicate well, but to organize technical material effectively you must first focus on the culture of the specific industry for which you are writing. The business world is becoming more global and corporate cultures are becoming more homogeneous. Outside of the office, however, customs remain much more localized. Perhaps the best advice, then, is to focus primary research on the culture within the corporate environment and to consider the national cultural values as useful extra information.

It's important to recognize that in today's electronic world, communication is often a mutually created event that becomes "inter-cultural" rather than cross-cultural.

More and more people are working online with writers from all over the world to create information together. And with hypermedia, users can choose whatever path through information that makes sense to them. Organizational strategies—still a cultural preference—are left in users' hands. A mix of cultures results, and the lines between individual customs become blurred.

Four Questions for Establishing Cultural Schemata

The best way to learn how to organize for an international audience is to ask the right questions and find as many local examples as you can. Familiarize yourself with the traditional formats of letters, reports, proposals, and other relevant technical documents within a specific technical environment. Doing so gives you a good sense of that industry's standards for communication and allows you to see the kinds of organizing plans that your audience is exposed to on a regular basis. Once you have collected samples, consider the following questions to establish the cultural schemata of your target audience:

- How do people in the cultural environment solve problems?
- Is this a high- or a low-context culture?
- How is background and explanatory information presented?
- How are messages routinely organized?

Let's look more closely at these questions.

How Do People in the Cultural Environment Solve Problems? Understanding how people in a particular cultural environment approach problems is valuable information because it signals what hierarchy of information works best for the culture. For instance, there are generally two types of problem-solving behavior: (1) People are taught to consult outside authorities first and then apply that knowledge to the problem at hand; and (2) people are taught to create their own solutions to a problem. Knowing which approach your target audience uses allows you two options: (1) to situate your material within a highly referenced context, giving background authority for the information; or (2) to present your material directly without reference to precedent or official sanctions for possible solutions. Further, choosing an approach allows you to know whether you need to write longer introductions to ease the audience into the material or whether you can trust your readers to want to interact with the material right away.

Is This a High- or a Low-Context Culture? Edward T. Hall, an anthropologist and an authority on cross-cultural communication, divides cultures into two basic types: high-context and low-context cultures. In high-context cultures such as China, Korea, Japan, and the Arab countries, the way the message is delivered is as important as the message, and it is actually part of the message. In low-context cultures, like that of the United States, Germany, Switzerland, and Scandinavian countries, the meaning of a communication is less dependent on such matters

as who said it or when it was said. Instead, communication in low-context cultures depends on explicit written and oral messages. In contrast, if you are communicating in a high-context culture, you need to pay special attention to traditions and the "niceties" of communication. You may need to begin with paragraphs of polite conversation before you get to the heart of the material. For instance, rather than plunging right into your main point, as we are used to doing in the United States, you might respect the target country's traditions by discussing the history of a problem first and paying compliments to the people involved. You will need to research the conventions for written communication for a particular culture.

How Is Background and Explanatory Information Presented? In many cultures, people read technical documents in a pragmatic way: to gain access to the technology, to learn how it works. In others, people first want to know not how things work, but *why*. An example might help here. Jan Ulijn, a professor at Eindhoven University of Technology in the Netherlands, conducted an experiment on culture and technical communication. Ulijn had 242 French and Dutch participants arrange the table of contents for a user's manual for a coffee maker in an order that made sense to them. The seven parts of the table of contents were as follows:

1. Introduction
2. Structure of Equipment
3. Technical Data
4. Operation
5. Maintenance
6. Troubleshooting
7. Appendix: Service

Both the French and the Dutch participants agreed on the placement of the Introduction, Structure of Equipment, and Appendix. But they disagreed on the placement of the remaining parts of the manual. According to Ulijn, the Dutch preferred more emphasis on the operation: What do I have to do to make it work? The French, on the other hand, wanted to stress both the operation and the technical details: Why does it work that way?

Noting the differences in readers' priorities is essential to creating technical documents that meet readers' expectations.

How Are Messages Routinely Organized? Analyze samples you collect to learn the subtle differences in message organization. For example, Germans are often quite direct in giving bad news, but many other cultures avoid negative messages or camouflage them. Categorize the types of messages you find within the samples and note the placement and the directness or indirectness with which they are presented.

With the answers to these questions, you can establish a clearer picture of the target audience's natural strategies for receiving information, and you can structure your material accordingly.

Two more quick tips are appropriate to mention in this chapter on organization, although later chapters elaborate on them. When communicating to international audiences, (1) make sure to use frequent transitional phrases so the readers can follow your lead easily, and (2) make room in the organization for many visual aids. See Chapter 4 for techniques for using visuals well and Chapter 5 for more information on writing effective transitions. For more about cross-cultural communication, see Chapter 7.

Quick Review

The key to organizing is to set readers' expectations and then follow through gracefully. To organize well, think in terms of components rather than long seamless prose and follow these principles:

- Frontload the document so that the main idea comes first.
- Include a road map to the organization.
- Use prose and graphical cues to signal organization.
- Divide the information into digestible chunks.
- Organize sections the same way you organize the large-scale document.
- Include mini-conclusions to each section.
- Emphasize the unifying idea in every paragraph.
- Connect each sentence logically to the one preceding it.

When writing for an international audience, be familiar with the target audience's cultural schemata so you know how best to organize documents to meet their needs.

Exercises

1. Find a document you have already written (a report or a proposal, for instance) and put it through a diagnostic checkup for effective organization. Look for the following elements: the main idea up front, a clear road map, reader cues throughout the document, effective headings, "chunked information," and a match between the overall organization and the reader expectations of the particular audience. You may want to develop a chart so you can check off the elements as you find them. How does your document rate? Where are the organization areas that need more attention? If you conduct such a diagnostic exam on several of your previously written documents—or even on drafts that are in progress currently—you may be able to see patterns that will allow you to develop a "profile" of your organizational strengths and weaknesses.
2. In the margins of a document you are writing (or have written), write in one sentence the main point (the unifying idea) of each paragraph. If you have trouble finding the main point—or if several points are contending for top

billing—then you know you should revise your paragraphs. Next, check to make sure those points logically progress in a sequence that will make sense to readers. Should any of the points be rearranged to make your document stronger? Should any be omitted because they are "extra" information that would be best left out or placed in an appendix? Do the points you have culled from each paragraph match the outline you prepared during the document planning stages?

3. Find a document written (in English or in another language, if you can read another language) by a writer from a different culture. How is it organized? What are the similarities and differences in its organization from the organizational strategies in your own culture? What does the organization tell you about the writer's cultural context? How would you reorganize a document that you have written if you were to target that culture?



Community Action Project

Offer to serve as an organizational editor for a department in your company or your school that is developing a long written document (for example, an end-of-the-year assessment or annual report). Begin with the preliminary draft of a document. As you organize the material, pay special attention to setting reader expectations, providing reader cues, and chunking information into focused, logical sections.

Sample of Effective Organization Techniques

Methods for Pulverizing Tires

Production of Tire Derived Fuel (TDF) is a new field that has become the focus of a great deal of research. In an attempt to make TDF cost competitive with coal-derived fuel, tire companies are actively funding TDF¹ research in universities and corporate laboratories. This activity has yielded several methods for reducing tires to small particles that can be further pulverized into powder that burns cleanly and efficiently. These methods fall into three major categories:

- Cutting, grinding
- Cryogenics
- Devulcanization

The following sections summarize our experimentation with these methods and our evaluation of their effectiveness and efficiency.

Cutting and Grinding

Cutting and grinding tires into fuel-efficient powder are the most common — methods because they do not require as much technical apparatus as the oilier methods. Generally, three tools are used: blades, grinding wheels, and water jets.

Blades: Many tire chip producers use large-bladed machines to cut tires into 1-inch and 2-inch square pieces. The chips that they produce are much larger than the 100 μm required for the fuel to burn efficiently. Chips of this size are ideal in other applications not requiring powder, such as additives to pavement and fertilizer.

Grinding Wheels: Another method the group tested was the use of grinding wheels. Because these grinders are capable of grinding rubber as well as steel, they do not require removal of the tires' steel belts or wire beads, although removing these elements does reduce wear on the machines. We tested bench grinders and high-speed hand grinders with the following results:

- Bench grinder—3,450 RPM—36 grit
 - Produces a powder
 - Grinds the steel belts and beads
 - Needs to be cleaned due to buildup in the pores of the stones
 - Produces 70 mesh powder or 180-230 μm
- High-speed hand grinder—10,000 RPM—36 grit
 - Produces a powder
 - Grinds the steel belts and beads
 - Produces toxic smoke
 - Produces 45 mesh powder or 380-400 μm

With both techniques, the powder produced clumps together, causing problems in sifting. A wet grinding stone might reduce the clumping by keeping the nylon cooler. Nonetheless, these methods are not the most efficient way to pulverize tires.

Water Jets: Water jet cutting is a method new to tire pulverization. Water jets are high-velocity streams of water produced by passing pressurized water through a nozzle. This stream acts like a blade and cuts through many materials, including

Report's overall main point is frontloaded

Bulleted list calls attention to subsection topics

Road map

Subheading uses same words as bulleted list above

Main point of subsection is frontloaded

Subsection road map

Topics follow order promised in subsection road map

Technical Object and Process Description

Mini-conclusion subsection

glass, steel, and titanium. Because these jets do not produce heat, smoke, or toxic fumes, they are becoming popular choices over lasers in manufacturing environments. Our tests show that water jets are capable of cutting rubber but require a secondary process to bring the product down to 100 μm . Therefore, they are not the best methods for reducing tires to powder.

Subheading uses same words as bulleted list in the introduction; subsection main point frontloaded

Because there are problems with each of these cutting and grinding processes, none of them can stand alone as a method of the pulverization.

Cryogenics

Cryogenics is the term for temperatures below -150 degrees C. Exposed to these temperatures, rubber approaches its glass transition temperature where it becomes plastic and brittle. The glass transition temperature of the rubber in tires is 60 to 80 degrees C. Crushing rubber into the line particles is much easier at or below such temperatures. This section gives a brief description of the methods we considered for bringing a tire to its glass temperature: liquid nitrogen, liquid air, and solvent with dry ice.

Subsection road map

Liquid Nitrogen: Liquid nitrogen, which is approximately -100 degrees C, easily cools the rubber to its glass temperature. We tested such nitrogen as a coolant and were able to chop frozen tire rubber to 100 microns. This method is expensive, however, because of the price of liquid nitrogen and its quick evaporation.

Topics follow order promised in subsection road map

Liquid Air: Our research has shown that liquid air is inexpensive compared to liquid nitrogen, while producing the same temperatures. However, the high concentration of oxygen in liquid air is too much of a fire hazard to use safely.

Mini-conclusion

Solvent with Dry ice: We also considered dry ice, which is inexpensive. A solvent with a low freezing point cooled by dry ice provides an environment in which the tire becomes brittle. Placing the rubber into the cool liquid causes the rubber to approach its glass temperature; however, the powder produced is not as consistent as that produced with liquid nitrogen.

Subheading uses same words as bulleted list in the introduction

Cryogenics seems to be the most effective and consistent method for pulverizing tires to 100 μm . Nonetheless, the expensive materials make the cost a major concern.

Devulcanization

Subsection main point

Devulcanization is the process of cleaving totally or partially the poly, di, and monosulfide crosslinks which are formed during the initial vulcanization of rubber. This section records various methods for reversing the vulcanization process to reduce tires to a fuel-efficient powder: chemical probes, microbial bacteria, ultrasonic waves, and microwaves.

Subsection road map

Chemical Probes: A chemical probe is an analytical reagent that is capable of being homogeneously introduced into a crosslink network where it reacts in a useful way. The probe is easily extractable, without side effects, after the chemical reaction is complete. This fact makes it an attractive solution for devulcanization. The major problem with chemical probes is that it is necessary to dispose of them after the process. This disposal may increase the cost of the process to a point where it is not economically viable. Another problem is that the cost of the chemicals involved may also increase so that our tire-derived fuel will not be able to compete with the cost of coal fuel.

Topics follow order listed in subsection road map

Microbial Bacteria: Microbial bacteria from Yellowstone National Park in Wyoming have been used to remove sulfur from vulcanized rubber. These bacteria attack the chemical bonds between sulfur and carbon, consuming the sulfur but leaving the polymer structure of the carbon atoms intact. It is therefore possible that the microbes can destroy enough of the crosslinks in small rubber chips so that grinders can make a finer powder.

Ultrasonic Waves: High-energy ultrasonic waves are successful in breaking the carbon-sulfur and sulfur-sulfur crosslinks in vulcanized rubber. However, the two patented methods of devulcanization by ultrasonic waves are not cost effective because they take too much time—at least 20 minutes—unless we use multiple ultrasound generators at increased cost

Microwaves: Microwave energy is also effective in devulcanizing rubber. The process consists of applying a controlled dose of microwave energy in an amount to sever all carbon-sulfur and sulfur-sulfurbonds, and the process takes only five minutes. Although this method has potential, the resulting devulcanized rubber may be too sticky to turn into powder.

Research indicates that devulcanization requires rubber particles to be small; therefore, this method has potential for the future, but at present it is not the most efficient way to pulverize tires.

Conclusions

After evaluating the various methods for producing TDF, we recommend a three-stage process as the most efficient and cost effective, pending refinements to the process and further research. The first stage, or primary cut, slices the tire into segments with water jets. This primary cut effectively reduces wear on the grinding machines used in the second stage. These machines bring the tires down to 1- to 2-inch chips in preparation for the final, cryogenic process.

Our cost analysis of this method shows that we can produce TDF for approximately \$50 per ton. With further research to ultimately reduce the cost of the cryogenic stage, tire-derived fuel can become competitive with coal.

Mini-
conclusion

Overall
conclusion
and clear
recommendation

Possible next
steps

Designing the Document: Format and Graphics

In the world of technical communication, graphic design is more than decoration; it is an integral part of the text. Some writers may have the luxury of concentrating only on the words they use, but those who communicate technical information must also pay close attention to how words appear on the page and how illustrations augment and balance the text. Three primary characteristics of technical documents present challenges in both writing and design:

1. the documents often contain highly complex information
2. a single document may be intended for multiple audiences who read it for different purposes
3. technical documents must facilitate quick transfer of information.

To meet these challenges and to communicate effectively, you must create documents that guide readers via prose *and* graphics.

The visual aspects of a document involve page design and illustrations. Sometimes writers don't realize that page design—the way words appear on a page—is as much a part of graphic design as are the illustrations. Although the words in hardcopy technical documents convey information in linear sequence, sentence by sentence, effective page design guides readers' eyes to what is most important and gives them cues about various reading paths through the material. For instance, a well-designed page permits readers to zero in on the sections most relevant to their needs, while skimming the rest. They don't have to waste valuable time trudging through unnecessary material. And a well-designed page also makes complex information appear more understandable, so readers are less resistant to tackling the information. Graphic illustrations—photographs, charts, graphs, tables, and so on—transmit information all at once, showing the relationship of all the parts simultaneously. Readers who don't have time to read the text or who understand visuals more easily than words depend on the graphics to make the information immediately accessible.

Both of these methods of communication—page design and graphic illustrations—work in different circumstances and for different readers, allowing writers to meet the varying needs of their audiences and the material.

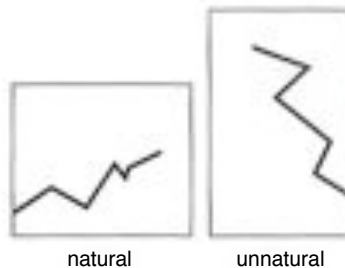
Understanding Visual Design Principles

Before thinking about how to arrange words and illustrations on the page, you should understand the basics of visual design. In Western culture, readers are conditioned to see things in certain ways. If you keep these conventions in mind, you can arrange information to the best advantage.

Conventions of Visual Perception

In the Western world, people share the following conventions about visually presented material:

- *We read from left to right.* Whether we are reading prose or viewing graphics, we traditionally begin at the left and move toward the right. Cartoon strips in the newspaper, for example, move in that fashion, as do charts and graphs. We expect to see line graphs begin on the left and progress to the right; graphs that don't proceed that way seem unnatural to us. For example:



- *We read from top to bottom.* When we look at columns of type or an illustration, we move from the top to the bottom, not vice versa. For instance, we don't begin to read a page at the bottom right; we start naturally at the top left.
- *Things in the foreground are more important than things in the background.* We expect to see the main objects or information featured up front rather than behind other less relevant material.
- *Large objects are more important than small objects.* It seems obvious to most readers that the bigger something is, the more attention it deserves.
- *Thick lines or objects are more important than thin ones.* In graphs and charts, especially, thicker lines draw more attention than thin ones. In page design, thicker "rules" (lines used to separate information) indicate more definite breaks than thinner rules.
- *Areas featuring the most activity also contain the most important information.* The parts of any visual aid that seem the busiest draw readers' attention immediately. It's habitual to think that the important elements are always where the most action is.

- **Related items are grouped together.** When several items are grouped together, they become one visual unit rather than several separate units,
- **Things stand out if they contrast with their environment.** Whenever an item differs markedly from its surroundings, it will be more noticeable. Visual elements contrast in many ways: thickness, color, typeface, size, and so on.

Because these basic conventions provide clues about what readers expect and how they "read" visual elements, understanding them is the first step in creating effective graphic design.

Strategies in Visual Communication

Another step in thinking about design is to put yourself in the readers' place. It is always tempting to assume that readers understand the material you are presenting as well as you do. Remember that you have become steeped in the material as you've done the background research and the preliminary organizing, but your readers will likely be seeing the material for the first time. If you have written the information well, you have done readers a great service. Nonetheless, they may need more guidance.

People process information in two ways: with the left and right sides of the brain. The left side—which processes language—is usually dominant. The right side of the brain is more adept at processing graphic information, perceiving reality more intuitively and less analytically than the left side does. Effective technical communicators consider both of these modes of perception as they design documents, recognizing that a balance of graphics and text enables readers to comprehend information from as many perspectives as possible. To design documents useful for readers, see Guidelines: Designing Documents.

GUIDELINES Designing Documents

- Decide on a design that is compatible with the practical constraints of your working environment. Before you begin, find out about your schedule, budget, and equipment. You may think you can design on a grandiose scale, when you only have time, money, and tools for a more basic project. Any document can be designed well with the tools at hand if you know your practical limitations from the outset.
- Create a document design style sheet. List all graphical elements you expect to implement, including standards for page layout (use the page layout grid); formatting (type fonts and sizes as well as line spacing, use of bullets and icons, and so on); placement, size, and types of graphics; and the use of color. Be sure to refer to this sheet for all aspects of the design.
- **Gear** the graphics to the level of the audience. If you use too many "bells and whistles" in your page layout, and the audience is accustomed to more traditional text, you may seem unprofessional to them. If you use graphics that are overly simplistic or too sophisticated for your audience, you will lose valuable credibility.

- Make sure every item on the page has a visual connection with something else on the page. This is almost the *feng shui* of visual design: Be sure that each element is aligned so that there is an invisible line that connects them in the reader's mind and eye. Even if items are not close in proximity, they need to appear to belong to the same piece.
- Provide readers with visual **road** maps through the document. Include a table of contents, glossaries, indexes, appendixes, chapter overviews, chapter summaries, decision tables, and other materials that support the body of the text and allow readers to find quickly the information they need.
- Make your document pleasing to the eye. If your pages look dense and difficult to read, readers will be hostile to the message you're trying to communicate. If the pages look easy to read, you have made a friend of the reader.
- Be consistent in your visual format. Make sure your heading structures and placement are consistent, and establish specific formats for how to present graphics. Readers use these patterns to help them comprehend and remember the relationships between different levels and types of information in the text.
- Take advantage of universal symbols that most people understand, and use them correctly. You can capture readers' attention easily and save time and space by using standard symbols—such as a circle with the slash through it to mean "don't" or a hexagonal "STOP" sign.

Designing Readable Hardcopy Pages

A particularly savvy writer once said, "Words are graphics, too." Many readers subconsciously view the arrangement of the text on the page as a measure of the writer's ability to lead them through the material quickly and professionally. Designing inviting pages that earn readers' confidence is hard work, especially when the information you present is complicated. To make your prose look readable, design each page so that readers can see clear hierarchies of information.

Creating Visual Hierarchies of Information

As readers, we expect to see information presented on the page with the most important material in the most prominent places. And most readers appreciate writers who structure information in clearly designated levels so that the relationship of all the parts is obvious to someone glancing quickly through the text. This "levels effect" allows people to read more quickly and to process and remember more easily what they have read. For example, look at how visible the hierarchy of information is in the following page design plan in Figure 4.1.

Even without reading the text in this document, anyone looking at this page can tell immediately that the first paragraph is an overview of the material; the three bulleted items highlight three key points. The first heading is about the first bullet, the second heading about the second bullet, and so on. In such a clearly visible

Figure 4.1

Page Design Plan

Strategies to Control and Prevent Light Pollution

Title clearly sets topic

Author Cliff Hass, in his paper to the World Congress on Managing and Measuring Sustainable Development, presented four basic strategies for controlling light pollution: shield it down, point it down, don't use more than you need, and turn it off when you are done or not there. Efforts to implement these strategies are in progress on three different fronts: *Overview*

- Education
- Legislation
- Design

3 key points of discussion indented

Education

Subhead matches bullet point

Education is the necessary first step to address light pollution. Implementing conservation strategies such as using only as much light as you need and only when you need it requires raising users' awareness. An increasing amount of information on light pollution from public advocacy groups, lighting retailers, municipalities, state and national government agencies, and power companies is available to the public. Yet without better dissemination, the sources and effects of light pollution remain unknown to many.

Legislation

Subhead matches bullet point

Many municipalities have found that creating a legally binding code or ordinance is an effective method for controlling and preventing outdoor light pollution. However, drafting effective lighting policies faces many challenges. A well-written policy must use detailed yet simple terminology readable by engineers and lay people, it must include all forms and applications of illumination, and it must apply to all outdoor lighting sources and users. In addition, it must take into consideration unique regional requirements, make allowance for special exceptions, and not restrict creativity.

Fortunately, the International Dark-Sky Association (IDA), an internationally recognized authority on light pollution prevention, in collaboration with key organizations, governments, and industry members, is working to develop a universal comprehensive standard code that any group can adapt. A continually updated version of this document is available from their Website under the link *Worldwide Lighting Standards*.

Design

Subhead matches bullet point

Education and legislation efforts have resulted in an increased demand for safe, effective, energy-efficient outdoor lighting solutions. In response, designers and manufacturers are developing new fixtures classified as "full cut-off optics" (FCOs). As the name suggests, the light is effectively cut off from escaping out the sides and top of the fixture and concentrated downward.

hierarchy, you can see what is most important and how the parts relate to each other. If you want to read only the section on one of the bulleted items, you can move directly to that point and read only that part. And if you are reading in a hectic environment with frequent interruptions, you can look away from the text for a moment and return to find your place quickly. Because the information has such a clear visible structure, you can probably grasp it more easily and remember it well.

Readers are accustomed to having information structured in these ways. If you tap into these expectations, you will connect with readers and direct their focus.

Using a Page Layout Grid

Another page design technique that makes technical documents look professional and readable is a method taken from the newspaper and magazine industry: the layout grid. As computer technology has allowed documents to become more sophisticated in their design, the use of the grid has become standard practice. Simply put, the layout grid creates standard column formats throughout a document.

Imagine your blank page divided into imaginary columns. For illustration purposes, visualize the columns as dotted vertical lines on each page. You can choose to divide the page into two columns, three columns, or four—although four-column formats are quite rare. Occasionally, writers choose to use no extra columns at all. This design is called the "one-column" format. Figures 4.2a and b on pages 82-83 show examples of the two- and three-column formats. Figure 4.3 on page 84 is an example of a multicolumn chart.

Formatting Text

You have many choices to make when formatting the various textual elements in any document. Size, typeface, justification, spacing, and the use of textual markers like bullets and numbers are all design decisions. Making good choices can enhance the effectiveness of any document you create.

Fonts and Typefaces. With the wide array of typefaces available to you in our electronic world, you need to make careful choices. Choosing a "typewriter" font can make your document look old-fashioned, but choosing too whimsical a font

audience.

Size. Generally, you will want to select a typeface that is either 10-point or 12-point. Anything smaller than 10-point may be hard to read; anything larger than 12-point is appropriate for headings but not for regular text.

Serif vs. Sans Serif. Serif typefaces (like Times Roman and Garamond) have small strokes added at the ends of each letter; sans serif typefaces (like Arial or Tahoma) have no extra strokes and appear more austere and cleaner. Although conventional wisdom suggests that serif types are more readable, further research has shown that, in a short document, there is very little difference in readability between serif and sans serif types. For longer documents, serif typefaces are still preferred.

Figure 4.2a

Two-Column Format

What is Clean Energy?

Dividing energy technologies neatly into categories of "clean" and "conventional" is problematic

The following technologies are considered "clean" by most analysts: wind energy, solar energy, geothermal energy and appropriately sited small hydroelectric power (typically limited to facilities under 10 MW).

Fuel cells (both stationary power and transportation applications) are also included in many definitions of clean energy, but the degree to which many consider this technology "clean" often depends on the fuel source. Fuels cells powered by hydrogen derived from renewable energy sources are generally considered clean, but fuel cells powered by natural gas or other fossil fuels could, in some circumstances, also represent an improvement over conventional technologies.

Biomass energy is also included in many definitions of clean energy, but again the degree to which many consider biomass technologies "clean" often depends upon the source of biomass. Biomass and biofuels derived from sustainable farming or forestry are typically included in most definitions of clean energy.

There is much less consensus regarding biomass energy derived from municipal waste, although in certain circumstances this could also represent an improvement over conventional waste disposal and energy production practices. In this overview of the clean energy market, the full spectrum of biomass energy is treated as a single clean energy sector, with special cases noted where relevant.

The clean energy sector can also include a variety of ancillary "power system technologies" that improve the efficiency of the entire power system through advanced measurement, controls, storage (e.g. flywheels or batteries) and communication systems.

Technologies and services that enhance the efficiency of energy use complete the definition of the clean energy sector. Energy efficiency comprises a broad range of loosely related products and services, from energy management software and advanced building design to more efficient appliances and building components. Due to the sheer size and diversity of the sector and scope limitations for this study, "energy efficiency" is treated at a fairly high level as a single aggregate industry for the purposes of this market overview.

Source: From "Poised for Profit" by Climate Solutions. Reprinted with permission of the Company.

Consistency and Emphasis. You can mix typefaces, using a serif type for the body and a sans serif for heads, but once you have made choices, use these consistently. Too many different typefaces can confuse and even annoy readers. Use the same type for all first-level headings, the same throughout for all body text, and the same for any callouts or other reader cues.

Some typefaces are wonderful for catching a reader's attention (and are often used in advertising copy), but they are overly ornate in technical documents and can impede readability. Typefaces like *Playbill* or *Brush Script* or even *Lucida*

Figure 4.2b

Three-Column Format

Fish and Wildlife Commission adopts marine fish farm regulations

In the 1990s, nearly a million non-native Atlantic salmon escaped from floating pens in Washington and Canadian waters. Because farm-reared salmon are not able to fend for themselves in the wild, most died after escaping. Fishermen also caught many of the escaped fish. Yet some of these fish strayed into more than 75 British Columbia streams.

Growers in British Columbia raised more than 100 million pounds of Atlantic salmon last year—10 times more than the eight farms located in Puget Sound. A typical farm has eight to 10 cages. Each cage can rear between 15,000 to 50,000 fish.

In 2001, the Washington state legislature, concerned about the accidental release of Atlantic salmon from net pens and their potential effects on native fish stocks, directed the Department of Fish and Wildlife to develop a program to minimize escapes.

"It took almost a year and a half of negotiations with interested and affected parties to reach consensus on the rules," said Andy Appleby, Fish and Wildlife's aquaculture coordinator. "I felt it was a very successful process."

On Dec. 7, 2002, the state Fish and Wildlife Commission adopted a rule

(Chapter 220-76 WAC) to require U.S. growers to report escaped fish and recapture them. Growers must mark all fish so that any escaped fish can be easily identifiable. Growers must also have plans in place to recapture escaped fish for each facility. The rule becomes effective in July 2003.

Rah and Wildlife can deny permits for fish farms that pose significant genetic, ecological or health risks. The commission also voted to prohibit fanning of transgenic fish, which involves the transfer of genes from one species to another.

Fish and Wildlife may also establish an Atlantic Salmon Watch Program, an education program for fish farmers and an annual inspection program.

The agency cannot charge growers for removing fish found spawning in the wild that escape from enclosures, net pens or other rearing vessels.

For more information, contact Andy Appleby, Aquaculture Coordinator, Department of Fish and Wildlife, (360) 902-2663 or applebes@dfw.wa.gov or view the department's fact sheet at <http://www.wa.gov/wdfw/factsheets/aquaculture.htm>.

Action Team approves 2003-2005 work plan

Members of the Puget Sound Action Team and Council met in October to review comments on the public review draft of the 2003-2005 Puget Sound Water Quality Work Plan. The Action Team approved the recommendations of the Council for changes to the draft plan based on public and agency comments.

Action Team staff then finalized the work plan and submitted it to Governor Locke and the legislature in December for their consideration during the current legislative session.

The two-year work plan is primarily a budget document. It contains actions submitted by state agencies that are funded by the legislature for activities to protect Puget Sound and that implement the Puget Sound Water Quality Management Plan.

Most of this funding supports activities for state agencies including providing technical assistance to local governments, offering public education and involvement, and measuring long-term trends to identify and address threats to Puget Sound.

Thanks to all who took the time to review and comment on the draft work plan, your suggestions significantly improved this important document and the work it represents.

The work plan is available on our website at www.wa.gov/puget_sound. You can also order a print version by calling (360) 407-7313 or (800) 54-SOUND.

Legislators learn about progress to protect Puget Sound

In the past year, state agencies, local governments, tribes and citizens took many specific actions to improve the health of Puget Sound.

Recently, the Puget Sound Action Team presented its report of the progress on those actions to legislative policy and fiscal committees. The findings are reported in the Action Team's biennial report, *Successes and Challenges of the 2001-2003 Puget Sound Water Quality Work Plan*.

The Action Team's review looked at efforts of state agencies and local governments to implement the work plan during the first half of the 2001-2003 biennium, from June 2001 through July 2002.

State law requires the Action Team to develop and submit the successes and shortcomings report every two years.

The report is available on the Action Team website at www.wa.gov/puget_sound.

Puget Sound joins global study of marine protection

Worldwide, scientists and resource managers are evaluating marine environments to see how well marine habitats and species are being protected.

Locally, The Puget Sound Action Team will be compiling an inventory of marine protected areas (MPAs) in Washington State for the National Oceanic and Atmospheric Administration's (NOAA) MPA Center.

The Action Team will gather information about locations of protected areas, which agencies are managing them, goals and objectives of the area, and types of management restrictions that are in place.

The information will go into a national database that the public and resource managers can easily access. The final is to provide a tool to see how much

marine resource protection exists in each state.

Marine fish and other wildlife are generally protected by regulations and policies that dictate how, when and where fishing and other activities can occur.

Other regulations may limit where boats can anchor, where people can participate in recreation activities, and what type of development can occur. Any area in marine waters that has been specifically designated or protected is called a marine protected area.

NOAA is funding the project, which is scheduled to be completed by mid-March.

For more information about MPAs, the national inventory and regional work on MPAs, go to www.mpa.gov and www.PacificMPA.org.

Calligraphy may appear attractive, or eye-catching, but they are inappropriate for professional communication in a technical environment.

Similarly, be careful in your use of boldface, italics, or capital letters for emphasis. Italics should be used primarily for titles of source materials like books and newspapers, and boldface should be used to highlight keywords, exceptionally

Figure 4.3

Multicolumn Format

Big Spenders Corp. Profit and Loss Statement For the year ending December 31, 1998				
	<i>Prior Year</i>	<i>Budget</i>	<i>Current Year</i>	<i>Percent Compared to Prior Year</i>
Sales (revenue)	\$450,000	\$475,000	\$500,000	11%
-Cost of goods sold	\$200,000	\$210,000	\$225,000	12.5%
=Gross margin	\$250,000	\$265,000	\$275,000	10%
Expenses				
Wages and salaries	\$75,000	\$77,000	\$97,000	29%
Rent	\$50,000	\$52,000	\$54,000	8%
Selling expenses	\$55,000	\$58,000	\$61,000	11%
Telephone	\$10,000	\$11,000	\$11,000	10%
Utilities	\$10,000	\$11,000	\$11,000	10%
Total expense	\$200,000	\$209,000	\$234,000	15%
Net income (pretax)	\$50,000	\$56,000	\$41,000	(32%)

Source: "Profit and Loss Table" from Understanding Your P & L. Adapted from *Small Business for Dummies*, 2nd Edition. Copyright © 2002. Reprinted by permission of John Wiley & Sons, Inc.

significant points, or bulleted introductions or summaries. Long passages in all capitals are very difficult to read; instead, use capital letters to highlight particular words.

NEHCIME TO AVOID DAMAGING THIS EQUIPMENT, DO NOT PLUG IN THE SERVER POWER CORD UNTIL THE INSTRUCTIONS IN THIS MANUAL TELL YOU TO DO SO.

MORE HCIME TO avoid damaging this equipment, DO NOT plug in the server power cord until the instructions in this manual tell you to do so.

Formatting As with typefaces, you have choices to make about whether your right-hand text margin will be *justified* (where all the lines end exactly at the margin) or *ragged* (where lines end at different points depending on the length of the line). Justified text will often include uneven spacing between words and is more difficult to read, so ragged right margins are preferable.

JUSTIFIED TEXT A Help file is a single computer file containing help information, while a Help system is a set of files organized and linked together to provide the user with modules of information. The Help system is ultimately linked to other online documentation that gives you detailed information beyond what Help provides.

RAGGED RIGHT TEXT A Help file is a single computer file containing help information, while a Help system is a set of files organized and linked together to provide the user with modules of information. The Help system is ultimately linked to other online documentation that gives you detailed information beyond what Help provides.

Lists, Boxes, and icons Again, the world of software provides you with almost endless choices in adding variety to our documents. And again, consistency and moderation are the key elements in effective technical writing.

Numbered and bulleted lists. *Numbered lists* are used to indicate a definite sequence, a series of steps, or a fixed quantity of information: "There are eight parts to this manual." When you use a numbered list, readers assume there is a sequence or hierarchy at work. *Bulleted lists* are a common way to highlight or emphasize a series or group of items of equal importance. Electronic formatting now allows you to substitute arrows, boxes, open boxes, and a variety of other icons instead of bullets. Two cautions apply: Be consistent with the kinds of markers you use (don't switch from bullets to arrows and back again); and don't overuse these elements. If you insert bullets at every opportunity, their special effect is nullified and they become repetitious and even annoying. Text that is filled with numbers, bullets, asterisks, and other textual markers can create so many conflicting signals that the reader is confused. Be judicious.

Sometimes writers put material inside a box to feature it or separate it from the body of the text. These *emphasis boxes* can be useful for material such as notes, cautions or warnings, alternative procedures, and examples. Again, however, using them can become addictive, and too many boxes will give your text an incoherent feeling.

Finally, you may be tempted to include icons or symbols found in *clip art* software in your documents. These can include cartoon figures, holiday symbols, smiley faces, pointing fingers, and a wide variety of other graphics. It can feel creative to insert these icons into your text—and even to add an occasional touch of humor. You should understand, however, that icons are useful only when they guide the reader to a better understanding of the information you are presenting, and not when they call attention to themselves.

By paying attention to all these techniques for manipulating prose as a graphic element of your document, you add professionalism to the document and increase your readers' confidence in the credibility of the information you present.

Deciding When to Use Graphic Illustrations

The other aspect of visual design is the use of graphic illustrations: tables, charts, graphs, drawings, and so on. Writers are often quick to insert such illustrations without realizing their full potential. Graphics convey many messages: they can reach the audience's intellect as well as emotions. With a single illustration, you can relate what might otherwise take several pages of text to say. Because graphics

communicate in so many ways—via color, design, and size—they are powerful tools that should be used wisely. You should begin your consideration of graphic illustrations by first identifying what issues or points in your text might be enhanced by visual support, then thinking about how the illustrations will work with the text to create a cohesive presentation of your material.

Purposes of Graphic Illustrations

The primary purposes of graphic illustrations in technical texts are to clarify, simplify, emphasize, summarize, reinforce, attract, show relationships, and save space. For example, many user manuals begin with a flowchart that serves as an overview and a map for the document. Readers can see at a glance how the document's parts

GUIDELINES Balancing Graphics and Text

- Make sure graphics are consistent with the text in tone. Using a cartoon character or a smiley face icon in an otherwise technical document is inappropriate. Doing so is like wearing red hi-top sneakers with a tuxedo to a formal wedding or dinner. Every document has a tone determined by its content and its intended audience. Make sure the graphics you choose match the spirit of the text.
- Make sure graphics and text complement, and do not depend on, each other. Keep in mind that busy readers often go straight to the graphics for information and don't bother to read the surrounding text. If your illustration depends on the text for readers to understand it, it isn't as useful as it should be. Instead, by including sufficient information in the graphics and using effective captions, you can make your illustrations comprehensible by themselves. Doing so gives readers a quick way to understand the information; if they need to know more, they will read the surrounding text.
- Use graphics in **moderation**—and make sure they support the text. When both prose and graphics are present in a text, they comment on each other—whether the writer realizes it or not. For example, in a document where the balance is tipped significantly toward graphics, the prose seems almost an afterthought and not useful. Such an imbalance may suggest to readers that the material is not important enough to warrant prose explanations. On the other hand, a document that has one or two small illustrations makes the prose seem more serious.
- Use an abundance of **graphics**—or only **graphics**—when it makes sense.
 - In **information mapping** (a technique for presenting procedures primarily via tables) tables naturally and properly outweigh the main text.
 - In hardware documentation or similar writing, concepts can often be explained solely in pictures and diagrams; no words are necessary.
 - In documents intended for international audiences, frequent illustrations allow readers to grasp the material without having to read extensively in a foreign language.

• *Tip: Be careful not to overdo graphics. Maintain a good balance between illustrations and words so that the illustrations don't overwhelm the document, making it seem more a picture story than a visually enhanced text. Illustrating every point dilutes the effectiveness of visual aids—and too many graphics may create the impression that you are talking down to your leaders.*

relate and how best to navigate through the material. Or you can help readers find information by using icons in section headings. Another technique is to use graphics as metaphors to help readers relate the concepts they are learning to concepts they already know. For example, you can use an icon of a file cabinet with file folders to help readers learn about software directories, or a picture of scissors to indicate the cut and paste function of a word processing program. Check your material for places where a graphic element might serve one of the purposes listed above and enhance the visual attractiveness of the document as well. (See Guidelines: Balancing Graphics and Text.)

As computer technology makes desktop publishing more accessible, and as graphics software becomes more commonplace, try not to be seduced by the many bells and whistles available to you. Remember the negative effects that too many graphics have on readers, and resist the temptation to use them indiscriminately.

Choosing Appropriate Graphics

Like most tools, certain types of graphics work best for certain jobs. You wouldn't use a hammer when a screwdriver is called for, nor should you use a pie chart when a line graph is more appropriate. This section gives you guidelines for choosing the correct tool for the job you want the graphic to do.

Graphic illustrations are generally divided into two types: figures and tables. Figures include photographs, line drawings, charts, and graphs—anything that isn't a table, really. Tables are a systematic arrangement of data (words or numbers) in rows and columns. In general, graphs are better than tables for indicating trends, making broad comparisons, or showing relationships. Tables are better than graphs for giving structured numeric information.

Figures

Figures are a visual representation of data, highlighting key points and allowing readers to grasp information quickly. When using figures, you should choose the type that best suits your message and communicates it most clearly to your audience.

Photographs Photographs, whether color or black-and-white, are most often used in brochures, annual reports, and other marketing pieces. They present an object or person realistically in a natural environment and can be attractive

Figure 4.4

A Positive Photographic Example

Source: Tony Freeman/Photo Edit

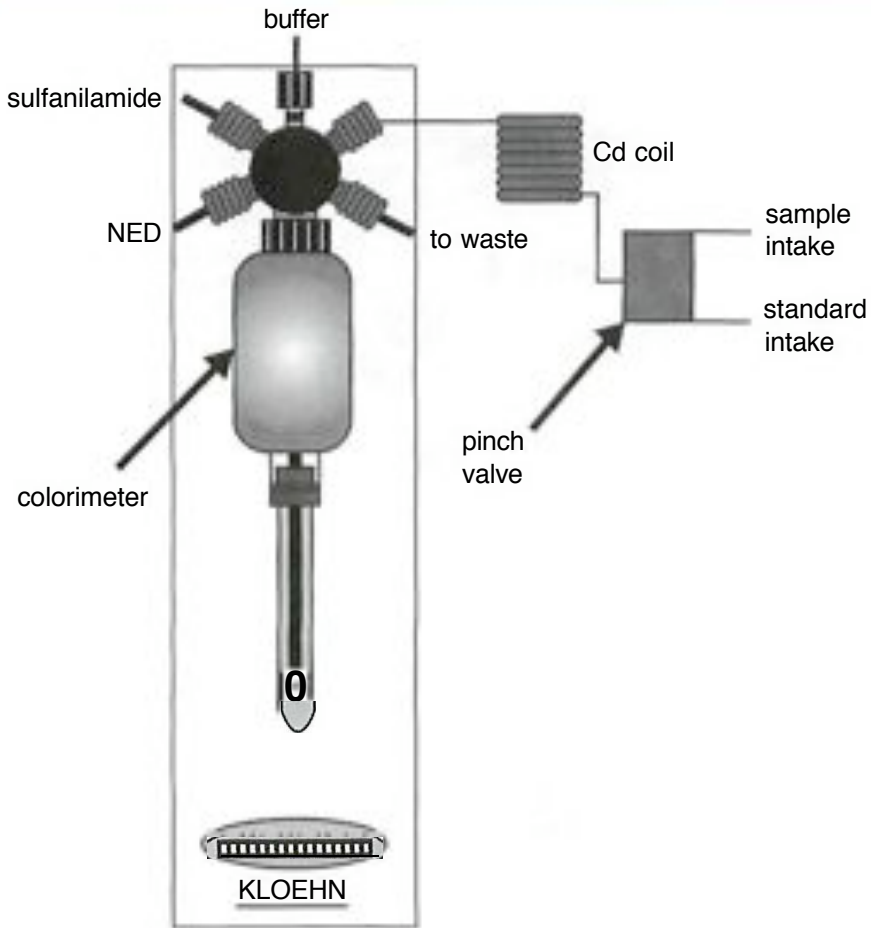
► **Tip:** *When you publish the photograph of any person, you need to get a signed release from that person giving you permission to reproduce the picture. This policy applies not only to paid models but to people who have volunteered to have their pictures taken as well as those who do not know you have taken their photographs.*

and glitzy, but they have several drawbacks. Photographs often include too much background information, too much clutter around the object in question. Those that include people go out of date as quickly as fashions and hairstyles do and may convey negative stereotypes as well—for example, a picture of a woman seated at a desk in the subservient, secretarial role and a man standing, in the dominant supervisory role. A good photo, as seen in Figure 4.4, is up-to-date and shows people and objects as they actually look in a positive work environment.

Line Drawings Line drawings are useful when you want to show how something looks or works, or represent only those aspects of the object that the reader needs to see. You can also manipulate reality a bit and show readers views that they could not see in real life. The drawings you use to illustrate your material may be generated by hand, perhaps drawn by a professional technical artist, or through the use of computer graphics programs. *Most* line drawings are labeled with a figure number and a

Figure 4.5

Representational Diagram



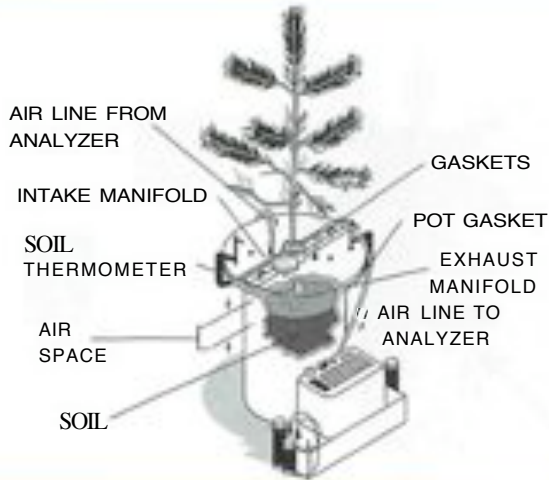
Source: Reprinted courtesy of Monterey Bay Aquarium Research Institute.

caption placed in a location consistently above, below, or alongside the figure. The following are the most common types of line drawings:

- The **representational diagram** (Figure 4.5) approximates the actual appearance of an object but usually highlights key parts or features.
- The **cutaway diagram** (Figure 4.6) shows the internal anatomy of an object.
- The **exploded diagram** (Figure 4.7) exaggerates the spaces between parts to better reveal how the parts relate to each other.

Figure 4.5

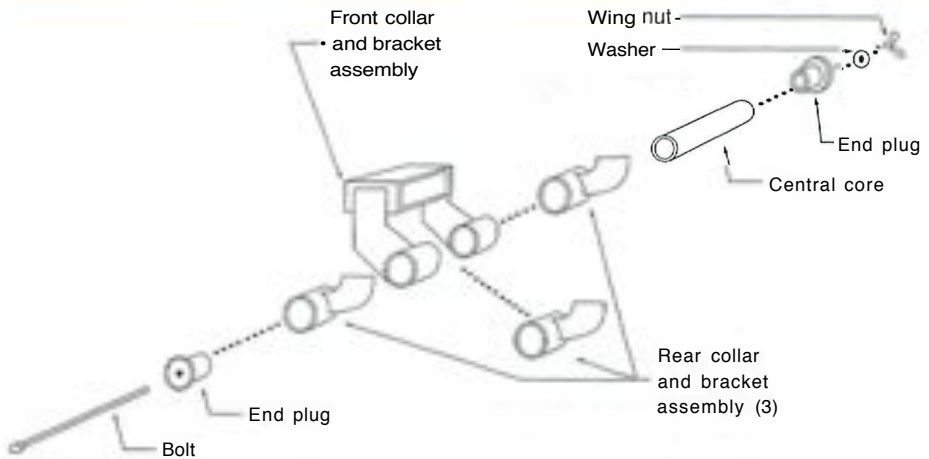
Cutaway Diagram



Source: Courtesy of the Capstone Design Course 1995–96, Northeastern University Department of Mechanical, Industrial, and Manufacturing Engineering.

Figure 4.7

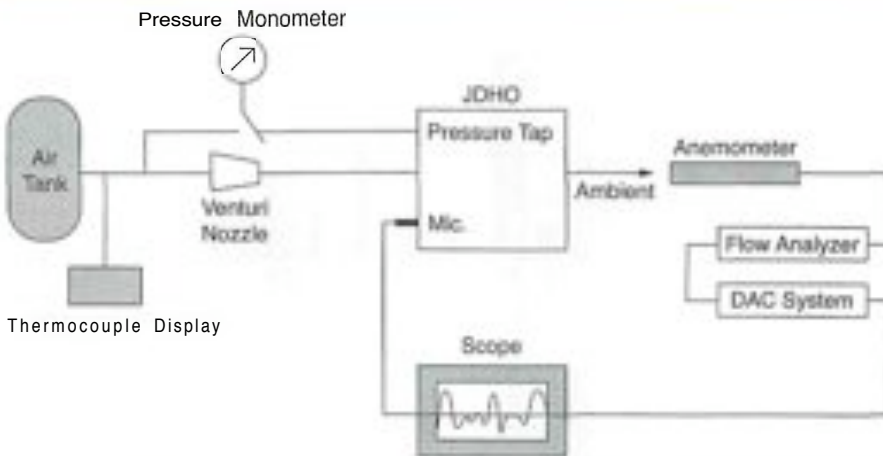
Exploded View



Source: Courtesy of the Capstone Design Course 1995–96, Northeastern University Department of Mechanical, Industrial, and Manufacturing Engineering.

Figure 4.8

Schematic of Test Setup



Source: Courtesy of the Capstone Design Course 1995–96, Northeastern University Department of Mechanical, Industrial, and Manufacturing Engineering.

- The **schematic** (Figure 4.8) depicts the function and layout of complex systems, such as the circuitry of an electronic device, or it can depict the interaction of elements, such as hot air through pipes.

Charts and Graphs Charts and graphs are among the most common graphics in technical documents. Like tables, they show relationships among data, but they do so metaphorically by using picture elements such as pies, bars, and lines. Label all charts and graphs with a figure number and caption placed *below* the figure. The following are common types of charts and graphs:

- The **bar chart** (Figure 4.9), like the line graph, depicts comparative trends but places more emphasis on individual units. Bar charts are also useful for comparing the size of several items at one time and showing the relative size of the components of a whole. You can be creative with bar charts in various ways: align the bars either vertically or horizontally, convert the bars to symbols (such as dollar signs, people, or smoke stacks), and choose bright colors and three-dimensional formats. Be cautious when using these graphics-enhancing techniques that you don't slant the data by making some of the bars (or symbols) thicker than others or otherwise disproportionate.
- The **Gantt chart** (Figure 4.10), named for management theorist Henry L. Gantt, is a preferred format for illustrating project schedules. It is a type of timeline chart showing the overall schedule for a project and the time needed to complete each individual task within it.

Figure 4.9

FY 2003 Estimate Percentage Change from FY 2002 by Mechanism

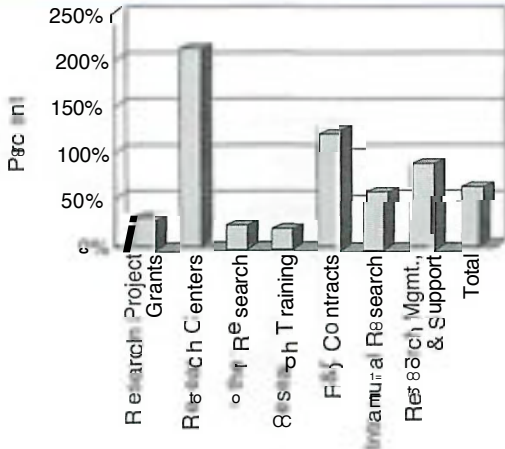
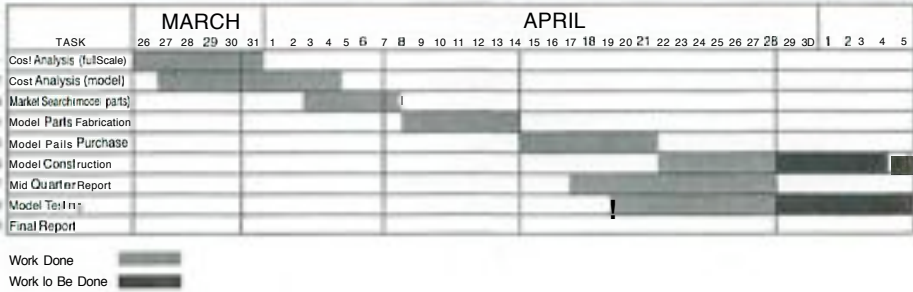


Figure 4.10

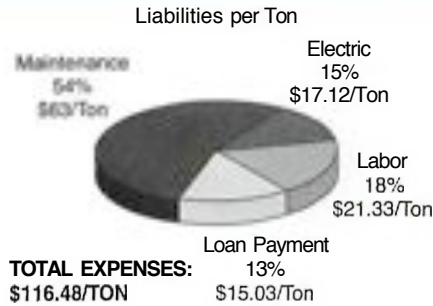
Gantt Chart (partial)



- The **pie chart** (Figure 4.11) shows the relative sizes of a whole, divided into percentage segments. A general rule is to restrict the number of "slices" in the pie to seven; otherwise the segments become too small to illustrate the relationships accurately. As in bar charts, you can use color and three-dimensional format to make the pie more memorable for readers.
- The **flowchart** (Figure 4.12) shows a series of steps from beginning to end or movement from one place to another. It can serve as a quick reference map through procedures, letting readers see at a glance how something is organized and how parts of a whole work together. The **decision tree chart** (Figure 4.13), a variation of the flowchart, is a procedure format combining

Figure 4.11

Pie Chart



Breakdown of Expenses

Figure 4.12

Flowchart



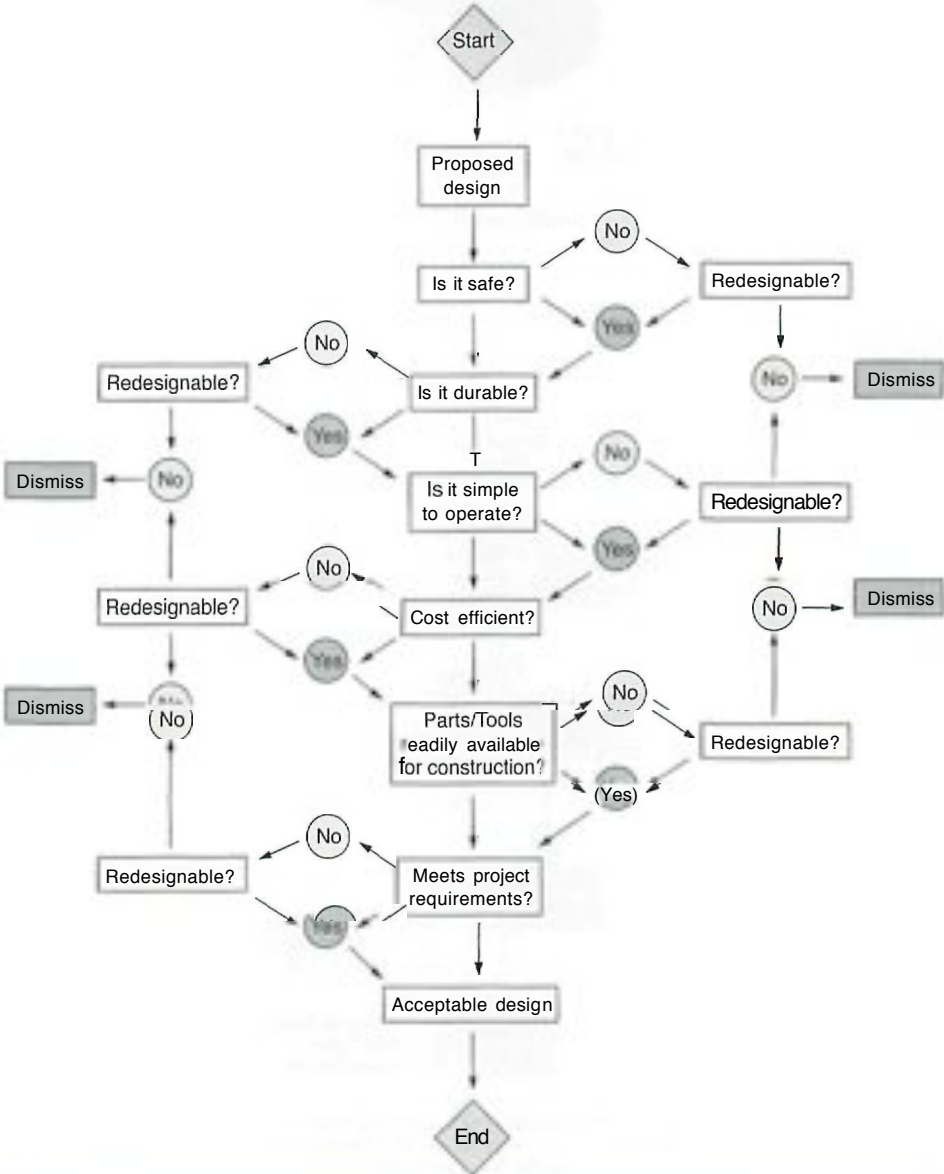
Proposal Phases and Related Activities
Whether a large or small effort, this flow of activity applies to any proposal.

Figure 4.13

Decision Tree Chart

Each design proposal is judged by many factors that distinguish whether or not it is an acceptable solution.

The designs that meet the requirements are then judged by the team to determine which proposal best meets design criteria.



the aspects of the flowchart and the decision table. Use a decision tree only if the procedure you are describing is nonlinear and involves only a few decisions and if it is important to show the outcomes of the decisions.

- The **organizational chart** (Figure 4.14) represents the hierarchy of offices, departments, or management in a given organization. It illustrates the functions of each unit and how units interrelate. Usually, organizational charts show the chain of command and the communication channels in a company or an institution, serving as a guide to which person or office should be consulted.
- The **tree diagram** (Figure 4.15) represents the complex organization of systems, such as the commonly known "family tree" or the evolutionary tree diagram of primates. Each branch in the tree is connected to a larger branch, which is in turn connected to a larger one, and so on. At a quick glance, readers can see the hierarchical relationships in a system—even when the relationships are highly complex.
- The **line graph** (Figure 4.16) illustrates trends over time or plots the relationship of two or more sets of variables. It is especially useful for

showing changes in data over time. When you use a line graph to indicate trends, use the vertical axis to show the amount and the horizontal axis to show the time or quantity measured. Make sure that both scales begin at zero and proceed in equal increments so that the graph doesn't slant the

Figure 4.14

Organizational Chart

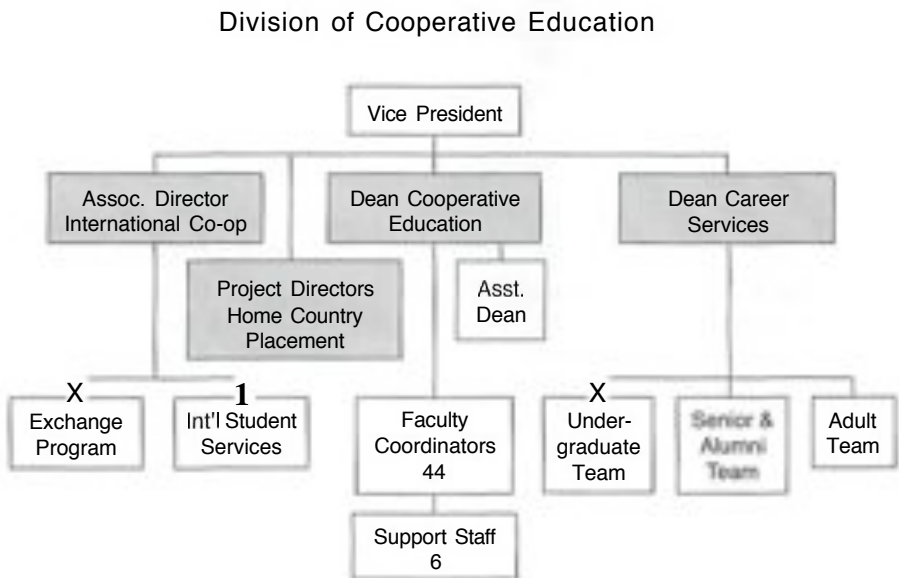


Figure 4.15

Tree Diagram

A document is a hierarchy of document elements:

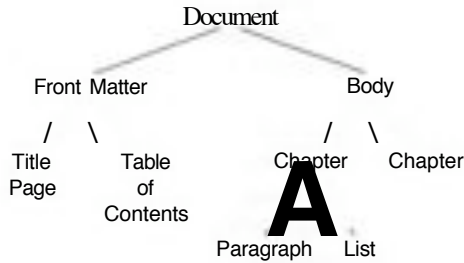
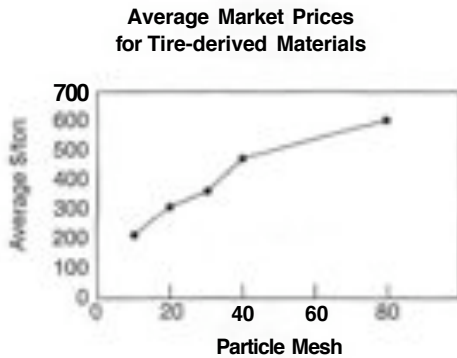


Figure 4.16

Line Graph



► **Tip:** *It's much easier for readers to compare numbers if they are in vertical columns than if they are in horizontal rows. The order of the rows in a table is also important. Arrange the rows so that the values are in descending order for the most important column. (See Figure 4.17.)*

data. A broken axis indicates that some of the increments have been left out. In general, try not to use more than three lines in one graph and make sure they are sufficiently distinguishable for the readers.

Tables

Tables are especially useful for depicting complex data, either in numbers or in words. They can also serve as a quick way for readers to understand choices available to them. Think carefully about the purpose your tables are serving because where

you place them in the text depends on their purpose. If they are reference tables that contain information people will look up, they can be placed in an appendix to save space. However, if their purpose is to demonstrate or illustrate a concept, they should appear within the discussion so readers don't have to (lip backward and forward. Tables are usually labeled with a table number and a caption placed *above* the table.

- The **information table** (Figure 4.18) presents detailed, specific information using a grid of rows and columns to create a cross-referencing system.

Figure 4.17

Table

Table 2b: Mean growth rate and intakes of supplement, milk, and water for 4 diets.

Supplement	Growth rate	Supplement intake	Milk intake	Water intake
	(g/day)	(g/day)	(ml/kg ^{0.75})	(ml/kg ^{0.75})
Lucerne	145	450	10.5	144
Sesbania	132	476	9.2	128
Leucaena	128	364	8.9	121
None	89	0	9.8	108

Source: R. O. Stern et al (2001) Informative Presentation of Table, Graphs and Statistics: A Guide to Good Statistical Practice (online version). Statistical Services Centre, The University of Reading. UK.

Figure 4.18

Information Table

Table 2-2: Summary of Cryogenics

Methods	Positive Aspects	Negative Aspects
Liquid Nitrogen	<ul style="list-style-type: none"> • Produces fine panicles • Fast 	<ul style="list-style-type: none"> • Expensive • Containment may be complex
Liquid Air	<ul style="list-style-type: none"> • Produces fine particles • Fast 	<ul style="list-style-type: none"> • Expensive • Fire hazard
Dry Ice with Solvent	<ul style="list-style-type: none"> • Produces fine particles • Less expensive than Liquid N₂ 	<ul style="list-style-type: none"> • Solvents are toxic • Solvents are flammable

Tables are particularly appropriate for presenting numerical data, survey findings, or comparisons of various items against a specific standard. When preparing a table, be sure to identify all the units you're using: dollars, percentages, or whatever. All items in a column must be expressed in the same unit. Be careful, too, not to use more columns or rows than are readable on a page.

- The **decision table** (Figure 4.19) indicates reader choices. There are several types of decision tables, the most common being the "If . . . then . . ."

Figure 4.19

If . . . Then Decision Table

<i>Operating the 780 Remote Data Manager</i>		<i>Page 4-23</i>
Reviewing Plate Set-ups (Continued)	4. Press	
		A window menu is displayed.
	If . . .	Then . . .
	you want to print the current plate set-up	turn on the printer and verify that it is online. Select PRINT PLATE SET-UP from the window menu and press <i>ENTER</i> . A copy of the plate set-up is printed.
you want to delete the current plate set-up and return all the specimens on it to the worklist	select DELETE, PARTIAL from the window menu and press <i>ENTER</i> . This plate set-up is deleted and all information is restored to the worklist. The specimens from this plate set-up can then be included on other plate set-ups, held indefinitely, or deleted.	
you want to delete the current plate set-up and delete all the specimens on it from the 780 RDM	select DELETE, TOTAL from the window menu and press <i>ENTER</i> . The plate set-up is deleted and all patient and specimen information from this set-up is removed completely from the 780 RDM.	
5. Press <i>F2</i> when you finish reviewing plate set-ups.		
A window menu offers two exit options:		
• Select SPECIAL FUNCTIONS to return to the Special Functions menu. Press <i>ENTER</i> .		
The Special Functions menu is displayed.		
• Select MAIN MENU to return to the Main Menu. Press <i>ENTER</i> .		
The Main Menu is displayed.		

► **Tip:** *A well-laid-out table does not need vertical lines. Stick to the numbers or other data you're presenting and don't clutter an already-complicated table with "non-data ink." (See Figure 4.20 on p. 100.)*

format: *If you want to do X, then you should follow Procedure Y.* Other types of decision tables graphically list all the information in a chart, allowing readers to determine the appropriate coordinates of their specific situations. By collecting all of the options and placing them in an easy-to-read table, you can avoid lengthy prose explanations and unnecessary repetitions.

The Ethics of Graphics

As you develop graphics to help communicate information, remember that information displayed visually can be misleading. In the wrong hands, graphics, charts, and tables can be designed to convey false impressions. Edward Tufte, a leading authority on designing visual information and author of *The Visual Display of Quantitative Information*, gives a brief list of how graphics can "lie":

- Comparing full time periods with smaller time periods (for example: comparing 10-year time periods with one 5-year period)
- Using sizes of graphical elements that are not in proportion to the quantities they represent (for example, showing a large visual icon to represent small quantities, and a smaller icon to represent larger quantities)
- Failing to adjust for population growth or inflation in financial graphs
- Exaggerating the vertical scale in graphs to make the data points seem closer together and thus less dramatic
- Compressing the vertical scale by not starting at zero
- Showing only a part of a cycle so that data from other parts of the cycle cannot be used for proper comparison

To be sure you have presented your graphics ethically, take a minute to check that they show appropriate comparisons, contrasts, and contexts—in short, that they tell the truth. (See Figure 4.21 and Figure 4.22 on p. 101.)

Placing Graphics in the Text

Once you have chosen graphics to convey your message, you need to decide how to fit them into the text. Even the best graphics won't do their job effectively if they are displayed poorly. There are several guidelines for positioning graphics in a document, but your approach to integrating graphics and text depends on the type of document you are writing. Different kinds of communication require different approaches to placing graphics. In glossy marketing material, graphics often dominate the page; in a technical report, they are closely tied to

Figure 4.20

Clarifying Tabular Data

A Excess lines and marks make the data hard to see

State	Number of agencies	Full-time employees	Full-time sworn officers
All States.....	18,769	921,978	663,535
Alabama.....	432	14,388	9,767
Alaska.....	68	1,884	1,254
Arizona.....	130	16,828	10,088
Arkansas.....	360	7,958	5,819
California.....	524	103,987	69,134
Colorado.....	247	14,002	9,896
Connecticut.....	129	10,319	8,525
Delaware.....	45	2,134	1,660
District of Columbia	3	4,651	3,908
Florida.....	385	60,808	37,395

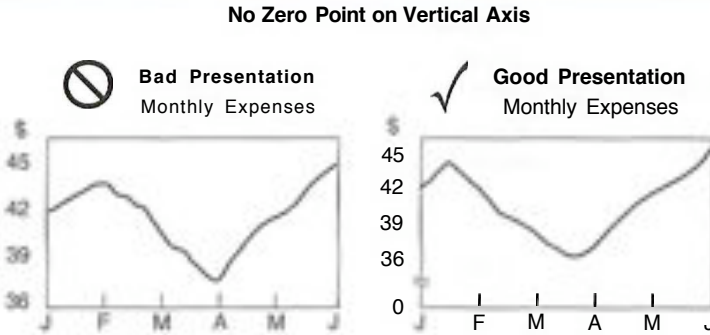
B Without the lines the data are the focus of the table

State	Number of agencies	Full-time employees	Full-time sworn officers
All States	18,769	921,978	663,535
Alabama	432	14,388	9,767
Alaska	68	1,884	1,254
Arizona	130	16,828	10,088
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California	524	103,987	69,134
Colorado	247	14,002	9,896
Connecticut	129	10,319	8,525
Delaware	45	2,134	1,660
District of Columbia	3	4,651	3,908
Florida	385	60,808	37,395

Source: Marianne W. Zawitz, Bureau of Justice Statistics, Office of Justice Programs. Department of Justice, "Data Presentation: A Guide to Good Tables." Methodology Seminar presented to the Washington Statistical Society. October 11, 2000.

Figure 4.21

No Zero Point on Vertical Axis

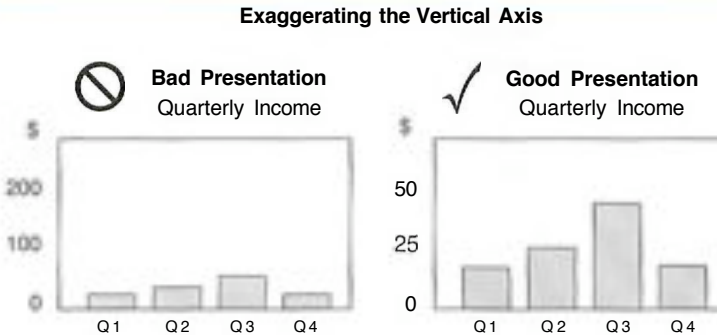


Graphing for the first six months of sales.

Source: *Business Statistics: A First Course* Second Edition by Levine/Krehbiel/Berenson, © Reprinted by permission of Pearson Education, Inc., Upper Saddle River, NJ.

Figure 4.22

Exaggerating the Vertical Axis



Source: *Business Statistics: A First Course* Second Edition by Levine/Krehbiel/Berenson, © Reprinted by permission of Pearson Education, Inc., Upper Saddle River, NJ.

the written information they illustrate. Business reports sometimes present all the graphics (usually called "exhibits" in business documents) in an appendix. It's a good idea to check with your supervisor to learn whether particular documents observe special positioning formats. (See Guidelines: Integrating Graphics.)

GUIDELINES Integrating Graphics

- Introduce each graphic before it appears in the **document**. Readers will not know the purpose of a particular graphic until you tell them. Always refer to the graphic in the text before your audience reaches it, and make sure to introduce its purpose clearly. Never include a graphic without mentioning it in the text. This is called a *callout*.
- Place the graphic as close as possible to its discussion in the text. Make sure readers don't have to flip pages forward or backward to see it while they are reading the material it illustrates.
- Present graphics professionally. Use the resources widely available to create your *graphics*—computer graphics, professional artists, or carefully hand-drawn illustrations that look professional.
- Make sure graphics are large enough to see clearly. If your graphics aren't 100 percent legible, they are not useful.
- Make sure the level of detail in the graphic is compatible with the significance of its subject. Stick to the idea you're illustrating, and present only enough information in the graphic to explain that concept.
- Position the graphic on the page so that it best **complements** the discussion it illustrates. Place each graphic so that readers focus on it naturally and conveniently as they read the discussion of it in the text. Placing graphics randomly on the page creates a scattered effect that hinders readers' ability to focus. Make sure that the page design guides readers' eyes to the important points.
- Use color only if it enhances your message. You want to be sure that your graphics are memorable, but not "trendy." Pay attention to color coordination and the effects that various colors have on audiences.
- Use sufficient white space within and around the graphic to increase impact and readability. Especially when you have many graphics to include in a document, leave enough space around each one so the overall effect is not cramped and cluttered. Graphics should be pleasing to the eye and easy to read, not squeezed together to save space.
- Avoid cluttering the document with unnecessary graphics. As with any good thing, too much can be a problem. Use graphics only to enhance understanding of the material.

Using Graphics on the World Wide Web

Graphics are an important part of Web pages. A graphic can explain a difficult concept or break up large amounts of text. It can help make a page more appealing, too. The downside to using graphics on a Web page is that they often take a long time to download: users may not be willing to wait several minutes for a graphics-rich page to materialize. Chapter 15 discusses designing Web pages in

CHECKLIST Numbering and Labeling Graphics

- Is each figure and table numbered and captioned appropriately? You may number figures and tables sequentially throughout the document, or you may number them by chapters. If you number them sequentially, the number doesn't indicate the chapter or section. If you number them by chapters, begin each figure number with the chapter/section number followed by a period or hyphen and then the figure number (e.g., "Figure 3.2 " denotes the second graphic in Chapter 3).
- Does each caption make a point and allow the graphic to be self-explanatory? Readers who skim a document may not read all of the text surrounding a graphic. For these readers—and for those who return to the text for quick reference after reading it—a graphic needs to tell its story independent of the text. That means the captions usually should make a point and not be simply descriptive. For example, the caption "Figure 5.6: Map of Flint Pond" doesn't convey a message or help readers understand its significance, while the caption "Figure 5.6: Map of Flint Pond Showing Three Areas of Possible Contamination" sends a direct message to readers.
- Are all the important parts of the graphic labeled? Use "callouts" (labels placed on the outside of the graphic with arrows pointing to the specific part), or write the labels directly on the parts of the graphic. Be sure the labels are legible.
- Are all labels horizontal? Don't expect readers to turn your document sideways to read labels, captions, or callouts. Make graphics as convenient as possible for people to read.

more detail, but the following general guidelines may help you design graphics that work:

- Use graphics instead of text alone to define complex concepts.
- Make sure your graphics correspond clearly to the surrounding text.
- Use graphics of a consistent size, if possible.
- Use audio or video to set a tone or explain a concept.
- Use media that will load and download quickly.
- Use color consistently, especially if your Web site has several screens.
- Flashing or blinking text is often annoying. Keep it to a minimum.

Using Graphics in Fliers, Brochures, and Newsletters

When you design graphics for pieces such as fliers, brochures, and newsletters, remember that the graphical elements have one primary purpose: to facilitate interest in and comprehension of the accompanying printed word. In these documents, graphics and words must work together in a highly focused, small space and the

result must be powerful and harmonious. Here are some things to consider as you think about designing these pieces:

- Design is linked to the message. The first step in the design process is to determine that message and plan the graphics to support it.
- Typography and layout, as well as the art, cannot be separated from the message they present.
 - Graphical elements set the mood. Readers usually notice (the graphics before the text, and their expectations are set by these elements.
- Type styles and art should have a proportional relationship. One should not overpower the other.
 - All graphical elements should work together: shape, type style and size, color.

For more detailed information on how to use graphics in fliers, brochures, and newsletters, see Chapter 16.

Using Graphics in Presentations

Professional presentations are much enhanced when the speakers use graphics. Not only do the graphics help the audience *see* what you mean, they also can help you stay organized. Although Chapter 16 deals more fully with presentational graphics, two cardinal rules for designing these graphics are worth mentioning here:

Rule #1: Make things big enough for everyone to read.

Rule #2: Simplify things enough so that they will be readable.

The first rule means that you should limit the amount of text or visuals on each graphic (whether it's an overhead transparency, a PowerPoint slide, or a poster board) so that you can make the information large enough to be seen at the back of the room. The second rule means that the audience should not have to study your visuals to understand them. If they have to decipher your graphics they will not be paying attention to what you're saying.

Designing Effective Posters

At many science and technology meetings and conferences, participants use posters to discuss their work. If they have experimented with new methods or conducted experiments to prove a hypothesis, the poster is a good way to illustrate the results. Posters allow you to display information pictorially and in a concise format that the audience can see all at once. But, as is true with any form of communication, posters work best when they are designed carefully with the audience's needs in mind. A poster board that's a jumble of glued-on photographs and Magic Marker text will not be successful. To create a poster that is attractive and professional, remember:

- The more professional the poster looks, the more professional you will look.
- The poster's design elements should attract the audience's interest without tipping into overly dramatic graphics.

- The audience should be able to view and understand your poster's material in less than five minutes.
- You should stand beside the poster as a courteous guide for the viewers and to answer questions, but the poster should be self-explanatory.

Most posters contain the following sections, communicated in words and pictures:

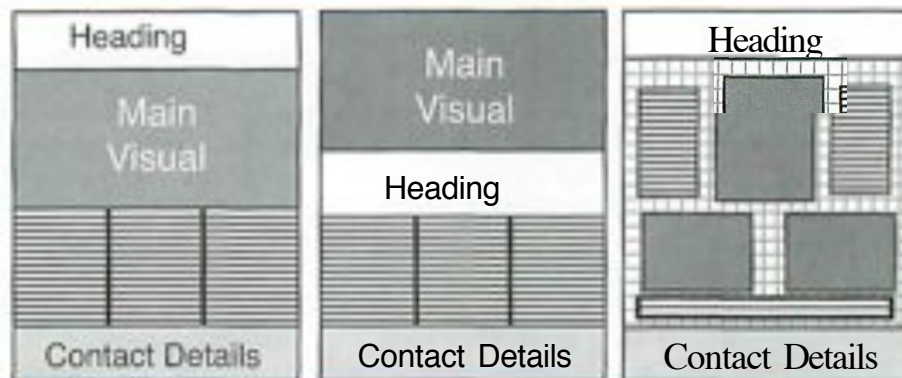
- **Title:** Should convey the issue or hypothesis your poster discusses and should be "catchy" enough to attract the audience's interest. Avoid titles that do not express the reason your topic is important. A title such as "POLLUTION" doesn't say much, but "PROVEN METHODS FOR PREVENTING POLLUTION OF SMALLVILLE'S WATER SUPPLY" will catch people's attention.
- **Your Name and Affiliation:** Be sure to include your name and those of others who work with you on the poster. Include your company or school's name and your department as well.
- **Introduction:** Explains why the issue is important and gives some essential background information. Keep this section as short as possible.
- **Materials and Methods:** Here's where you can use graphics (flowcharts, photographs, figures, tables, and so on) to describe how you conducted your experiment.
- **Results:** What happened? Did the experiment work? What data did you accumulate?
- **Conclusions:** Do the results support your original hypothesis? Discuss why your results are relevant and contribute to knowledge or progress in your field.
- **Acknowledgments:** Thank individuals and organizations for their specific contributions to your work.
- **Contact Information:** Provide your e-mail address or your Web site—or even a URL where interested people can download a PDF version of the poster.

➤ **Tip:** *If you are preparing a poster for a specific conference or class, you should follow the requirements provided for you. Some organizations ask you to include an abstract on the poster itself, and you may be asked to list the "literature cited" in your work.*

Most poster sessions are held in large rooms with presenters and their "boards" arranged strategically in rows or around the edges of the room. People usually move informally through the exhibits, talking with each other and with the presenters—creating quite a noisy buzz. As you might imagine, people entering the room move first toward those posters that attract them from as far away as 15 feet or more. To meet that challenge, your poster must be designed with elements that can be seen from that distance.

As a general rule, effective posters are a mix of text and graphics, optimally 20 percent text, 40 percent graphics, and 40 percent empty space. The empty space surrounding the other two elements allows them to stand out so viewers can read

Figure 4.23

Sample Poster Layouts

Source: From p. 5 of PDF Policy on Using large Format Printer, Reprinted with permission.

them easily. The type size should be large—think of 16-point type as suitable for fine print and work up from there. Use 20-point for your main text and even larger for your title and headings. Using such large type means you have space for very little text and what you do use must be absolutely necessary.

As an aid to your audience, be sure your poster has "flow" to it. In other words, be clear by the layout of the text and graphics how the viewers should read the information: what comes first, second, third, and so on. Figure 4.23 shows just a few of the sample layouts you use.

Figure 4.24 uses a combination of layouts and effectively integrates text and graphics.

Presenting Your Poster

Before you arrive at the poster session, think ahead about your wardrobe. Not only should you dress professionally for the presentation, you should choose colors to wear that will not clash with the colors on your poster. Although this may seem a small thing, it makes a difference in how the viewers perceive your overall image. If your audience will not know who you are, wear a nametag so it's easy for them to identify you as the author.

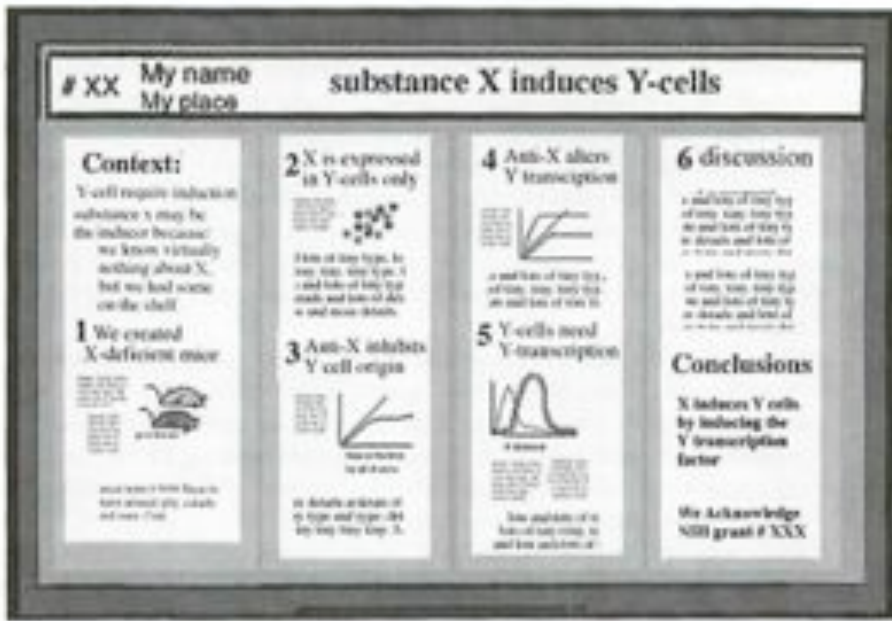
Once you're in the room with the audience, stand beside your poster as you walk the viewers through it. While you should point to the work, always turn and talk to the audience, don't turn and talk toward the board. It's a good idea to have business cards handy and to have a stack of smaller photocopies of your poster available for viewers to take with them.

Be sure to thank people for taking the time to view your work and talking with you about it.

Effective graphics can separate powerful technical documents from weak ones. In many instances, graphic elements serve to catch the audience's attention and

Figure 4.24

Sample Poster



Source: Kathryn Tosney, University of Michigan. "Substance X induces Y-cells" poster from p. 22 of posters. PDF. Reprinted by permission of the author.

cause them to read material they otherwise would not. Graphics also allow readers to comprehend information with both the left and the right brain, which makes concepts more immediately understandable for many people. But to use graphics well requires care, patience, and a good sense of visual design. With rapidly increasing graphics applications available, it's tempting to assume that computers can do the designing for you and that the more graphics you use, the better. As an effective technical communicator, you need to incorporate visual elements into your documents, and you need to be familiar with the tools available to you—but only a good grasp of the basic principles can allow you to use graphics well, no matter what tools you use or what type of document you are producing.

Tips for International Communication

Graphics play a large role in international communication because they convey meaning without relying on words. In some documents designed for multinational release, illustrations dominate the text—some contain no words at all. (Think, for example, of the safety instruction cards found in the seat pockets of airliners.) If

you are writing for non-native speakers, a good rule of thumb is to use more graphics than you normally would use.


- **Using Color.** If you plan to use color in a document designed for an international audience, you may want to do some research into the significance of color in the country you are targeting. Do certain colors have negative connotations? In several Asian cultures, for example, white, rather than black, is the color of death. In Europe, purple indicates royalty, but it signals death in Latin America. Are there colors that are associated with specific corporations or products? (For example, IBM is renowned as "Big Blue.") Are there religious groups or other groups that have special colors emblematic of their identity? (Yellow or saffron is the color of monks' robes in many Buddhist countries.) Knowing these associations in advance can save you time and embarrassment.
- **Using Icons.** We tend to assume that certain symbols are universal simply because they are so prevalent in this country. It's worth checking to be sure that the icons you use are recognizable in the target country. The circle with the red slash through it is fairly universal, but hands pointing or the finger with the string wrapped around it (to indicate a "reminder") may have **different—**and possibly **unfortunate—meanings** in other places.
- **Depicting People.** Rather than using photographs or realistic drawings, it's a better idea to create generic figures that diminish race and gender. Try using simplified line drawings, or even stick figures, to depict people.

If you need to include drawings of hands in your document, show them manipulating a recognizable object or performing a procedure, not making a gesture (such as the "OK" gesture, which may have negative connotations in some cultures). Stylize the hands so they are not clearly male or female, and, if the procedure can be performed with either the right or the left hand, show it being performed with the right hand. (The left hand is for unclean tasks in some Arab countries.)

- **Designing for Translation.** Effective graphic design is effective management of space. Text translated from English frequently expands to take up more space than the **original—expansion** rates vary from 10 percent and up: Greek can easily expand by 30 percent. (Notable exceptions are Japanese and Hebrew.) If you are designing a page that will be translated directly into other languages, you should allot more space to your page design **elements—margins,** headers, footers, columns, sidebars, and so **on—than** what English language text requires.
- **Learning Different Modes of Visual Perception.** Keep in mind that the visual principles discussed in the beginning of this chapter are specifically Western. In Eastern cultures, many people read from right to left or bottom to top. Their sensitivity to every graphic element of an illustration is heightened because of their sensitivity to the subtle difference a stroke can make in the Chinese, Japanese, Korean, or other alphabets using kanji characters. To design

effective documents for these audiences, you need to explore the target country's natural modes of perceiving visual information.

For more about communicating across cultures, see Chapter 7.



Quick Review

For technical communicators, graphics are more than just decoration; they are an integral part of the text. Knowing how to use the visual aspects of the page to enhance the message is essential for communicating technical material clearly and powerfully for audiences with many different reading needs.

Effective graphic design includes understanding how to design text on the page as well as how to design and place graphics.

General Guidelines


- Understand the eight basic conventions of visual perception.
- Keep your readers in mind at all times and design documents for their convenience.

Page Design Guidelines

- Create visible hierarchies of information.
- Use the grid format (three-column is the most common format).
- Pay attention to the guidelines for formatting textual elements such as typeface, icons, and bullets.

Graphic Design Guidelines

- Think about the purpose for using the graphic.
- Remember that people process information with the left and right side of the brain: the right side processes text, the left side processes graphics. Try to determine which side of the brain your audience is most accustomed to using to process information.
- Choose the right type of graphic for the message you want to convey.
- Balance graphics with text appropriately for the document and the audience.
- Be familiar with the general standards for placing and labeling graphics.
- Check with your supervisor so you can comply with any required formats.



Exercises

1. Find a technical document that you feel is designed poorly and explain how you could make it better. Take at least one page of the document and redesign it to illustrate your techniques.
2. Think about colors and icons that you know are associated with certain products or companies (your own company or one you know of). Why do

you think the companies chose these graphic elements? What do they represent? How are the colors and icons used in the written material published by these companies? Do they use the same color scheme and icons when communicating with other cultures? Are there possible cultural biases associated with these elements? Will they have the same associations for people in other cultures as they do in this culture?

3. Find a set of written instructions that could be delivered solely as graphics—without any text. (For example, you might choose hardware installation instructions or equipment assembly instructions.) Working with a group or by yourself, design a series of graphics that conveys the information necessary for a reader to complete the required procedure. When you have finished, exchange your instructions with another individual or group and critique each other's work. Check to be sure the graphics include all needed information and preclude any potential confusion.
4. Take a section of a document you're working on and develop at least two different graphic methods of portraying the information. For instance, you may decide to illustrate the material in your text by using a pie chart and then illustrate the same material by using a bar chart. What are the difficulties you encountered in communicating with each of these graphic types? Is one type better suited to the material than the other? Why or why not?



Community Action Projects

1. Working individually or in a group as a design team, enhance the impact of an organization's written materials adding graphical elements. You may find that a local group such as the Audubon Society or the Neighborhood Recycling Program would welcome your efforts in adding flair to their published material.
2. If you work in a company or organization that produces multiple documents, develop a design style sheet to ensure design consistency across all of the material. Such consistent use of the graphics provides a coherent "look" to the company's document and creates a more professional image.



Technology Challenge

Using a Graphics Software Package, design an illustrated map of your local transit system. (DrawPlus and Inkscape are freeware you can download.)

Editing for Style

Many people believe that **style** has no place in technical communication. Perhaps these people believe that style is synonymous with "flamboyance." In his book, *Technical Writing Style*, Dan Jones defines style as "your choice of words, phrases, clauses, and sentences, and how you connect these sentences. Style is the unity and coherence of your paragraphs and the larger segments. Style is your tone . . . **who** you are and how you reflect who you are. . . ." Characteristically, technical prose doesn't call attention to itself with noticeable flair as do fiction, poetry, and some nonfiction prose. Nonetheless, effective writing of any sort works in large part because writers are careful stylists—and technical writing is no exception.

As you work to communicate complex information, make sure your prose doesn't further complicate already difficult material by cluttering the page with unnecessary words and convoluted sentences. Similar to a smoothly oiled machine that doesn't clang and bang, calling attention to its mechanical parts, good technical writing gets the job done without readers noticing the stylistic mechanics. By writing with clarity and efficiency, you enable your readers to concentrate on the information you are presenting, not on the manner of its presentation.

Revising your work is a process that involves at least three levels of editing:

- *Broad-level revisions* that entail rethinking your organization and the substance of your document
- *Sentence-level revisions* that entail editing the structure and words of your sentences
- *Mechanical revisions* that entail checking for correct grammar, spelling, and punctuation

Most writers perform all three kinds of revising many times during the development of a document—they don't save the revision phase solely for the end of the writing process.

This chapter focuses on the second level of revisions: techniques for editing your technical prose to improve its style. "Editing" here means working hard at the micro level, fine-tuning sentences to achieve clarity and readability. (Chapter 3 offers

➤ **Tip:** *When you sit down to edit, be sure that you have easy access to basic reference books for style, such as The Chicago Manual of Style; a good desk dictionary, such as the American Heritage Dictionary, or Merriam-Webster's Collegiate Dictionary, or an online dictionary; a handbook of grammar and usage; and any style sheet or guidelines your company may have issued.*

suggestions and techniques for improving your organization, and the concise guide at the end of this book concentrates on certain specific grammar and punctuation problems. You may want to use both sections in conjunction with this chapter as you revise your work.)

At this point, it's important to differentiate between "editing for style" and "developmental editing." The latter is a collaborative process that occurs between the writer and a professional editor involved in the production of long, complex documents, such as technical manuals or user guides. Editing for style, on the other hand, is a process you perform on your own prose at the sentence level, no matter how long or short the document is and no matter if you are working alone or with a professional editor. (For more information on col-

laborating with a developmental editor, see Chapters 9 and 10.) To edit your own writing, you must maintain a sense of objectivity about your prose, even when you are so familiar with it that the sentences seem totally understandable and readable. You need to be able to recognize how to revise the sentences so that someone reading your material for the first time can comprehend it easily and efficiently.

Creating a Readable Style

Effective writers concentrate on three stylistic principles pivotal to composing readable technical prose:

- Emphasize the important points in each sentence.
- Avoid "agentless" prose.
- Use an appropriate tone.

Emphasizing Important Points

Technical writing often features long passages of complicated information in which every part seems as important as every other part. The root of this problem is at the sentence level and is caused by overuse of nominalizations, strings of qualifiers, and poor narrative structure. For example, consider the following sentence from a scientific report:

There may be a retardation of the metabolism of ethanol by the congeners so that it has stronger effect on the nervous system.

The sentence is so heavy with nouns and information that even a scientist would have trouble understanding it quickly. To make this passage more readable, the first thing to do is to recognize and remove the nominalizations.

Nominalizations A nominalization is a verb or an adjective turned into a noun (for example, *realize* becomes *realization*, or *slippery* becomes *slipperiness*). Because technical communicators often write about complex technical concepts, they tend to present the information in noun-based abstractions rather than in direct, active verbs.

Look again at the sentence about the congeners and the nervous system. By removing the nominalization "retardation," the sentence begins to be easier to understand: "*The congeners may retard the metabolism of ethanol sothat...*"

To make sure your prose is as direct as possible, take time to review what you have written, looking for nouns that could be converted to verbs. (Look for long nouns, especially those ending in *-ion*.) In a matter of minutes, you can increase clarity in your writing and make life much easier for your readers. The following examples identify common nominalizations (the first few are underlined) and illustrate how to edit them.

ORIGINAL We conducted an investigation of the site.

EDITED We investigated the site.

ORIGINAL Additional consideration should be given by Jordan Company to the possible contribution of off-site sources.

EDITED Jordan Company should also consider how off-site sources may contribute.

ORIGINAL A listing of emission units, operations, and activities at the plant is presented in Table 3-1.

EDITED Table 3-1 lists the emission units, operations, and activities at the plant.

Information Strings Another roadblock to readability is the use of too much information strung out in seemingly endless words and phrases. Writers frustrate readers by adding strings of phrases and clauses to the basic information in their sentences:

BASIC SENTENCE The first difficulty is evaluating the pollutants a plant emits after the government lifts pollution controls on coal-fuel burning in this vicinity.

INFORMATION STRINGS The first matter of difficulty is the problematic task of assigning some kind of value to the amount of and nature of the pollutants that a plant emits after the controls for pollution of the air in this particular vicinity and in this specialized coal-fuel burning process have been lifted by the government.

Such strings are especially problematic when they occur between the subject and the verb of a sentence. By the time readers wade through the excess material, they

have probably forgotten the point of the sentence. In the following excerpt from a Maine statute governing sanitary engineering projects, the subject is so far removed from the verb that engineers might spend more time trying to decipher the compliance rules than completing renovations to the sewage treatment plant:

ORIGINAL Any sanitary district formed under this chapter, for the purposes of accomplishing its objectives, or paying and refunding its indebtedness of paying any **unnecessary** expenses and liabilities incurred under this chapter, including organizational and other necessary expenses and liabilities whether incurred by the district or any municipality therein, or any person residing in unorganized territory encompassed by said district for any such expenses incurred or paid by it or him, and in acquiring properties, paying damages, laying sewers, drains, and conduits, constructing, maintaining and operating sewage treatment plants, or systems, and making renewals, additions, extensions and improvements to the same, and to cover interest payments during the period of construction, by resolutions of its board of trustees, without district vote is authorized to borrow money and issue, from time to time, bonds, notes or other evidences of indebtedness of the district in one series, or in separate series, in such amount or amounts bearing interest at such rate or rates, and having such terms and provisions as the trustees shall determine.

State of Maine

MRSA Title 38, Subchapter IV, Section 1201

Not only is that passage one long sentence, its subject, *any sanitary district*, appears in the first line while the verb—*is authorized*—does not appear until near the end. The qualifying phrases and clauses that intervene are enough to drown any reader. All the necessary information is there (as the writers of the statute might argue), but should readers have to work so hard to understand it?

The writers could have put the subject and verb together and listed the qualifiers in a bulleted list:

BETTER The board of trustees has resolved that any sanitary district formed under this chapter is authorized without district vote to borrow money and issue bonds, notes or other evidences of indebtedness to accomplish its objectives or to pay or refund its indebtedness for paying unnecessary expenses and liabilities incurred under this chapter. This resolution includes organizational and other necessary expenses and liabilities (whether incurred by the district, any municipality therein, or any person residing in unorganized territory within the district) as long as the expenses are for such things as

- acquiring properties, paying damages, laying sewers, drains and conduits, **constructing**, maintaining and operating sewage treatment plants or systems, and making renewals, additions, extensions, and improvements to these plants
- covering interest payments during construction periods

The district may issue the bonds or notes in one series or in separate series in whatever amounts, bearing whatever interest rates, and under whatever terms and provisions the trustees shall determine.

Now the statute is more understandable: one long sentence is divided into three, with subject and verb united in each; the parts are rearranged; and the qualifiers are set off in a bulleted list.

Creating similar problems, today's companies often label new products or processes with terms made up of long strings of nouns or adjectives: *industrial manufacturing deceleration system, Jumbo 1400 Internal Drive Tape Back-up Software, front suspension pivot bar support plate*, and so on. Although these lengthy terms precisely label the products and differentiate them from all others, they frustrate those who want readability and clarity in their documents. It's a challenge to work around noun and adjective strings if a meaning changes without each component word, but try to simplify where possible. Eliminating these strings is easier once you learn to recognize them. The following sentences are loaded with extra words—both nouns and adjective strings and strings of phrases and clauses. The edited versions illustrate ways to tackle these problems at the sentence level:

STRING	Renewal of the contract is conditional on the continued availability of state funds for this purpose and on the approval by the New York State Division of Budget.
EDITED	If state funds are available and approved by the New York State Division of Budget, we can renew the contract
STRING	This velocity mismatch is due to the inaccuracies in the measurement of the initial velocity and the inaccuracies in accelerating the actuator system to the speed of the pallet at the precise moment of contact.
EDITED	This velocity mismatch occurred because of inaccuracies in measuring the velocity and accelerating the actuator system to the pallet's speed at the precise moment of contact.

Narrative Structure Even in technical writing, readers expect material to be organized in a way they understand: in other words, to have a "plot." To establish **narrative structure** in your sentences, order the information so that it parallels the way someone might tell a good story: the characters and setting are established first, and then the storyteller explains what happens to them. Similarly, in your writing make clear first what the focus is of each sentence and then what you want to explain

about it. Remember that each sentence is a miniature story, and ask yourself, "Whose story is it?" and "What's the plot?" You can organize the information by putting whoever (or whatever) it is first and the plot second. For example, notice how the emphasis shifts as the organization shifts in these sentences:

Miss Grundy taught me grammar.

I learned grammar from Miss Grundy.

Grammar I learned from Miss Grundy.

In the first example, the focus is Miss Grundy. She is the important element and appears first in the sentence. The plot—or what the writer wants to say about Miss Grundy—appears in the second part of the sentence: "taught me grammar." The next example emphasizes "I"; Miss Grundy becomes the plot, not the focus. And the third example focuses on grammar, relegating "I" and "Miss Grundy" to the plot position.

As these examples illustrate, creating emphasis in any kind of writing means putting whose story it is first and what happens to that person or thing second. When writers apply these principles to technical prose, their sentences become much more readable. We can see how this technique works on technical sentences by looking again at the example on page 112: "There may be a retardation of the metabolism of ethanol by the congeners so that it has stronger effect on the nervous system." Whose story is it? The *congeners*. What is the plot? *They retard the metabolism of ethanol*. By simply rearranging the information into this narrative order, you can revise the sentence to be much more readable:

The congeners may retard the metabolism of ethanol so that it affects the nervous system more strongly.

Using this simple method allows you to write prose that readers can follow easily. Take one more look at the congeners, this time in the paragraph in which their sentence occurs. The writer paid no attention to establishing narrative structure at the sentence level.

The effects reported in this study have one of two explanations. Either the congeners themselves have direct and permanent effects upon the central nervous system, or there may be a retardation of the metabolism of ethanol by the congeners so that it has a stronger effect. The probability of the latter is less, because the observation of the effects occurred well after the blood alcohol concentrations were immeasurably small.

It's pretty hard to discover what's going on in this prose. To try to clarify the meaning, first identify what you think are the important elements in the sentences (whose stories they are). It may take a couple of rereadings, but you'll probably agree that the stories in the three sentences belong, respectively, to "explanations," "congeners," and "the latter."

ORIGINAL The effects reported in this study have one of two explanations. Either the congeners themselves have direct and permanent effects upon the

central nervous system, or there may be a retardation of the metabolism of ethanol by the congeners so that it has a stronger effect. The probability of the latter is less, because the observation of the effects occurred well after the blood alcohol concentrations were immeasurably small.

Identifying these elements is a step in the right direction, but the paragraph still has problems. To gain greater readability and clarity, it needs to be revised with the plot lines emphasized.

REVISED We can explain our results in one of two ways. Either the congeners themselves directly or permanently affect the central nervous system, or the congeners retard the metabolism of ethanol so that it affects the nervous system more strongly. Retardation is less probable, though, because we observed the effects well after the blood alcohol concentrations were immeasurably small.

Now we can track definite narrative structure. The beginning of each sentence establishes focus (whose story it is), while the end of each sentence features the emphatic new information (the plot). Notice that the end of each sentence is the "stress position" where the writer puts the information he or she wants to emphasize most:

We can explain our results in one of two ways. Either the congeners themselves directly or permanently affect the central nervous system, or the congeners retard the metabolism of ethanol so that it affects the nervous system more strongly. Retardation is less probable, though, because we observed the effects well after the blood alcohol concentrations were immeasurably small.

Notice, too, that the revision has made the prose much more direct by naming the persons or things that are the focus of each sentence. A simple table illustrates how to establish sentence plot lines:

First Part of the Sentence	Second Part of the Sentence
Whose story is it?	What's the plot?
Focus	Explanation
Subject	Predicate

By following this narrative pattern, technical communicators can make their prose remarkably more readable without seeming overly simplistic.

Avoiding Agentless Prose

Another problem with technical writing is that it often emphasizes *things* more than *actions*. Most readers find such prose hard to navigate because people naturally respond better to sentences that are verb-driven and clearly identify the

persons and things that are acting—that is, the **agents**. For example, compare these two sentences:

It was found that information pertaining to the heat transfer experiment was not included in the report.

Ablex Company discovered that the scientists had not included information about the heat transfer experiment in their report.

Which one seems clearer? Which one packs more of a punch? Readers probably respond to the second sentence better because it includes clear agents (Ablex and the scientists) performing definite actions, whereas the first sentence is a mystery story—we don't know "who dun nit."

In most of the other reading they do, readers are used to seeing sentences that progress in this way: *agent* → *action* → *result*. They expect to read that somebody does something and causes something else to happen as a result. If you follow that pattern as often as possible when presenting technical information, your sentence structures will conform to reader expectations and be easier to read. For instance, in the following examples, each sentence in the first column does not follow reader expectations. Instead, the agent is buried somewhere deep in the sentence. Note how the revised sentences move the agents to the more natural—and more readable—position before the verb.

ORIGINAL The growth of *M. tuberculosis* is inhibited by streptomycin.

Revised Streptomycin inhibits the growth of *M. tuberculosis*.

ORIGINAL Once site preparation was complete, excavation was initiated on the trench or soil pit as directed by the site manager.

Revised The site manager directed the excavation of the trench and the soil pit once the site preparation was complete.

ORIGINAL The effects reported in this study have one or two explanations. [No agent is present.]

Revised We can explain our results one or two ways. [Writer has put agent in sentence.]

Passive Voice When you write "agentless" prose, you are probably overusing the passive voice, the primary cause of a style that keeps readers guessing about whose story it is. In **active** voice, the subject of the sentence *performs* the action; in **passive** voice, the subject *receives* the action. Here are examples:

Joe threw the ball.

The ball was thrown by Joe.

To recognize the passive voice:

1. Find the grammatical subject of your sentence.
2. Find the verb of your sentence.
3. Determine if the subject is performing the action of the verb.

4. If the subject is *acting*, then the verb is in the active voice.
5. If the subject is passively being acted on by some outside agent, the verb is in the passive voice.

Inexperienced writers mistake passive voice for the past tense and therefore try to remove all past tense verbs in their prose. Others believe that the passive voice is always incorrect and never use it. Both assumptions are wrong.

► **Tip:** *Sometimes writers use passive voice when they want to avoid responsibility. For example: "The air intake valve was inadvertently left open." Who left it open? Certainly nobody appearing in that sentence. Be sure to consider the implications of using the passive voice in this manner: will you raise more questions than you avoid?*

The passive voice is a grammatical structure that serves a real purpose: to emphasize the object and downplay the agent. If that is what you want to do, then the passive voice is an appropriate technique. For example, "The building was constructed of pre-stressed concrete and steel beams" is a better sentence than "The contractors constructed the building of pre-stressed concrete and steel beams" because *who* did the construction is not important at all.

But before taking that example as license to pepper your documents with passives, remember that readers respond much more readily to the active voice, and using the active voice makes your writing more direct. Only in certain circumstances does the passive work better than the active.

The examples below illustrate passive sentences edited to the active voice. Notice that editing from passive to active often means that you must provide the *name* or *identity* of the agent in the revised sentence:

PASSIVE	The flow rate will be regulated by the air pumps and flow meters.
ACTIVE	Air pumps and flow meters will regulate the flow rate.
PASSIVE	It is estimated that testing will require one to two weeks, and it is anticipated that evidence of biodegradation will appear after a maximum of two weeks of testing.
ACTIVE	Ablex Co. estimates that testing will require one to two weeks, and we anticipate that evidence of biodegradation will appear after a maximum of two weeks of testing.
PASSIVE	Concepts and issues were identified for an initial staff questionnaire from reviews and field site visits.
ACTIVE	The supervisor identified concepts and issues for an initial staff questionnaire from reviews and field site visits.

Using an Appropriate Tone

When you speak, your tone of voice, gestures, and facial expressions create an impression on your listeners. Written words convey a **tone** as well, although readers gather their impressions from the words you choose rather than from gestures and

facial expressions—which they cannot see. Understanding how to control the tone of your prose is key to making good impressions on your readers. When you write technical documents, an appropriate tone matches the purpose of your document and the audience for which it is intended.

Standard English A country as diverse as the United States naturally encompasses varied subcultures with their own rich and vital vocabularies, such as the dialects of many African Americans and Hawaiians or the technical slang of computer hackers. The common language that brings all speakers together is standard English, usually defined as the English expected and used by educated readers and writers. Standard English is "standard" not because it is better than other forms of English but because it is accepted as the common language, much as dimes and quarters are accepted as the common currency. Standard English allows diverse people to communicate.

In situations calling for standard English, including most technical and business writing, you should use some specialized vocabularies cautiously, as when aiming for a particular effect with an audience you know will appreciate it. You should entirely avoid some other vocabularies, especially those expressing prejudice, out of consideration for your readers' feelings. (See Guidelines: Avoiding Inappropriate Labels.)

Sexist Language Sexist language distinguishes needlessly between men and women in such matters as occupation, ability, behavior, temperament, and maturity. It can wound or irritate readers and indicates the writer's thoughtlessness or biases. See Guidelines: Avoiding Sexist Language to help you eliminate sexist language from your writing.

GUIDELINES **Avoiding Inappropriate Labels**

Labels for groups of people can be shorthand stereotypes and can be discourteous when they ignore readers' preferences. Although sometimes dismissed as "political correctness," sensitivity in applying labels hurts no one and helps gain your readers' trust and respect.

- Avoid labels that (intentionally or not) disparage the person or group you refer to. Always focus on the person rather than the disability: a person with emotional problems, not a *mental patient*, a person with cancer, not a *cancer victim*; a person using a wheelchair, not *wheelchair-bound*.
- Use names for racial, ethnic, or other groups that reflect the preferences of each group's members, or at least many of them. Examples of current preferences include *African American* or *black*, *Latino/Latina* (for Americans of Spanish-speaking descent), and *disabled* (rather than *handicapped*). But labels change often. To learn how a group's members wish to be labeled, ask them directly, attend to usage in reputable periodicals, or check a recent dictionary.

GUIDELINES Avoiding Sexist Language

- Avoid demeaning and patronizing **language**—for instance, identifying women and men differently or trivializing either gender.

Sexist

The consulting scientists are Dr. Mark Liddell, Mr. James CDDney, and Kathy Porter.

REVISED

The consulting scientists are Dr. Mark Liddell, Mr. James Cooney, and *Dr. Kathy Porter*.

SEXIST

Ladies are entering almost every occupation formerly filled by men.

REVISED

Women are entering almost every occupation formerly filled by men.

- Avoid occupational or social stereotypes, assuming that a role or profession is exclusively male or female.

Sexist

The considerate doctor commends a nurse when she provides his patients with good care.

REVISED

The considerate doctor commends a nurse *who provides good care for patients*.

- Avoid using *man* or words containing *man* to refer to all human beings. Some alternatives:

businessman	businessperson, business executive
chairman	chair, chairperson
congressman	representative in Congress, legislator, member of Congress
craftsman	craftsperson, artisan
layman	layperson
mailman	mail or letter carrier
mankind	humankind, humanity, human beings, people
manpower	personnel, human resources
policeman	police officer
salesman	salesperson, sales representative

SEXIST

Man has not reached the limits of social justice.

REVISED

Humankind [or *Humanity*] has not reached the limits of social justice.

SEXIST

The equipment contains man-made materials.

REVISED

The equipment contains *synthetic* materials.

- Avoid using */?eto* to refer to both genders.

Sexist

Everyone brought his own lunch. [Some members of the group are women.]

REVISED

All the employees brought *their* own lunches. (Use of the plural avoids agreement problems and maintains unbiased language.)

Sexist

The manager insisted that everybody on the project team carry his professional license while on site. [Some of the team members are women.]

continued

Guidelines **Avoiding Sexist language**, *continued*

INCORRECTLY	The manager insisted that <i>everybody</i> on the project team carry <i>their</i> license while on site. [The plural pronoun <i>their</i> does not agree with the singular pronoun <i>everybody</i>]
REVISED	
CORRECTLY	The manager insisted that everybody on the project team carry a professional license while on site. [Substitute a for the pronoun or say <i>his</i> or <i>her</i> license.]
REVISED	

Levels of Formality Different types of documents require different **levels of formality**. Just as the dress code for some social occasions is "black tie" and for others is "come as you are," some writing situations may call for great formality while others do not. When sending an e-mail to a colleague, for example, you may write more casually than when preparing a report for your supervisor or a proposal for a potential client or a funding agency.

In any writing situation, a good rule of thumb is to think of your writing as a conversation with an intelligent person who speaks well and expects you to do the same. This middle ground between stiff formality and excessive informality is almost always appropriate.

For example, note how the following two sentences are at either extreme of the formality scale—and both are inappropriate for a technical document:

- Too **FORMAL** The rules, policies, and procedures established by this Policies and Procedures Memorandum (PPM) are intended to afford full opportunity for effective public participation in the consideration of highway location and design proposals by highway departments prior to submission to the Federal Highway Administration for approval.
- Too **NORMAL** This PPM sets it up so that folks will get a chance to have their say on the matter of highway location and design.
- REVISED This Policy and Procedures Memorandum ensures that the public will be allowed to participate in considering highway location and design proposals before these proposals are approved by the Federal Highway Administration.

Contractions Contractions are almost always inappropriate in formal professional documents such as reports, proposals, and manuals because they create a breezy tone. Although you may use an occasional contraction in letters to readers you know personally, it is generally prudent to avoid them in technical writing.

- Too **INFORMAL** The new computer system *doesn't* function properly.
- REVISED The new computer system *does not* function properly.

Jargon Jargon is the insider language used by a group, such as computer programmers or hackers, to reflect common experiences and to make technical references efficient. The following example might be overheard in a group of Internet surfers:

The sysop needs to watch out for the lurkers and flamers on this chat thread.

As we become increasingly accustomed to communicating online, it may be tempting in more formal documents to use the acronyms that pepper online conversations:

GR8! GIWIST. I'm ROTFL! You're ROTM. TANSTAAFL. TYVM for the insight.

[**Translation:** Great! Gee, I wish I said that. I'm rolling on the floor laughing! You're right on the money. There ain't no such thing as a free lunch. Thank you very much for the insight.]

Though valuable within a group, slang is often too private or imprecise for academic or business writing.

Colloquial Language **Colloquial** language is the everyday spoken language, including expressions such as *get together*, *go crazy*, and *do the dirty work*. It is labeled "informal" or "colloquial" in your dictionary.

Colloquial language suits informal writing, and an occasional colloquial word can help you achieve a desired emphasis in otherwise formal writing. But most colloquial language is not precise enough for technical writing.

At first, following these guidelines for creating a readable style may seem difficult, but with practice these techniques become second nature—and your prose improves dramatically. Once you have mastered these methods, the rest of your editing task becomes much easier.

Controlling Wordiness

In most documents suffering from wordiness, writers either use unnecessarily complex terms or phrases, or add meaningless qualifiers to pad sentences. There is no magic formula for eliminating unnecessary words, but the following examples illustrate some specifics to watch for.

Unnecessary Large Words

Writers often think that if a simple word is good, a more complex word is better. Some writers even believe that using large words is impressive and makes them seem more professional and competent. Actually, the most impressive writing conveys meaning with the simplest words possible. Use large words judiciously and only when they are the best way to express your meaning. The following list is merely representative, but it is a good place to start when you are editing unnecessary words out of your prose.

Large Words

activate
 administrate (not a real word)
 alleviate
 apprise
 ascertain
 attempt
 cognizant of
 contingent upon
 deem
 demonstrate
 discontinue
 endeavor
 elucidate
 employ
 eventuate
 fabricate
 facilitate
 initiate
 mitigate
 modification
 numerous
 optimum
 orientate (not a real word)
 prior
 requirement
 remediate
 render
 strategical (not a real word)
 subsequent
 sufficient
 terminate
 transmit
 transpire
 utilize
 utilization

Simple Words

begin, start
 administer
 lessen, ease
 inform
 learn, make certain
 try _____
 aware of
 depends on
 think
 show
 stop
 try _____
 explain
 use
 happen, result in
 make
 aid, help, assist
 begin, start
 relieve, lessen
 change
 many
 best
 orient
 before, earlier
 need
 remedy
 make
 strategic
 after, following
 enough
 end
 send
 happen
 use
 use

Unnecessary Phrases

When writers are lazy or pressed for time, they tend to write "pre-fab" phrases instead of searching for the one word that will convey meaning efficiently. Much of this problem comes from imitation: we hear phrases used over and over and we insert them in our own prose without thinking. Such lazy writing results in hackneyed phrases that clutter prose and hinder readability. Here's a list of some of these phrases, paired with their more efficient counterparts:

Unnecessary Phrase	More Efficient Word
are designed to be	are
as a consequence of	because
at the present time	now
based on the fact that	because
by means of	by, with
consensus of opinion	consensus
despite the fact that	although
due to the fact that	because
during the course of	while
during the time that	while
end result	result
fewer in number	fewer
for the purpose of	for
has the capability of	can
in all cases	always
in close proximity	near
in conjunction with	with
in order to	to
in some instances	sometimes
in the event that	if
in the near future	soon
in the vicinity of	near
involve the use of	use
it appears that	apparently
it is clear that	clearly
it is evident that	evidently
it is obvious that	obviously
on a daily basis	daily
serves the function of	is
take into consideration	consider

Meaningless Qualifiers

A **qualifier** is a word (usually an adjective or an adverb) that modifies the meaning of another word in a sentence: "Professor Thompkins is *invariably* late for class." But some qualifiers add nothing to the meaning of a sentence; they are either vague (and thus meaningless) or obvious (and thus should not be included). Here are some typical offenders:

appropriate, suitable

References will be obtained from an appropriate library.

[Are you likely to obtain them from an inappropriate library?]

relatively

This source of pollution is relatively unimportant.

[This sentence is meaningless unless you specify relative to what.]

somewhat, more or less

The stratification was somewhat reduced.

[How much less than "reduced" is "somewhat reduced"?)

very, really

The experiment was really successful.

(How much more than successful was the experiment?)

Writing Smooth Transitions

Another important aspect of a readable style is that it enables readers to move through the information with little effort. Smooth transitions make logical links seem natural as the writer leads readers from sentence to sentence, paragraph to paragraph. As Chapter 3 explains, achieving coherence in technical prose depends on linking each sentence to the ones before and after it to establish a line of thought uninterrupted by gaps in logic. In almost all effective writing, writers use three techniques to create this seamless prose: (1) explicit transitions, (2) implicit transitions, and (3) the given/new principle.

Explicit Transitions

Explicit transitions are those words that shout their function: HOWEVER, THEREFORE, NONETHELESS, ALSO, and so on. They can be single words or short phrases, such as "in conclusion," "on the other hand," "First . . . second . . . third," and "for example." You use these words in your sentences to signal readers that you are making a link between what you are saying and what you are going to say. Although these explicit connectors usually work well, it is possible to overuse them or to use them inappropriately. As a result, some documents have so many

explicit transitions at the beginnings of their sentences that the prose is redundant, hard to read, and almost comical:

In conclusion, we chose the cycle design because it is constructed with steel, aluminum, and wood. These materials are readily available and keep the cost to a minimum. Finally, the construction of the cycle design is less complex than the other designs considered. For example, the other four designs are much more elaborate and require various moving parts such as gears and/or levers. Obviously, these designs are hard to manufacture, particularly by nontechnical builders. More importantly, the other designs are very costly, unsafe, and require continued maintenance. For example, gears are expensive to buy, and they are heavy and require frequent lubrication. Also, levers are not safe.

When you use explicit transitions to connect your ideas, make sure you think carefully about how to use them well, and don't overdo the technique.

Implicit Transitions

A primary connector used by more sophisticated writers is the **implicit transition**—a connection made through meaning rather than the use of an explicit linking word or phrase.

EXAMPLE A major problem with levers is safety. Because the levers are at eye level, the operators' eyes are often in danger if they slip or are **inadvertently** pushed from behind.

What happens if you try to link them with an *explicit* transitional device—by beginning the second sentence with "For example"? You'll probably agree that the resulting sentence sounds amateurish. But what is the link between these sentences? It is the unstated but **implicit** connection between "safety" in the first sentence and "danger" in the second, a connection that doesn't seem contrived or heavy-handed and is easy to follow.

EXAMPLE The relationship of *Homo sapiens* to the other animals is one of unremitting exploitation. We employ their work; we eat and wear them. ("Exploitation" is followed by examples of it.)

EXAMPLE Considerable publicity and misinformation has surrounded isolated incidents of mistreatment of laboratory animals. Along with the general public, research scientists are appalled by such abuse whether in scientific, industrial, or spoils environments. ("Mistreatment" is followed by "appalled by such abuse.")

EXAMPLE Our CEO and the vice presidents have a movable **administration**. They take their show on the road at every opportunity. ("Movable" is followed by "take their show on the road.")

The Given/New Principle

Another method of linking sentences and ideas is the given/new principle: The writer begins a sentence with information readers already know and ends with information that's new for them. The sentence after that begins with the idea at the end of the previous sentence and closes with new information about it.

EXAMPLE We analyzed the exiting flow by using a microphone and a hot film anemometer in tandem with an oscilloscope that displays the frequency and the magnitude of the exiting flow velocity. These frequency readings are close to the predicted Helmholtz frequency.

Note how the writer ended the first sentence with the idea of frequency readings, began the next sentence with a reference to these readings, and ended with new material about the Helmholtz frequency.

This pattern works well to link complex information clearly and to create appropriate emphasis at the end of each sentence. (Remember, the end is the "stress position" or point of emphasis where material gets the most attention.)

EXAMP As discussed in detail in the Phase I Final Report, Kirchhoff analysis can predict several key features of scattering/emission performance, even though the precise effects of diffractive shadowing, multiple scattering, and fractal patterns are not completely understood. These problematic processes seem to be of secondary scale and only account for enhancement of the desired absorption band.

The given/new principle allows you to link ideas in a clearly linear fashion, but it can also result in overuse of the passive voice. For instance, "To confirm the accuracy of this procedure, an AlGaAs/GaAs (ALE) sandwich structure was deposited with a GaAs thickness of 50000Å. The thickness of the ALE film was then determined by selectively etching a step on a photolithographically masked wafer."

For each transition that you choose—whether explicit, implicit, or the given/new principle—try to weave connections between your sentences in a pattern that seems logical and forceful. It's difficult to get lost in sentences that interlock properly. Smooth transitions contribute significantly to clarity.

Pacing

A discussion of transitions leads naturally to another element of readability: pacing. Readable documents work well not only because their individual sentences connect smoothly, but also because the writer has paid attention to the rhythm of each sentence. Writers of technical documents are often so concerned with listing facts that they forget that readers need variety in the way the material is presented. Consider the following:

The collapsible bicycle is a combination of full-size bicycle components and a revolutionary folding technique. The bicycle's overall dimensions are 43¼ inches in

length by 28½ inches high by 17½ inches wide. The bicycle consists of all the typical components found on the average bike. This bicycle also has other components associated with its folding design. These unique components include the major hinge and the adjustable cross member. This bicycle is built around the rear triangle. The triangle's overall dimensions are 10% inches high by 11 ½ inches long by 6 inches wide. The triangle holds the drive train which consists of the crank, rear and front sprockets, and the chain. The crank arms are 5 inches long and the overall width is 6 inches. The front sprocket is 6 inches in diameter and the rear sprocket is 1 ½ inches wide. Items attached to the triangle are the seat post and the major hinge.

Any reader will tire of this prose quickly. It lacks variety, creating a redundant pace that makes even the most straightforward material hard to read. Sentences, like music, have timing and phrasing that work together to produce a rhythm that helps pace reading. If the sentences are all the same length or repeat the same structural patterns, the resulting pace is monotonous and irritating. To help readers follow your prose easily, be sensitive to the rhythms of your sentences. If they are all the same, your reader will be bored. When you edit your documents, remember that variety goes a long way toward keeping a reader's attention.

Varying Sentence Lengths

The length of your sentences can make a big difference in the effect of your writing. A series of short sentences keeps the reader on edge; longer sentences invite readers to settle in and take the time to absorb a large amount of information at once. You can recognize the potential for danger without even seeing words themselves. What would be the effect of the following pattern?

Most people would find such prose difficult to read because it looks sketchy and has a short, choppy rhythm, and a pace that is entirely too clipped. The sentences are almost all the same length, creating a monotonous—almost hypnotic—pattern. Now visualize the opposite extreme:

Obviously, the pace here is too slow. Readers resist having to wade through long sentences to understand the paragraph. When encountering a paragraph structured this way, readers usually find an excuse to either skim the headings (if there are any) or skip it altogether.

Now take a look at examples with words:

PACE TOO QUICK The operating point is maintained as near as possible to the peak performance. This is done by constantly lubricating the gears. The gears are of the photoelastic type. It is interesting to note that they have a distinct performance advantage over the standard metal type. Also they require less oil. This is true even when the cooling system has failed.

PACE TOO SLOW The fundamental concept of this proposal is the development of long wave length infrared detector (LWIR) arrays using GaAs-GaAlAs multi-quantum-well (MQW) photoconductive structures grown in a nearly vertical superlattice (NVSL) configuration, where the hetero-interfaces are nearly perpendicular to the surface of the wafer. These geometrical considerations are necessitated by the fact that the multiple quantum wells only function as infrared detectors for illumination in the plane of the superlattice interfaces. This arrangement permits the fabrication of LWIR GaAs-GaAlAs MQW detectors which function with infrared radiation having near-normal incidence to the wafer surface, allowing for easy fabrication of many-element arrays and monolithic integration of detectors with other GaAs-based signal-processing components.

Though their paces are at different extremes, both examples are guaranteed to frustrate readers. As you write, check your sentences to make sure you vary the lengths and don't fall into either of the above patterns. Here's an example of a paragraph that *is* paced well:

GOOD PACING Some executives see no clear economic justification for getting involved, either as child-care providers via arrangements with independent agencies, or through other assistance such as modified work schedules. They are skeptical; productivity and other gains are difficult to prove. They are also concerned about potential problems: costs, complex insurance arrangements, obligations incurred by referrals, parental complaints, quality control, and equity issues. Actually, many such concerns or fears are unfounded. Costs for getting involved vary widely—some are remarkably low. Many companies merely subsidize existing child-care costs (direct or allocated) that are in some way tax deductible or expensed. Several states offer special tax credits for employers who provide certain kinds of help.

Varying Sentence Beginnings

Just as sentence lengths create a rhythm to your prose, so does the way sentences begin. For instance, if you begin every sentence with its subject followed by the verb and use no transitional links to previous sentences, your writing may seem to hammer home your point, but it may also pound an unwelcome rhythm into the reader's head. Each sentence probably seems choppy because it is an isolated unit. For instance:

CHOPPY The third part of our exhibit is designed to display gear stresses. It consists of two static gears constructed of clear polyester, a photoelastic material. The gears are loaded and the resultant stress field in the teeth is visible through a circular polariscope as interference fringes. This display shows the gear tooth stresses and the magnitude of the stress. This part of the exhibit also features variable center distance in order to view the changes in stress concentration as center distance changes. Our photoelastic gear display also satisfies the design objective of determining gear tooth stress in a cost-effective manner.

In this paragraph, every sentence begins with the grammatical subject followed closely by the verb. Even though the sentence lengths are varied, notice how clipped the rhythm is because of this redundant structure. To fix this problem, begin your sentences in a variety of ways: prepositional phrases, dependent clauses, adverbs, and so on. When mixed with these other patterns, the occasional sentence that begins with subject-verb works well:

SMOOTHER The third part of our exhibit displays gear stresses. Consisting of two static gears constructed of clear polyester, a photoelastic material, the loaded gears display a visible stress field when viewed through a circular polariscope. Through the polariscope, both the gear tooth stress and its magnitude are clear. Additionally, the exhibit shows variable center distance, so we can see how the stress concentrations change as the center distance changes. Along with the other parts of our exhibit, these displays satisfy the design objective of determining gear tooth stress in a cost-effective manner.

If you pay attention to the pacing of your prose and vary sentence lengths and beginnings, readers will not be lulled into drowsiness by unnecessary repetition or irritated by unpleasant rhythms.

Considering the Ethics of Style

As a technical communicator, you will invariably face ethical dilemmas—moral choices you must make as you communicate information. In most classroom discussions of style for technical documents, the advice is to be as clear and as direct as possible. In theory, this is sound advice, but it may cause confusion for writers in

GUIDELINES Making Ethical Choices

- Never suppress knowledge or data. *Examples:* not disclosing known safety hazards; relegating unfavorable information to a footnote or an appendix where it is less likely to be seen; "misplacing" negative data so they don't make it into the report.
- Never exaggerate claims or favorable **data**. *Examples:* guaranteeing the absolute success of a product or service; making false claims about the accessibility of a work environment to disabled people; promising employees significant raises every year.
- Always give your readers a clear understanding of what the information means. *Examples:* providing the repair record of a product in a comparative list with the records of similar products; stating employee benefits with specific examples; offering a broad spectrum of examples of clients who have purchased a product or service.
- Always respect copyrighted information. *Examples:* taking other people's writing and incorporating it into your documents without giving credit; photocopying and distributing copyrighted material without permission; downloading graphics or prose from the Web and importing it into your own documents without permission.

the workplace who know that to state information directly in certain situations may cause problems. Pressure from clients and from corporate management may cause you to question whether direct, honest writing is to your benefit.

The stylistic techniques given in this chapter and elsewhere in this book are the preferred **guidelines** for technical communicators, but you must apply them at your own discretion. If you feel the situation requires you to finesse the rhetoric to achieve results, you must decide for yourself what to do. There is no sure rule that applies to such situations, but the wisest course is always to follow **Guidelines: Making Ethical Choices**. (See Chapter 8 for a more detailed discussion of ethics.)

Tips for International Communication

Editing for style in documents intended for international audiences can be a difficult task because different languages have vastly different word orders and reader expectations. In *An Introduction to Language*, Victoria Fromkin and Robert Rodman discuss this problem:

We find in all languages that sentences contain a noun-phrase subject (S), a verb or predicate (V), and possibly a noun-phrase object (O). In some languages the basic or "preferred" order of these elements is subject-verb-object (SVO). Many familiar languages, such as French, Spanish, German, and English are examples. Other languages, such as Japanese and Korean, have the preferred order subject-object-verb (SOV).

GUIDELINES Writing for International Audiences

- Use short sentences. Shorter lengths are easier for non-native readers to understand.
- Use frequent transition phrases. The more you can show the connection between concepts, the better.
- Avoid redundancy. Unnecessary words provide more opportunities for misreading.
- Avoid informal style. In some countries, certain uses of the pronoun "you" may seem too informal.
- Avoid jargon. If you must use technical jargon, include a glossary.
- Avoid humor. Humor is almost always culture-bound and difficult to translate; puns, in particular, do not travel well.
- Use metaphors, similes, and analogies with caution. Some of these language structures depend on culture-specific knowledge. They are useful tools for technical communicators, but consider their global appeal before using them.
- Keep acronyms to a minimum. Remember that different languages have different word orders and your acronyms may not match your readers' expectations.
- « Avoid contractions. Such abbreviated language often causes confusion for non-native readers.
- Use figures for numbers. Figures are international; spelled-out numbers are not.
- Spell out months in dates. Don't use the abbreviated number form—for example, 2/4/01—because different cultures use different orders for days, months, and years.
- Make sure headings and figure captions are globally understandable. Don't use telescopic English—short, cryptic descriptions or abbreviated names—because your readers may not be able to decipher what it means.

When you are writing in English for non-native speakers, you need to keep these expectations in mind and write as simply and as directly as possible to accommodate readers who may not only have difficulty understanding the foreign words you're using but also have trouble following a different word order. If you are writing a document in English that will be translated into other languages, you can make the translator's job easier by using certain stylistic patterns especially for translation. For example, using sentences that feature subject-verb-object patterns makes translation easier.

Unfortunately, there are no absolute rules to help you with these stylistic patterns; see the Guidelines in the next section for general ones.

Simplified Languages

Companies or other organizations whose information is frequently translated often develop specific style guides for their technical English. These style patterns are

known as simplified languages or sometimes "controlled languages." Simplified languages usually have the following features in common:

- A limited vocabulary
- A dictionary specifying precise meanings of all the approved words
- Strict punctuation and syntax rules
- A review board that audits the use of the language and controls any revisions to it

The most widely known examples of simplified languages are AECMA Simplified English, developed by the aerospace industry for the writing of maintenance and service manuals; Standard Marine Navigation Vocabulary, created to enable navigators to communicate with each other; and Caterpillar Technical English, developed by the Caterpillar Tractor Company to facilitate translation of their manuals.

For more about cross-cultural communication, see Chapter 7.

Quick Review

Creating a readable style in technical documents is one of the hardest things for technical communicators to do because it requires craftsmanship at the microlevel. In the rush of business activity and deadlines, most writers concentrate on organization while letting the sentences tumble onto the page without much care. But sentences are the basic communication element of your writing. If the sentences don't make sense, neither will your document as a whole.

To edit your sentence-level style, keep the following guidelines in mind:

- Organize sentences along expected plot lines.
- Put the topic of the sentence first.
- Put the action of the sentence and the most important information second.
- Where possible, include agents before the verbs.
- Edit unnecessary nominalizations, the passive voice, and strings of qualifiers.
- Use the most efficient and direct language.
- Use effective transitions between sentences.
- Check the pace of your prose; vary sentence lengths and beginnings.
- Avoid sexist language,
- Use stylistic patterns suitable for easy translation.

Exercises

- i. Read each part of a document you have written out loud, listening for the *pace* of your prose. If you find yourself rushing to finish a long sentence before you run out of breath, perhaps the sentence is too long or could be punctuated better. If you hear your prose "inarching" in a staccato rhythm,

- then you may have used too many short sentences or too many sentences of similar structure. Remember that sentence variety is key to effective pacing.
2. Exchange your document with a classmate or a colleague. Ask that person to read a section of the document aloud to you so you can hear the words in a voice other than your own. What did you notice about the pacing of your prose? About the word choice? Were there places where the sentences seemed to be burdened with too many words? Was the tone harsh or sharp in some spots? Does the person reading the prose have any opinions as to where it became difficult to read? You should be able to collect some valuable information for revising your style from such an exercise. Return the favor by reading your colleague's work aloud.
 3. Take a relatively short section of a document you have written (a paragraph or two) and intentionally make the style difficult to read: turn all active voice into passive voice, create nominalizations at every opportunity, use strings of qualifiers, and add unnecessary words wherever you can. Then, once the style is as contorted as you can make it—but still grammatically correct—reverse the trend and revise prose to be as efficient and as readable as possible. When you have finished both steps, return to the original document section you chose and note the differences between it and the revised, efficient version. Are there differences? If so, is the new style more efficient than the original? Why or why not?



Community Action Project

Volunteer to edit written material for your company or a neighborhood organization. As you work, develop a set of style guidelines you can leave with the organization. Include in the guide specific writing standards so that any writer new to the organization will be able to write in the same style. For example, determine the circumstances when the passive voice is appropriate and give an example from the document; do the same for specific terminology, including what is acceptable as a "term of art" and what is unacceptable jargon; indicate when to use acronyms and abbreviations; give general tips on sentence patterns and usage. Make sure everyone in the organization understands the style guide and agrees with its specific standards.

Technology Challenge

By e-mail attachment, exchange a document you have written with a classmate or a colleague. Using editing software (or the tracking feature of your word processing package), edit the text and return it electronically to the author. Include an e-mail summary of your comments.

Collaborating on Writing Projects

Many writing projects are team efforts requiring collaboration with two or more people. To participate most effectively in collaborative projects, you need to understand *all* of the roles and processes that work together to make a team productive, even though you may be playing only one of the roles yourself. As you read this chapter, remember that if you learn to collaborate well, you have learned one of the most important techniques for writing in the professional world. Collaboration is the way work gets done today.

The Collaborative Process

As is true with most types of writing, collaborative writing is a process, not an event that happens all at once. Each team member must understand the many factors that affect the process and allow it to operate smoothly: the types of collaborative roles, as well as specific strategies for planning the project and techniques for working together.

Types of Collaborative Roles

When you approach a collaborative writing project, you should think about what role matches your strengths: individual contributor or manager. Individual contributors who work on the project are often specialized experts of the team and bring skills in defined areas to the project. These team members need to be able to work in concert with other people, to meet deadlines, and to listen carefully to others as well as to voice opinions in team meetings. Project managers may be less expert in specific areas but have skills in managing groups and in understanding the "big picture." Many project managers began as individual contributors, so they know the nuts and bolts of producing large documents and understand what it's like to be part of a writing team. Managers should be not only good writers but also

effective problem solvers. They need *experience*, *writing skill*, and the *ability to resolve conflict* (between people, schedules, budgets, and so forth).

The Individual Contributor

Individual contributors need to have specialized skills in their assigned areas of expertise, but they also need to be able to work well with others and be responsible for meeting the deadlines set by the project manager. One of the most desirable strengths of a team member is the ability to work for the good of the entire team, rather than pushing a narrow personal agenda. To be a good team member, you must understand the scope of the whole project and know how your contribution fits into the larger context, valuing your own piece and respecting the work others are contributing. For well-staffed writing projects, the individual team members will have well-defined roles such as:

- A minimum of one *writer* who generates the drafts and is responsible for revisions.
- An *editor* who works with the writer in developmental stages.
- A *designer* who supplies the graphics for the document.
- A *technical reviewer* who reviews the document for technical accuracy.
- A *production specialist* who prepares the document for printing.

► *Tip: All the members of the project team should have a statement in writing that defines each of their roles and responsibilities. Distributing this list of clear job descriptions prevents confusion and contributes to the openness of communication among the team members.*

Some project teams have more than one person in each of these capacities. In fact, project managers in large companies often develop multiple teams for each of these responsibilities. For example, if your project is operating on a large budget, you may want to create a planning and development team, a writing and editing team, and a review team. Dividing the group into these subunits focuses the effort, allowing each subteam to have a specified role and more people to participate in the document's development. Remember, however, that increasing the number of people increases the possibility for miscommunication. It's

essential to maintain clear communication with everyone involved throughout the life of the project.

Each project is really only as strong as its weakest member. It's important for every person working on the team to feel ownership of the whole project and feel the value of contributing to its ultimate success. The section Guidelines: Collaborating Effectively will help you to be an effective contributor, no matter what your role is on the team.

GUIDELINES Collaborating Effectively

- Be actively involved. Avoid the temptation to sit back and let the rest of the team carry you through the project. If you are genuinely interested and are giving your best effort, the project as a whole will benefit and you will learn more from participating.
- Don't be afraid to ask questions and express opinions. If you don't understand an issue or have reservations about an aspect of the project, speak up. For a team to work well, every member must understand and agree with the project's goals and methodology. During the planning stages and every step along the way, make it your responsibility to listen carefully, respect other opinions, and offer your own suggestions.
- Remain open to other ideas. Everyone has different ideas about how a project should look and how it should get done. The beauty of collaboration is that these different ideas encourage people to see various approaches and perspectives and find creative solutions to document problems. Although you may have always approached writing in one particular way, allow yourself the luxury of listening to other methods and ideas. If your team has a few people who are trying to impose their own methods on everyone else without really listening, gently remind them that everyone needs to have input and there is no one "right way" of completing the work.
- Be patient. As in any project where more than one person is involved, the frustration level can get high. Remember that people move at different speeds and think differently—and anger at such differences is usually a disruptive force, not a constructive one.
- Articulate problems. If you find you have a problem related to the schedule, information flow, or personalities, speak up and let the manager know before the problems become unmanageable.

V.

The Project Manager

Managing writing projects successfully is not an easy task. Not only do you need experience with the product and with the industry, you also need expertise in psychology and business. To be an effective writing project manager, you must play a number of roles simultaneously:

- *Visionary*: You need to conceptualize the project in its ideal end form. While others may view the project from the limited perspective of their particular job function, the manager must transcend the narrow focus and view the project as a whole.
- *Expert estimator*: You need to be able to estimate the scope of the project, including time, personnel, and budget, so you have a realistic sense of the necessary resources and can set reasonable deadlines for project completion. Project managers set the expectations for both their team and senior management—expectations that are the basis for resource allocation and corporate planning. Poor estimates guarantee frustration, as inadequate resources harm team morale and doom efforts for a high-quality product delivered on time.

- *Communicator:* You need to be able to communicate not only with your team members but also with senior management. Many times you will find yourself in the role of go-between when your team conflicts with senior management, or when senior management is reluctant to allocate resources to your team.
- *Coach:* You need to be able to guide others to achieve the quality standards envisioned for the product. You are the leader who must be engaged enthusiastically in the project and able to engender similar enthusiasm and care in your team members. You also have to keep them steadily on track toward meeting the project goals.
- *Advocate:* You need to let team members know that you not only manage them but also will go to bat for them at all levels of the organization for resources and reasonable requirements.

If you hope to be an effective project manager, you must work well with your team and with the necessary organizational hierarchy so that you can get things done as efficiently as possible. But it's important to remember to keep a balance among the many factions demanding your attention. If the balance tips too far in favor of one or the other, conflict is likely to arise and stall the project.

Phases of the Project

To collaborate better on writing projects, you first need to consider the general cycle for document development. Sometimes known as a project "life cycle," the four phases of document development are these:

- Planning
- Writing, usability testing, and editing
- Producing
- Conducting a postmortem

In general, you can expect to spend approximately 30 percent of your total project time on planning; 50 percent on writing, testing, and editing; 20 percent on producing; and 1 percent on conducting the postmortem. These figures may change, of course, depending on the nature of the specific project. (See Chapter 1 for more on planning.)

Writing, Usability Testing, and Editing Phase

During this phase of project development, the team members are busy writing sections of the document and the developmental editing process is in full swing. The manager's job is to track the document's progress, coordinate the team's efforts, and begin testing the initial drafts on real audiences. Once again, team members will spend a lot of time in meetings: project review meetings, team meetings,

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10

PLANNING A PROJECT

the planning phase is one of the busiest for the entire team. Whether you are working with a large group or coauthoring a project with one other person, it's important to begin the writing process by setting a planning meeting, dividing responsibilities, and developing a writing schedule.

1. **Brainstorm.** Get the team members together for a brainstorming session. It's a good idea to hold the meeting in a room that has blackboards, whiteboards, or flip charts so you can write down the ideas in a form that everyone can see. The objectives for this meeting are:
 - to agree on clear goals for the project
 - to allow everyone to have a say in formulating these goals
 - to establish individual members' responsibilities
 - to set a writing schedule
2. **Divide responsibilities.** If the team is large, the group may decide to assign parts of the document to various team members. You can accomplish this task in several ways: you can assign one person to do the research, one to do the writing, one to do the editing, and so forth. Or you can break each phase of the document development process into segments and assign everyone a task in each phase. For example, one person might be responsible for researching and writing the first **two** sections, another for researching and writing the next two, and still another for researching and writing the final sections. Editing the entire document would also be shared among the team members. No matter which method you choose, be sure to hold a team meeting when each phase is completed to share everyone's individual work with the whole group.
3. **Develop a schedule.** Be realistic about the length of time necessary to complete individual tasks and impress on everyone the need to meet the project milestones that the group sets. Usually, the milestones include research, writing, editing, and production—but keep in mind that editing occurs all along in the process, not just at the end. Keep in mind also that production always takes longer than you think it will. Build in sufficient "slip time" in the schedule.

negotiation meetings, and so on. They will also need to develop an effective vertical as well as horizontal communication system. That is, individual contributors need to report to the project manager and establish clear channels of communication among the team members themselves. Specific techniques for developing these channels are given later in this chapter (pp. 147-150).

Peer Editing One of the most common collaborative strategies—and one of the most useful—is peer editing, a process you may have first encountered in the classroom. When you are asked to look at another class member's work and suggest ways to improve it, you have an opportunity to provide valuable input, and you are also learning a technique that will be valuable to you in the workplace (see

Figure 6.1

Example of Peer Editing of a Document

Amphibians thrive in old-growth forest ecosystems with clean air and a mix of terrestrial and aquatic environments. Because they absorb and loose moisture through their skin, they are vulnerable to environmental degradation from pollutants and ultraviolet radiation. This makes them good indicator species of healthy ecosystems. Worldwide, amphibian populations have been declining. Through the Natural Resource Challenge, National Parks have begun to study amphibian populations to see if park populations are also at risk.

Handwritten annotations:
 - "SPELLING?" with an arrow pointing to "loose"
 - "WHAT?" with an arrow pointing to "This makes them"
 - "GAD? How does this sentence connect to" with an arrow pointing to "This makes them"
 - "COR the previous" with an arrow pointing to "Worldwide, amphibian"
 - "THIS" with an arrow pointing to "good indicator species"
 - "CHARACT" with an arrow pointing to "populations have been declining"

Guidelines: Peer Editing). An added benefit of editing other people's writing is that it sharpens your ability to critique your own work. In the work environment, peer editing is designed to involve the whole team in a project, making sure that everyone in the group has a stake in the final product. Figure 6.1 shows an example of classroom peer editing.

In many ways, classroom collaboration is the same as collaborating in business and industry; even though you do not have the same corporate structures and job titles, many of the same problems arise. You can use the specialized classroom techniques discussed in this section and adapt the other techniques in this chapter to your company project as necessary. Not all of them will apply, but many will allow you to improve your teamwork and your final written product.

See Chapter 5 for more on editing and Chapter 9 for more on usability testing.

> **Tip:** Remember to allow enough time for the translation process. These translations will need to be edited and to go through several review cycles—over and above the initial document's development—to ensure accuracy and effective localization of content for the target countries (see Chapter 1, pp. 26-28).

Production Phase

The manager's job becomes easier at this stage. Once the document is ready for production, the primary concern is to locate the vendors and produce a detailed production sheet with all the typesetting and design specifications clearly marked. If your company uses in-house production people, this task is easy. The vendors are on site and are experienced with company projects and standards. If you need to contact external production companies, your job is more difficult because you must find vendors who have experience with such projects and who also can meet your project deadlines and

GUIDELINES **Peer Editing**

- Put yourself in the intended audience's **shoes**. To the extent possible, read the document as if you were the person for whom it's intended.
- Read the whole document through once before making comments on it. Getting a sense of the whole before commenting on the parts is essential for effective editing. Once you know what the entire document is about, it's easier for you to see how the parts succeed or fail in enhancing the whole.
- Ask the writer for a list of particular concerns about the document. Often the writer has questions about specific elements of the text, and it's helpful when editing to focus on those areas. A fresh pair of eyes may find the solution to a problem that the author can't see because of being too close to the material. Asking for a list of concerns also makes the editing process more of a productive dialogue than a critical monologue.
- Express your comments in the form of questions. Instead of saying definitively "Change this paragraph," ask the writer how the text will affect readers: "Will readers be confused here?" By using these "reader response" questions, your comments are easier for the writer to accept. They will be interpreted as suggestions rather than wholesale revisions of the prose. Remember that writers almost always have a lot of ego in their work, and that those egos bruise easily. Asking questions allows you to make your points gently but firmly (see again Figure 6.1).

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budgetary requirements. For documents that will be translated for international markets, you also need to supervise the translation process, making sure the content is accurately represented and localized for the target countries.

See Chapter 4 for more on designing.

Postmortem Phase

Document completion is not the end of the writing team's job. Conducting a postmortem on the project is the best way to learn from mistakes and successes. Once the document is out the door, effective managers call together their project teams and evaluate the experience. Depending on how detailed you want this step to be, you can conduct evaluations at several levels: the document itself (which requires you to get follow-up feedback from the intended audiences who are now using the document), the document development process, the team, the individual team members, and the manager. By doing these evaluations immediately after the project is finished, you have the best chance of planning for a more effective process next time.

Always be sure to get audience feedback about the final document. You can do so by implementing audience surveys, visiting customer sites, telephoning or meeting with customers to discuss the document, or conducting usability tests. (See Chapter 9 for more on usability testing.)

Tracking the Project

One of the manager's most important jobs is to track the project as it progresses through the phases of the development cycle. In some cases, managers are responsible for several projects at once, and keeping track of where each is at any given moment can be a daunting task. Nonetheless, for managers to be in control of the process, they must set up a system to keep informed about what's happening at each stage along the way.

Scheduling

Your first tracking step as a manager is to check the schedule given in the document specification. If the spec is a reasonable one, it should have regularly spaced milestones for completing important sections of the project. For example, the first major milestone might be to complete the first draft, the second to complete a developmental edit, the third to complete a second draft, and so on. To keep the document on this schedule and to make sure that everyone on the team is able to meet these milestones, set some interim deadlines between the major points in the schedule, as shown in Figure 6.2 (see p. 144).

At each of these interim deadlines, ask writers to have completed subportions of the task and review them with you. If part of the team falls behind with these smaller units of the project, you can adjust the schedule more easily than if you had waited until the major milestone—or you can find ways to help the writers to pick up the pace.

Progress Reports

One method for keeping informed of the document's progress is to require weekly progress reports from each team member. These reports should be in a standardized form—no random memos or hasty e-mails—that can be added to the project notebook and kept on file. It's a good idea to provide the forms for these weekly updates so your staff gives you complete information. Otherwise, you might get a partial update from one writer and a detailed report from another. The team members need to know what you expect, and you need to be firm in requiring these reports on time every week. Late reports don't keep you informed and in control of the project. Figure 6.3 (see p. 145) shows a possible format for a weekly progress report.

Meetings

Establish a regular schedule of meetings so your team members can discuss their progress and perhaps solve some of the problems that might lead to delays. Usually, project teams meet once a week as an entire group and then in subgroups (for graphic design, or for certain chapters, and so forth) between the weekly team meetings. As project manager, you should always attend the large-group meeting to keep yourself informed of the team's progress and to communicate pertinent information to the whole group. If the team has a sense of the entire project's

Figure 2

to work with interfaces a

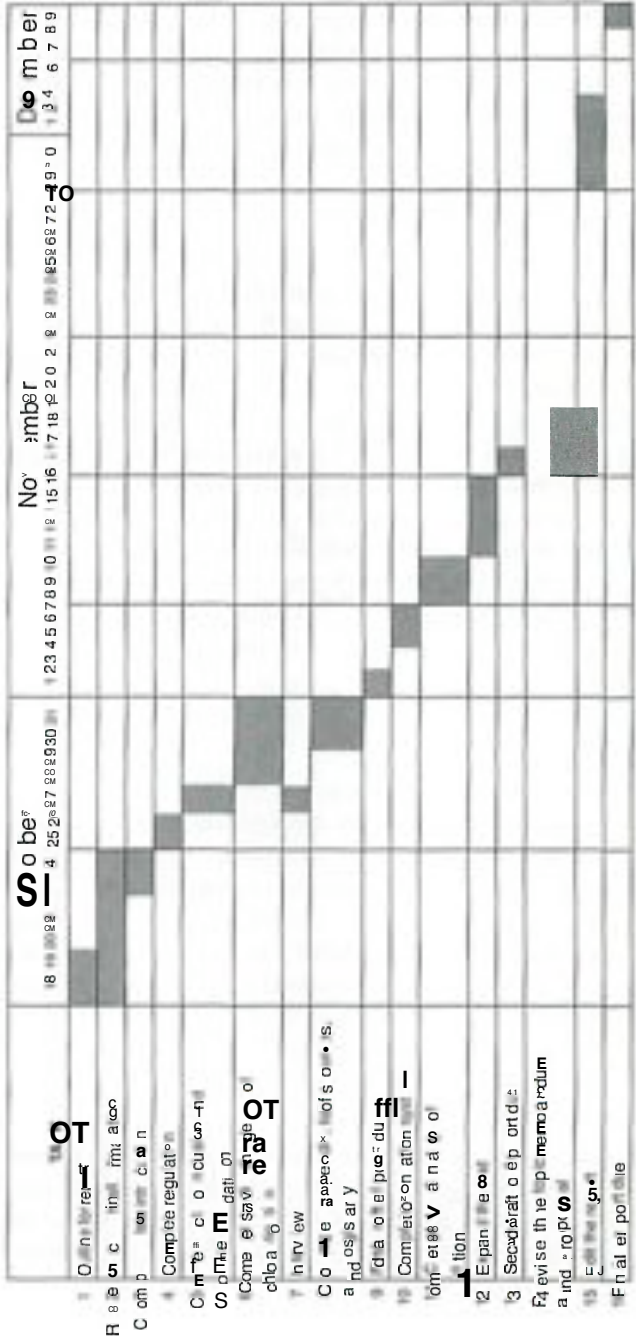


Figure 6.3

Weekly Progress Report Format

WEEKLY PROGRESS REPORT
Project Name: CLIENT SERVER PROPOSAL

To: G.K. Kelly, Manager

From: R.W. Barrow, Project Leader: Team 2

Date: 8-17-07

Document Specification Goals Scheduled

	<u>Goal Met</u>	<u>Goal Not Met</u>
1. Create project schedule	✓	
2. Complete audience analysis		✓
3. Define cross-functional team members	✓	
4. Assign writing tasks	✓	
5. Establish key themes		✓

Reasons for Not Meeting Goal:

Goal #2 - unable to contact sufficient key people

Goal #5 - cannot establish themes until audience analysis is completed

Plans for Meeting Goals: Scheduled meetings with clients next Tuesday (8/21) to complete Goal #2.

Goal #5 can then be completed by Thursday (8/23).

Tracking Hours: Planning - 20 hrs.
 (hours spent) e-mailing - 2 hrs.
 meeting - 6 hrs.
 writing - 10 hrs.

Comments: We should be able to catch up to the original schedule by the end of next week. I plan to assign two team members to the "Key Themes Goal."

progress, they're more able to understand how meeting individual deadlines supports the whole effort.

It's a good idea to attend some of the small-group meetings as well, although you may not always need to be at each small-group meeting. Sometimes having a manager present can be counterproductive as the group may not feel they can air their concerns or do their work quite as freely. If you have group leaders, you might want to meet with them after each of the unit's meetings. Arrange to attend enough of the small groups to maintain a presence and to keep as informed as possible without micromanaging.

Electronic Collaboration

In many situations today, project teams are composed of members from across the state, across the country, or across the globe. These teams can't meet in person to conduct business, but they can collaborate via electronic methods. Several techniques and technologies are available to facilitate such collaboration. You can circulate documents and ideas sequentially through e-mail; you can use sophisticated "groupware" software programs to circulate documents, both text and graphics, to the entire team simultaneously; you can create comment boxes within documents to show individual team members' suggestions for the text; you can use mark-up and comment software facilities to edit text; you can use teleconferencing systems to hold group telephone meetings and videoconferencing systems to allow participants to see and hear one another as well as share displays on computer screens. One easy way to collaborate electronically is by developing a Wiki. A Wiki is a quick way to create and share ideas through web pages that can be edited with only a web browser. (The name comes from a Hawaiian term that means "quick".) Just click the "edit page" link on a wiki page, and you can update information.

► **Tip:** *Some caution here: Many managers spend so much time writing reports and juggling reporting tools that they don't know what's going on with the actual project. The more time you're reporting, the less time you're spending with the people involved in the project. Be sure to visit with individual team members, chat in the halls, and keep your finger on the real pulse of the project.*

As the need for long-distance collaboration increases, so too do the sophisticated techniques for doing so. But whether you are working with others in person or electronically, the basic strategies for collaborating in teams are the same. Pay attention to the phases of the project (as noted in the previous section), and understand how each team member can best contribute to the process.

Using a Tracking Spreadsheet

As you collect information from the progress reports, the meetings, and the daily interactions you have with your team, it's a good idea to chart this material in a form where you can see the project's progress at a glance. Keeping a spreadsheet of where the document is in the development cycle at any given moment allows you to visualize as

well as conceptualize the project's status. You may want to keep this spreadsheet on your computer, where you can update it easily, but it's important also to post it on a wall, where you can see all of the information simultaneously—and where the team members can keep updated, too. Anyone coming into your office, if that's where you choose to post the spreadsheet, can take a look at the project's progress and see how all the parts fit together. Figure 6.4 illustrates a project-tracking spreadsheet.

► *Tip: AM projects need some built-in "slip time." Smart managers anticipate changes to the project schedule, no matter how carefully they have planned, and plan ahead for managing these changes. Anytime such a change occurs, be sure to inform everyone involved on the team, and distribute change updates weekly—or when necessary.*

The Project Notebook (Project Central)

As mentioned earlier in this chapter, the most important tool for tracking documents is the **project notebook**—or "project central." This book is where you organize every scrap of information about the project: the progress reports, the weekly versions of the tracking spreadsheet, memos, e-mail, the telephone log, and notes of conversations pertaining to the document. It's essential to keep the notebook well organized and up-to-date—a disorganized and outdated project book is likely to reflect sloppy management and a sloppy project. At least once a week, sit down and organize the week's information for your own reference and for factual support should you need to justify the decisions you make or to explain project delays or

cost overruns. The notebook also serves as a resource in planning future projects. It provides 20/20 hindsight for you or other project managers who can look at the history of this project and learn from its successes and problems.

Establishing Effective Communication

Projects run more smoothly when there is a spirit of open communication among team members and between the team and the manager. That happens when communication lines are clearly defined and open and when teams learn techniques for making their meetings efficient and productive.

Vertical and Horizontal Communication Networks

It's important for teams to establish horizontal and vertical communication networks to encourage constant feedback and understanding, breaking down potential barriers caused by lack of information.

Vertical Communication Team members need to be assured that they can communicate their ideas and concerns directly to the project manager. If you are

Figure 6.4

Project-Tracking Spreadsheet

MONTH: January PROJECT: HiTek 2004	Projected Schedule 1/1-1/8	Projected 1/9-1/16	Projected 1/17-1/24	Projected 1/25-2/1
Writer 1: C. Doherty	Revision	Draft 2.0 Chs. 1-3	Revision	Final Draft Chs. 1-3
Writer 2: L. Gomez	Draft 1.0 Chs. 4-6	Revision	Draft 2.0 Chs. 4-6	Revision
Editor: K. Jones	Edit Draft 1.0 Chs. 1-3	Edit Draft 1.0 Chs. 4-6	Edit Draft 2.0 Chs. 1-3	Edit Draft 2.0 Chs. 4-6
Illustrator: C. Fralick	Meet with project team	Draft 1.0 Art, Chs. 1-6	Revision	Draft 2.0 Art, Chs. 1-6
Production: W. McNeil	Meet with project team	Develop Draft Templates Chs. 1-6	Revision	Finalize Templates Chs. 1-6
	Actual 1/1-1/8	Actual 1/9-1/16	Actual 1/17-1/24	Actual 1/25-2/1
Writer 1: C. Doherty	Revision	Revision	Draft 2.0 Chs. 1-3	Revision
Writer 2: L. Gomez	Draft 1.0 Chs. 4-6	Revision	Draft 2.0 Chs. 4-6	Revision
Editor: K. Jones	Edit Draft 1.0 Chs. 1-3	Edit Draft 1.0 Chs. 1-3 Chs. 4-6	—	Edit Draft 2.0 Chs. 1-3 Chs. 4-6
Illustrator: C. Fralick	Meet with project team	—	Draft 1.0 Art, Chs. 1-6	Revision
Production: W. McNeil	Meet with project team	Develop Draft Templates Chs. 1-6	Revision	Revision

the project manager, you can set up several channels to foster open communication with the team:

- Assure all team members that you value talking with them. Prove it by getting out there and talking with them.
- Encourage team members to speak with you in your office in small groups or alone.
- Encourage team members to send you e-mail messages, and respond to them conscientiously.
- Schedule team meetings regularly.
- Ask for written progress reports weekly.

Horizontal Communication Individual team members should feel comfortable sharing information with each other. Too often, the left hand doesn't know what the right hand is doing. While the project manager is the one whose job it is to know what's going on in all facets of the project, team members should be aware of the status of the project and should know where to get specific information if they need it. If a team doesn't communicate well within its own ranks, its members are unlikely to share a common sense of purpose about the project—and this in turn reduces their ability to collaborate. To foster horizontal communication among team members, effective teams should try the following techniques:

- Circulate weekly project status reports to all team members.
- Schedule team meetings regularly.
- Publish job descriptions for each team member and list accompanying responsibilities.
- * Schedule focus groups and live chat sessions to discuss problems pertaining to the project.
- Encourage interdepartmental meetings and collaboration to break down departmental barriers.

Team members who feel that they can operate in a vacuum and not bother communicating to the rest of the team may cause a negative reaction among the entire group as well as information gaps, generating serious consequences for the project itself. Similarly, managers who believe they can solve all of a project's problems by themselves and report the major decisions after they are made establish a poor atmosphere for communication. Engendering a spirit of collaboration and openness about the project means that managers share information with the team and invite team members to participate in solving any problems that arise and to communicate among themselves as fully as they communicate with the manager.

Conducting Productive Meetings

Members of project teams spend considerable time participating in and running meetings. These meetings are important forums for communication where participants express their views, expand on ideas, present solutions to problems, and report

on their activities. Whether you are a project manager or a team member responsible for running certain meetings, it's important to set regular meeting schedules and to allow time for ad hoc, problem-solving meetings when the need arises. Regularly scheduled meetings are a formal way to share information and get the team members together to communicate. But to be effective, meetings must be conducted well. Nobody wants to attend a meeting that has no real purpose and no clear agenda. In all instances, make sure not to waste people's time—prepare in advance, taking into consideration the various factors that create productive collaboration.

The success of any meeting is affected by its purpose, the people who attend, the size of the group, the time at which it's scheduled, the location, and the agenda. Setting a meeting at 4:30 in the afternoon for a large group of people with varying needs is a recipe for disaster, as is holding a meeting in an area where there are annoying distractions (ringing telephones, clattering food service equipment, and so on). The meeting leader needs to plan carefully and prepare for the dynamics of the group. If the meeting group is large, it may need to be divided into subgroups who share the same concerns and can hold their own meetings as well. In instances where the team itself is large (twenty or so people), project managers should convene the entire team less often and do so only for updating purposes rather than for problem solving.

But even with these elements taken into consideration, the meeting will not be effective unless it is run well. See Steps to ... Scheduling a Successful Meeting.

One of the worst mistakes a meeting leader can make is to hold meetings but not follow through on the suggestions made or the actions requested. Such meetings are quickly tagged "superfluous," are counterproductive to collaborative efforts, and can easily damage any team cooperation.

Steps
to ...

SCHEDULING A SUCCESSFUL MEETING

1. Before the meeting:
 - Set up a schedule of meetings well in advance so people can plan ahead.
 - Always publish an agenda for the meeting and distribute it in advance.
2. During the meeting:
 - Set a time limit for the meeting and stick to it.
 - Keep the meetings focused on the work that needs to be done.
 - Ask someone to take careful minutes.
 - Encourage participants to lead portions of the meeting.
 - Listen to what the participants have to say, and act on their suggestions.
3. After the meeting:
 - Come away with a written list of action items for yourself and your team members.
 - Distribute the minutes as soon as possible (within two or three days) after the meeting.

Fostering Team Dynamics

Collaborating on writing projects requires significant preparation and the necessary skills to do the job well, whether you're a manager or a team member. And it's important for all collaborators to understand the dynamics of the entire team. Individual team members must understand that their roles as contributors to the whole project depend on the rest of the team members' contributions. Territorialism or a slip in performance in any area of the project affects the entire project. For managers, it is not a simple matter of delegating work and monitoring deadlines. Being a leader and a facilitator, a boss and a colleague, advocating for the team in negotiations with senior management, and being a representative of senior management to the team—all these factors pull project managers in multiple directions. To make team efforts on writing projects run smoothly, managers must understand the dynamics of collaboration and be comfortable in the many roles required to make the team effective. Ultimately, the quality of the final product depends on the quality of each member of the team and the whole team's ability to work together well.

Conflict and Mediation

While there are many factors that can inhibit collaboration—far too many to list here—a few of the possibilities are common to many project teams and deserve mention. Most of them involve conflict of some sort and can be corrected if detected early or if planned for in advance.

- *Rivalry* is the biggest barrier to horizontal communication. Team members begin competing for resources, positions, and recognition, so friction develops.
- *Personality clashes* are common and may be intensified by the suppression of information, the release of inaccurate information, or the project manager's favoring the style of one person over another.
- *Personal agendas* that have nothing to do with the project's goals result in disunity within the team.
- *Lack of respect* for the project leader, for each other, and for the project's goals can derail any project.

If project teams recognize the potential for these problems and work hard to implement effective horizontal and vertical communication channels, these barriers will be infrequent. If they do arise, however, the team must be prepared to deal with them directly and quickly. The longer these difficulties persist, the more they will affect other group members and ultimately damage the whole project.

How to Manage Conflict

Whenever people collaborate, there are bound to be times when team members disagree. Certainly, team members need the freedom to disagree with one another and with the manager. Constructive argument often results in better decisions. But

project managers and team members alike must be able to recognize the difference between productive disagreement and conflict that is out of hand.

The first step in all disagreements should be to negotiate among the feuding parties to come to some sort of a productive compromise. But when consensus can't be achieved, the project manager must resolve the conflict before the disagreement undermines the quality and credibility of the team.

In their book *Getting to Yes*, Roger Fisher and William Ury examine strategies for resolving conflict productively. They suggest that the main goal of negotiating effectively is to focus on the common interests and mutually satisfying options of the parties instead of focusing on one person winning and one losing. They offer four points for managers who are negotiating between feuding team members:

1. ***Do not confuse the people with the problem.*** Keep them separate.
2. ***Avoid positional bargaining.*** Determine the underlying interests of the larger group, not those of the individual members, then focus on them.
3. ***Do not select a solution while under pressure.*** Doing so may limit the creativity and value of the solution. Consider as many possibilities as you can.
4. ***Agree on criteria or standards for measuring the effectiveness of the solution.*** Insist that the standards be applied."

When you're faced with the need to resolve conflict, keep these points in mind as you decide how to approach a problem. These points are based on the premise that you need to step away from emotions and personalities and to focus instead on how to listen carefully and examine alternatives with an open mind.

➤ **Tip:** *No matter what style of management makes you most comfortable, it's important to note that good managers know when to let the team members manage their own difficulties and when to step in and act decisively. It's sometimes best to make a few people unhappy for the good of the entire project. When these situations arise, consider your options carefully, decide on the best course of action, and act firmly. Remember that the team looks to you for leadership.*

Overall, project managers especially need to pay enough attention to their team to be able to recognize serious conflict and step in when necessary. If you find yourself in such a situation, keep in mind that reaching a compromise is the most desirable outcome: Steps to . . . Effective Conflict Management can lead to effective and efficient decision making.

When Negotiation Doesn't Work If the disagreement can't be resolved, decisive steps are needed to correct the situation before it undermines the team. The first step for the manager is to make the decision between the conflicting sides and inform the entire team of the reasoning behind that decision. Then he or she should take the feuding parties aside and firmly insist that the disruptive

Steps
to ...

EFFECTIVE CONFLICT MANAGEMENT

1. Prepare for conflict. In all aspects of the communication process, encourage participants to share their points of view and their reasoning. When team members understand the perspectives of others, they are less likely to become angry or unyielding in their positions.
2. Defuse emotions. When conflict does arise and the participants become emotional, allow them to cool off before attempting to resolve the issue. Asking people to think or behave rationally in the heat of argument usually intensifies the problem.
3. Focus on questions that ask why, how, and what. Ask what are the fundamental difficulties, why are they problematic, and how have they come to be so. Try to get to the bottom of the problem, the basic issues. Focus on these issues rather than on the people involved; depersonalize the conflict.
4. Search jointly for solutions. Ask all participants to brainstorm ways to find a solution to the disagreement. Everyone involved should play a role in solving the problem.
5. Evaluate solutions in terms of both quality and acceptability. Agree with the parties what the criteria for final solutions should be. Avoid such techniques as voting, tossing coins, drawing straws, or any other form of arbitrary decisions. Instead, focus on evaluative criteria that will benefit the final outcome of the project.

behavior not be repeated. Usually such a reprimand is enough. But if the behavior continues, the next step is to make the whole team aware of how such feuding affects the credibility of the project team and stalls their progress on the project. A last resort is to write a formal letter to senior management, detailing the problems with the team member(s). Finally, the offending people may need to be separated from the project so the work can continue.

Tips for International Communication

Collaborating with team members from the same culture is challenging enough, but cross-cultural collaboration expands the challenge significantly. Too often, individuals in cross-cultural collaborative efforts are unable to get beyond their own cultural values to see the differences in attitudes, expectations, and work methods. Understanding how to collaborate in groups and how to motivate and reward team members depends heavily on learning the differences in cultures. For example, the low-context cultures in North America and Europe place the

*Adapted from Robert W. Flisberry and Laura Lemoine Lindsay. *Effective Managerial Communication* (Belmont, CA: Wadsworth, 1994), pp. 474–476.

greatest emphasis on the needs of the individual, while high-context cultures, especially those in the developing world, prize the collective experience more than the individual (see Chapter 3, pp. 68-71). It's also important to realize that some high-context cultures do not encourage speaking up or offering overt opinions. Doing so shows disrespect for the hierarchy of the group and overly emphasizes the individual. These differences affect the way groups establish criteria for success, standards of achievement, the decision-making process, and styles of thinking and communicating.*

Workers in Europe and North America prefer linear thinking where the pragmatic answer is found swiftly and verified. On the other hand, many other cultures prefer an emotive approach where the needs of the community take precedence over the quickly pragmatic approach, and it's more important to involve entire groups of people in finding community solutions than in finding the rational answer.

Figure 6.5 provides some insight into how cultural differences may affect behavior in group collaboration. For more on collaborating across cultures, see Chapter 7.



Quick Review

Working in collaboration with others on a writing project in the classroom or the workplace requires your team to coordinate the document development process in clear and systematic ways.

- Understand your role as either an individual contributor or a project manager.
- Understand the four phases of document development: planning, writing, producing, evaluating. Each phase has specific tasks associated with it for team members and for the project manager.
- Understand that collaboration requires attention to the differing roles of each team member. Each role should be defined clearly and the various team members should adhere carefully to those job descriptions.
- Develop a tracking system so you can follow the progress of all the team members working on the document.
- Establish effective communication networks, both horizontally and vertically, among the team members. Keeping the channels of communication open is crucial for avoiding conflict and misunderstanding.
- Know how to manage conflict and keep the project and team members on track.

*This information comes primarily from Deborah S. Bosley, "Cross-Cultural Collaboration: Whose Culture Is It, Anyway?" *Technical Communication Quarterly* 2(Winter 1993), pp 51-62.

Figure 6.5

Behavior, Rationale, and Implications of International Students in Group Work

Behavior	Rationale	Implication
May not respond with a definite "no"	To prevent both parties from losing face	May take on more work than others in group
May be reluctant to admit a lack of understanding or to ask for clarification of information	To do so might place speaker in position of revealing ignorance	May pretend to understand
May avoid criticizing others	To avoid embarrassing self or others	May not respond critically to other members of group or on evaluation forms; may avoid confrontation
May avoid initiating new tasks or performing creatively	To avoid making mistake and appearing foolish	May accept assigned tasks but may not volunteer
May avoid asking for promotions or deserved benefits	To protect supervisor from possibly refusing and to protect self from humiliation	May not emphasize own part in group on evaluation form
May feel discomfort with compliments	To avoid the imbalance between parties such compliments create	May not seek verbal approval from teacher or other group members
May avoid complaining about product or service	To prevent other party from feeling a sense of failure	May not indicate problems with group members on evaluation form

Source: "Cross-Cultural Collaboration: Whose Culture Is It, Anyway?" by Dr. Deborah Bosley from *Technical Communication Quarterly* 2 (1993). Reprinted by permission of the author.

- Understand that cross-cultural collaboration requires learning and respecting other values and approaches to problem solving. The most common differences in approaches to collaborating between North America and Europe and other cultures are the primacy of the individual in the former group and the primacy of the collective experience in the latter.



Exercises

1. Develop a project team for a large document you are working on. Begin with a group meeting of all the team members to decide on individual roles and responsibilities. Write down a careful rationale for each member's assignment to a particular role and describe the specific responsibilities assigned to that person.
2. Keep a project notebook ("project central") for a collaborative writing project involving more than two people. When the team is finished with the project, the notebook should contain all of the schedules, memos, reports, e-mail, and other communications necessary to the job.
5. Hold a postmortem meeting on the project. Have each team member review the project notebook and be prepared to discuss ways to improve the collaborative process for the next team project. Be specific about where your group got bogged down in the collaborative process and where they worked together efficiently. Explain the reasons for both.



Community Action Projects

Design a project notebook template for an organization in your neighborhood working on a large-group project. The project may be focused on writing, or it may not. The organizing, planning, and tracking skills apply in any case. Once you have identified the project, your first step is to meet with the project leader to learn the goals, participants, and time schedule involved. It would be helpful, too, to meet with the whole team before you draft the template, so you can get everyone's input. When the first draft is ready, circulate it to the team again so you can incorporate their feedback on the final version. As the project moves forward, offer to work with them to keep the notebook up-to-date. This "project central" focal point can be extremely useful for keeping the project on track and well organized.



Technology Challenge

Limiting your team communication to groupware such as WebEx or Wiki, plan and complete a team project.

Communicating **with Other** Cultures

Before the Internet, e-mail, jet travel, and even television, most people only read about other cultures. *Experiencing* them was rare. Today the world has become so interconnected that nearly everyone has visited or lived in another country. On the streets of most major cities you can hear multiple languages spoken, and college campuses across the United States attract students from all over the world. Ethnic restaurants abound in even small towns, offering dishes from Vietnam, Greece, Russia, India, and many other faraway places.

This interconnectedness has greatly affected the way we do business. When you work in a company today, you likely will have to collaborate with people from other cultures, either virtually or in person. Products and services created in one country are targeted for markets in many other lands, and the expert teams who create them may include collaborators from multiple nations and cultures. Understanding how to work together is vital to success in this business environment, and communicating well across cultures is key.

While understanding other cultures is part of all aspects of technical communication—as is noted throughout this book—Chapter 7 focuses especially on the multicultural nature of today's work world and offers suggestions for successfully communicating across cultural differences.

Technical Communication Tasks in the Global Workplace

Most companies are involved in some sort of international communication. Whether it be as simple as purchasing products from abroad and marketing goods to other countries or as complex as collaborating in global teams, the contemporary business is international. The following are just a few of the multicultural tasks you might be asked to do in your company or organization.

Developing Content for a Global Audience

Companies who deliver products to other countries also need to create instruction manuals, online help, and other resource material for the target audience. In many cases, the material will be written in simple English to be translated by technical communicators in the destination country. In other instances the already-translated material needs to be “localized” (edited to use the phrases and examples best suited to the local culture), and in still other cases, the material is sent directly to the target audience without modification. Each of these communication tasks requires careful understanding of the destination culture.

Editing and Proofreading

Another frequent job in the international workplace is editing and proofreading documents drafted by engineers whose first language is not English. This task is the inverse of creating copy for other cultures. Instead, it is taking the organizational and language patterns of other countries and revising them for your home culture.

Collaborating on Global Teams

In multinational corporations, many projects require teams made up of experts from around the world. These teams may relocate to one place for the duration of the project, or they may collaborate virtually through e-mail and other more synchronous methods. Gathering together people from different cultures and asking them to work on a project means that the first step is to understand the widely varying needs and expectations of the team members and come to mutual agreement on collaborative processes. See pp. 163-165 for more information about collaborating on a multicultural team.

Relocating to Another Country

You may find yourself assigned for a few years as a manager or an individual contributor in a land where the culture is foreign to you. Developing countries, especially, need people who have communication expertise and other highly trained skills. This experience can be an exciting way to learn about other customs and make new friends along the way.

These examples represent some of the opportunities available in today's workplace. As businesses of the future become even more international, understanding how to navigate across cultures will become imperative.

Culture as More than Stereotype

Consider this excerpt from a column on cultural difference:

Italy and southern Germany (Bavaria) both huddle against the Alps, but the differences between Bavarians and Italians permeate their lives. Bavarians drink beer, drive Porsches at unregulated speeds on their straight, well-maintained highways, always

look a bit severe if not thunderous, and wear *lederhosen* (leather shorts with suspenders) as a matter of course. Italians drink wine, drive Alfa **Romeos** on twisting, crumbling roads, always look sexy and cool, and wear gorgeous, stylish clothes for which they're famous. Could close neighbors be more different?

—Alice Jane Emmanuel, "You Can Get There from Here", *Intercom*, May 2006.

To what extent is this information trustworthy and helpful? To what extent does it promote stereotyping? Asking yourself these questions is important as you begin to research the customs and characteristics of people from places outside of your experience.

Learning about other cultures can be exciting, as doing so broadens your own world. But it can also be frustrating unless you approach the experience with an open mind and a willingness to observe and listen instead of making judgments quickly and unfairly. A major caution when working across cultures is to avoid the trap of stereotyping. It is easy to revert to stereotypes when thinking of people from other lands. Scandinavians are tall and blond, Americans are loud and gregarious, Asians excel at music and mathematics, Germans are punctual and humorless, Latins are romantic, and so on. Unfortunately, these images were not based on absolute truth in the first place, and they rarely, if ever, apply absolutely. But many books and articles that offer advice on communicating with other cultures still rely on these oversimplified notions of cultural identity.

Stereotypes can be useful when they reduce complex realities into manageable dimensions and when they represent the general "norm." For example, the information on "high" and "low" context cultures noted earlier in this book (see pp. 68–71) provides valuable tips for planning effective communication styles. Such basic information about cultural norms allows you to design different communication approaches for doing business with a Japanese company (high context) and a Swiss company (low context). But when stereotypes become the "rule" and allow no differences, they can be harmful.

Defining who each of us is as a person requires an understanding of the **multiple** influences on our lives; setting expectations about who someone is before knowing that person is almost always problematic. Problematic, too, is setting definite expectations about a culture based on stereotypes.

Although it is useful to learn what common practices are in various **cultures**—for instance, it is considered impolite in India to give or receive a business card with the left **hand**—it is equally useful to **learn** about the many dimensions that influence people from that culture. No longer is each country isolated from the globalized world. Stereotypes that depend on such isolation are gravely suspect, as each person's behavior is influenced by what she or he knows about the greater world and by elements particular to that person's upbringing. Technology, especially the media, has assured that a person's cultural identity is a combination of influences always intersecting in different ways, and each person is also a product of his or her local environment. Everyone is a complicated mix of family, history, politics,

financial realities, religion, and many other colliding influences. To assume that a cultural stereotype is an accurate snapshot of a country and the people who live there is a major mistake.

As you communicate with people from other countries, remember that they are *people* first, as complex as you are. Certainly take the time to learn the customs and habits of the nation you are working with, but don't believe the stereotypical information you receive about people before meeting them and getting to know them. Successful communicators realize the difference between cultural customs, individual behavior, and judgmental stereotypes.

Key Focus Areas of Cultural Difference

While it is important to remember that culture is a constantly shifting mixture of influences, it is also useful to anticipate where miscommunication can occur. The following chart—adapted from the work of Nancy Settle-Murphy—illustrates areas where different cultural patterns may explain people's difficulties in working together. Many of these differences occur naturally in people of the same culture, depending on individual upbringing, but these general characteristics can be culturally instilled as well.

Category	Cultural Differences
Seeing the Big Picture vs. the Details	<p>People from "high-context cultures" (see p. 69-70) tend to derive their most valuable information from the context that surrounds the words rather than the actual words. Precise details may be less important than the broader context.</p> <p>People from "low-context cultures" pay more attention to the words and details than to the overall context.</p>
Monochronic vs. Polychronic Tasking	<p>Some cultures are more comfortable taking one thing at a time (monochronic). Following the correct order or using the right process is almost as important as achieving the desired outcome. Unstructured conversations and interruptions can be unsettling.</p> <p>Other cultures cope well with simultaneous activities and see interruptions as a necessary and natural way of doing business (polychrome).</p>
Vertical vs. Horizontal Communication Patterns	<p>Some cultures have a more compartmentalized communication flow, where information is parceled out on a need-to-know basis, usually top-down.</p> <p>In other cultures, people share information more freely among all levels, back and forth and up and down, and maintain multiple channels of communications, both formal and informal.</p>

Category	Cultural Differences
Expressing Opinions Directly vs. Indirectly	<p>In some cultures, people tend to break in frequently to ask questions, pose challenges, or openly disagree, while others prefer to maintain group harmony by never openly disagreeing, especially in front of a group.</p> <p>Some tend to allow others to speak before voicing their own opinions, while others speak over others' voices if that's what it takes to get heard.</p> <p>Some need silence to think (and to translate into their native language and back again), and others are uncomfortable with silence, rushing in to fill a pause.</p>
Feedback as Validation vs. Feedback as Interference	<p>People from some cultures seek constant validation for the quality of their work, and may assume that the absence of feedback signals at least mild disappointment. These same people tend to provide frequent unsolicited feedback.</p> <p>Others assume that unless they hear otherwise, the quality of their work is just fine. Some feel a need to lead with the positive before delving into the negative when giving feedback, while others regard "sugarcoating" as confusing and unnecessary.</p>

Source: Adapted from Nancy Settle-Murphy, "Collaborating Across Cultures: Key to Success for Global Projects." Chrysalis International, Inc.

Eastern and Western Thinking Patterns

Another area of difference is the thinking patterns ingrained in various cultures and the resulting influence on written—as well as oral—communication. As noted in Chapter 3, deductive organization is the most efficient method for organizing technical documents in Western cultures. This "analytic" thinking pattern is based on the process of dissecting an idea or an action into its parts for analysis. Because the Western mind is trained in this pattern, Americans frame an argument by stating a strong opinion or the main point and then divide it into chunks to support the thesis. Headings and subheadings provide the road map to the discussion.

The typical Western pattern looks like this:

- Introduction/Main Point/Opinion
 - Subtopics Supporting the Main Point
- Conclusion Strongly Reiterating Main Point/Opinion and Summing up the Argument

In contrast, Chinese and other writers from Eastern cultures use a "relational" thinking pattern that seeks to unify all the parts of an argument rather than dissect the whole into chunks. Each part relates to the whole on many levels, and headings and subheadings get in the way of these inseparable relationships. This thinking

pattern relies on inductive organization where the parts are discussed in relation to each other, and the main point or opinion comes at the end, often indirectly stated.

The Eastern pattern looks like this:

- Introduction/Presentation of the Subject Matter
- Development of Argument by Examples
- Transition to a Discussion of How Subject Relates to Other Subtopics (some may be indirectly related)
- Conclusion, Writer's Opinion is Implied not Stated Directly

Here's an example of this pattern taken from a book on communication strategies written by a Chinese author*:

[Introduction] We human beings know each other and understand the world by speaking and writing. [Development] Therefore we realize the importance of communication to knowing ourselves and understanding the world surrounding us. Computer knowledge, or a skilled mastery of computer technology such as word processing and the Internet, etc., is indispensable to effective communication in today's world. [Transition] Anyone, be he or she a teacher, a student, a journalist, an engineer, a sales person, or a white-collar worker, has to **broaden** his or her horizon by communicating with others. Computer knowledge can make this communication effective, thus helping one realize the goal of broadening his or her horizon. [Conclusion] Therefore, to master necessary computer knowledge is of important value.

Now, the same **subject** as a Western writer might write it:

[Main Point] A mastery of computers is essential in today's world. [Supporting points] Through word processing, the **Internet**, and other computer-related technologies, contemporary people communicate, do business, and learn about the world around them. Whether you are a **student**, a teacher, an engineer, a **journalist**, a salesperson, or an office manager, computers are a vital part of your work and your life. Without a basic knowledge of computer technology, you could not operate effectively in most environments. [Conclusion] Succeeding in today's high-tech society demands computer literacy.

Because of the differences in approach to organization, Americans reading Eastern documents may have trouble following the argument and often become impatient to get to the point. In contrast, Eastern readers may find Western documents strident and lacking nuance. When your target audience is primarily of one culture, it is best to learn the thinking patterns of that culture and follow them. However,

*Qi, Shouhua 2000. *Western writing theories, pedagogies, and practices*. Shanghai, PRC: Shanghai Foreign Language Education Press. Translated by Li-Huilin in C. Barnum and L. Huifin "Chinese and American technical communication: A cross-cultural comparison of differences." *Technical Communication*, vol. 53, no. 2, May 2006.

when you are working with people from many countries, each culture needs to make some adjustments to communicate with the other successfully.

Collaborating on **Multicultural** Teams

Increasingly, work teams are made up of multiple cultures. Too often, managers of these teams assume their own culture is the norm and charge ahead without taking time to consider intercultural dynamics. The result can be disastrous as the team never coalesces, the work doesn't get done, and valuable time is wasted.

Successful team collaboration depends on two things: understanding the cultures of others on the team, and understanding *how you* might be perceived by other team members. In the U.S., business etiquette often leans to the informal, but it's never a good idea to assume that such informality will be accepted by other cultures. When first meeting other team members, ask each how he or she would like to be addressed. Many may not want to be called by their first names. Similarly, Americans usually are not shy about offering opinions or interrupting others to insert a comment or an idea. Some cultures frown upon such practice and never openly disagree or voice their own opinions in a group situation. Take the time up front to learn about the communication styles and preferences of all national cultures on the team. How? Make friends! Get to know as many people on the team as you can. Ask them about their culture, watch and listen with heightened sensitivity, and seek out other media information about the cultures (films, novels, histories, and so on). Then, think together about the *decision-making process*, the *review process*, and the *evaluation process* and establish guidelines all team members are willing to follow.

The Decision-Making Process

Some cultures prefer the consensus method of decision making: team members negotiate until everyone agrees. Other cultures prefer a more hierarchical decision process where the manager has ultimate authority to decide. To be a productive work group, team members should develop decision-making criteria together and provide copies of the criteria to all stakeholders.

The Review Process

Who reviews the team's work products and what are the phases involved? These questions should be answered clearly at the outset. Once again, cultural differences may come into play. Some members may be used to participating in every phase of the project and expect to be in the review loop for each detail. Others are used to a more compartmentalized process where the review is done by a separate group. It should be clear from the beginning what milestones and deadlines are involved and who is critical to the review process. Productive teams understand these mechanics and work together smoothly to complete the whole project efficiently.

GUIDELINES Collaborating with E-mail

If you are part of a global team depending on e-mail to communicate, the opportunities for cross-cultural miscommunication increase. Here are some rules to help you avoid unnecessary cultural miscues:

- Be concise. Try to keep all e-mails to a single screen and restricted to one subject.
- Make the subject line informative and specific so busy readers can scan their inboxes and determine how quickly they must attend to the message.
- Avoid subject line phrases that contain words that spam filters might block (such as "free" or "congratulations").
- Identify the purpose and action items **at** the beginning of your message.
- Decide carefully what style of communication to use: formal or informal? In every case be professional and polite.
- Avoid misspellings and ungrammatical constructions.
- Avoid **emoticons** (see p. 213).
- Avoid special e-mail features unless you are sure all team members will be able to read the messages. Not all e-mail readers can handle graphics, special fonts, color, or other features.
- Indicate if the message may be forwarded. Do not forward messages unless you have the author's permission to do so.
- When forwarding e-mail, indicate your reason rather than simply forwarding it. Add a few words of explanation.
- Copy people who need to know. If the whole team needs to be aware of the message's content, then copy all of them. If only a few do, then copy only those who need to know.
- Use abbreviations for months or spell them out when discussing dates. (Dec. 8 or December 8, rather than 12/8.) Different countries have different conventions for listing dates, and listing just the numbers may be confusing.
- Avoid words that are unnecessarily complex or could have ambiguous meanings or create inappropriate tone (such as "demand" instead of "ask," or "initiate" instead of "begin"). Choose words that are likely going to have the intended meaning when translated.
- Try to work out differences in **person** rather than via e-mail. If you are having a disagreement with a team member, pick up the phone rather than attempting to work out the difficulties in negative e-mails.

These guidelines are common sense and apply to most situations, whether or not the team members are from many cultures. But when the team is spread out across the world and must work together virtually, following these rules can make the difference between an on-time successful project, and a costly failure.

The Evaluation Process

In the business world, each team member's performance will be evaluated at some point. It is critical that everyone involved in the project knows who will do the evaluating and with what criteria. It's good practice to have team members evaluated

by the same person rather than diffusing the process to a number of outside managers. Publish the criteria and the evaluation timeline to set the team's expectations.

Working across cultures can be a fascinating experience, but it takes patience and a willingness to step outside of your own expectations to see from others' eyes and hear from others' ears. Constantly validate your assumptions; observe and listen carefully and without judgment. With practice, you cannot only become an effective global communicator, but you can learn more about yourself and your own culture as well.

Quick Review

Multicultural communication requires sensitivity to the multiple elements that make up each person's identity. To communicate successfully with people of other nationalities and cultures, keep the following guidelines in mind:

- Research the cultural "norms" of your target audience, but avoid harmful stereotypes.
- Pay attention to the key areas of cultural difference: Big Picture vs. Details, Monochronic Tasking vs. Polychrome Tasking (one thing at a time vs. multi-tasking), Formal vs. Informal, Expressing Opinions Directly vs. Indirectly, and Feedback as Validation vs. Feedback as Interference.
- Western thinking patterns are often analytical, whereas Eastern thinking patterns are often relational.
- Collaborating in a multicultural team works well if team members establish team norms and expectations up front. It is especially important to determine at the projects beginning the team's decision-making process, review process, and evaluation process.
- Successful e-mail across cultures requires concise, unambiguous messages—even more so than the messages you send to people in your own country—to avoid miscommunication.

Exercises

1. Research companies in your local area to find how many include cross-cultural communication as part of their daily work. How do they bridge the cultural differences?
2. Think about the stereotypes of your own culture. Write down the image people who don't know you may have of your country, your town, your neighborhood. Discuss where these stereotypes may have come from. To what extent are they true?
3. As a class project or as an individual, establish e-mail correspondence with a technical communication class (or student) in another country where the students speak enough English for basic understanding. Exchange information

about cultural norms, communication styles, and other topics discussed in this chapter.

4. Choose a particular country or region and research its culture using books, films, and personal interviews (if possible). Create a cultural profile of the area, paying special attention to the ways people who live there communicate.



Community Action Project

If you live in an area with an immigrant population, visit one of the local centers devoted to helping the people get settled in their new land. Offer to work with some of the staff to develop written guides to aid with housing, finding jobs, navigating the transit systems, and other resources as needed. You may find that you can write the material in English or you may need to collaborate with a translator. Either way, you will benefit from the experience of communicating with people from other cultures, and they will benefit from the information you provide for their use.

Considering Ethical and Liability Issues

On January 22, 2003, in the middle of the *Columbia* Space Shuttle mission, mission team leader Linda Ham spent much of the day following up on a rumor. She had heard that someone wanted satellite images of the shuttle in orbit to determine whether the debris shed on liftoff could have damaged the vessel. Chief engineer Alan Rocha was in the room and said nothing, even though he knew there had been at least three separate requests for such images from engineers around the country. Early Saturday **morning, February 1**, *Columbia* incinerated on reentry, claiming the lives of all seven astronauts. In an interview with ABC television after the fatal crash, Mr. Rocha said he regretted not having spoken up. Later on, another engineer spoke on the condition of anonymity: "Part of the problem," he said, "is that everybody assumed that someone else would do it, and the old axiom of business is no one ever wanted to be first."

On July 10, 2006, 38-year old Milena Del Valle was killed when bolts supporting the ceiling in the "Big Dig" tunnel in Boston gave way and the falling concrete panels crushed her car. Engineers for Bechtel Corporation, the company that supervised the Big Dig project, argue that the company is not responsible for the faulty bolts. Specific designs for each segment of the project were drafted by other companies, including individual contractor Modern Continental, leaving Bechtel without ready or organized access to the critical documents detailing the work on the ceiling's collapse. "At present," said **Turnpike** Authority spokesman Robert Johnson, "that is 62 boxes of records." In the meantime, the *Boston Globe* obtained a memo written years ago warning Bechtel and Modern Continental that the bolts may not last. Modern Continental claims the memo is a fake. The author insists it's genuine.

Whether you are writing in a company or a classroom, at various points in your writing career you will inevitably face ethical dilemmas pertaining to the communication of information. As the world's dependence on transmitting information within national as well as global networks increases, so too will the pressures—and

the opportunities—to manipulate or suppress data. If you are unprepared for such ethical confrontations, you may make some choices you will regret later, or you may not even realize that you have choices. This chapter discusses the various roles ethics can play in technical communication and the framework needed to understand the nature of ethical conflicts. It begins with the broad picture and then moves to specific principles needed in the decision-making process.

Ethics Defined

Any dictionary contains several definitions of ethics, most having to do with morals, judgments, and values. In this chapter, the term *ethics* means the nature of the specific moral choices you must make as you communicate technical information. These choices usually involve situations beyond the scope of legal codes or standards, situations where you must weigh your values carefully and base your judgments on internal codes of behavior (your inner sense of right and wrong). For example, imagine you are writing a computer manual and you know there is a serious bug in the software. In the interest of meeting deadlines for shipping the product, your supervisor has told you to ignore the bug and not mention it in the manual at all. "Later versions will correct that problem," she tells you. "We need to get the manual out the door *now*." You know delays in shipping the manual will cost thousands of dollars and will cause bad publicity for the company. On the other hand, you also know that the software has the potential to cause significant loss of data for the customer if certain conditions exist. What do you do? In the business world, where the bottom line is the driving force, people are constantly making compromises and trade-offs between financial profits and social responsibility. And while everyone knows what it means to turn a profit, it's also important to understand the other side of the equation: each person's obligation to society.

Social Responsibility

Any discussion of social responsibility pertaining to writers for the technical professions necessarily focuses on the nature of that responsibility in the business world. Broadly classified, social responsibility comprises four categories: (1) economic, (2) legal, (3) voluntary, and (4) ethical responsibility.*

Economic Responsibility

To be economically responsible, a business produces goods and services that society needs and wants at a fair price that allows the business to continue and satisfies its obligations to its investors. When companies use unfair employment practices

*Adapted from O. C. Ferrell and John Fraedrich, *Business Ethics*, 5th ed. (Boston: Houghton Mifflin, 2001).

or do not compete fairly in the marketplace, they violate their responsibility. Companies need to weigh their profit-making decisions against their role as economic stabilizers in the local and national communities.

Legal Responsibility

All companies must obey laws at the local, state, and federal level. When companies or individuals violate these laws, they are prosecuted under either civil or criminal law, depending on the type of violation that has occurred. *Civil law* defines the rights and duties of individuals and organizations and is the governing law for most business ethics disputes. *Criminal law* prohibits specific actions—that is, fraud, theft, securities trading violations, and so forth. Most of the laws governing business activities fall into one of four groups: (1) regulation of competition, such as the Sherman Antitrust Act; (2) laws protecting consumers, such as the Pure Food and Drug Act; (3) laws protecting the environment, such as the Clean Air Act; and (4) laws promoting equity and safety, such as the Equal Pay Act.

Voluntary Responsibility

Companies are viewed as good citizens when their efforts produce or sustain a high quality of life for their neighbors and their consumers. For example, giving to charitable organizations, supporting community projects, and curtailing environmental hazards are forms of volunteerism for a company. When companies neglect such efforts, their business often suffers.

Ethical Responsibility

While the economic, legal, and voluntary aspects of social responsibility are fairly clear, the ethical dimensions are less so. Ethical responsibilities are defined as behaviors or activities that society expects of a business but are not codified by law. In your daily work, you may be faced with problems where there is no absolute right or wrong, nor is there a clear set of rules you can use to help you choose the best path. Unfortunately, ethics have often been systematically ignored in overall business strategy, perhaps because of the ambiguous nature of the problems. Some firms believe that ethics, like religion, is a personal subject that should not be taught or discussed in the workplace. As a result, companies will have no coherent ethics policies unless they come to understand their sense of collective morality that evolves through the collaboration process. In other words, as you work in teams on various projects, you begin to make group decisions that help you to define your collective sense of what's right and what's wrong. The role of top management is crucial in these group decisions, because managers and team leaders set the tone for others to follow. This haphazard approach to ethics in the workplace creates uncertainty and a greater likelihood that civil—and even criminal—laws may be violated in the name of "groupthink" without clear guidelines.

Types of Ethical Issues

To establish ethical guidelines, either for yourself or for your company, you must first understand the types of ethical issues you are likely to face in the work world. Most of the ethical issues relevant to business organizations can be broadly classified in these areas:

- Conflict of interest
- Trustworthiness
- Communications
- Organizational relationships

Keep in mind that these areas overlap in places, and paying attention to one means paying attention to aspects of all of them.

Conflict of Interest

A conflict of interest exists when you must choose whether to advance your own interests, those of the organization, or those of some other group. Bribery is one example of a conflict of interest when you are promised extra money or a kickback in profits or advancement in status for either keeping silent about something or performing an unethical action. When you are writing in a technical environment, you may be asked to alter data or to omit certain information for the sake of your group's getting funding or increased recognition—or even to save on production costs. The bribe doesn't have to be cash. It can be in terms of promotions, extra perks, or the promise of "fitting in."

When you are part of a collaborative team, you may be faced with conflicts of interest on a daily basis. Should you take credit for another team member's work? Should you slow down your work (and thus the entire team project) to cover for a friend who has trouble meeting the deadlines? Should you leak proprietary information about your project to the competition for an under-the-table fee? Should you tell your supervisor that the person who has been recommended to head a vital new project has disclosed to you in confidence that she has major health problems that may affect her work?

Trustworthiness

When you are working in the business world, you are expected to follow all the applicable laws and regulations, and you are expected not to knowingly harm customers, clients, employees, or competitors through deception. While people are often guided by their own self-interest, ethics in the workplace must be grounded on fairness and a sense of honesty in business dealings. Sadly, there is a prevailing impression that business is run by its own set of rules that are separate from the rules of human decency.

Building on the idea that "all's fair in love and war," movies and books about business tycoons and slick entrepreneurs paint the picture of business as a war of

competition where the underhanded dealers get ahead. When you work in a high-pressure environment, the temptation may be equally high to view your workplace as a war zone where trustworthiness doesn't count and your job is to use whatever tactics are necessary to undermine the competition. For example, you may resort to "dirty politics" to get promoted before another person in your group by spreading unflattering rumors about that person or falsifying information. You may even be tempted to "pad" your resume to include experience you do not actually have. Sometimes, too, trustworthiness is a simple matter of industriousness. Are you doing all you're being paid to do, or are you coasting until payday?

Communications

The broad area of communications is an obvious place where ethical issues may arise. These may be related to advertising messages, and information about product safety, pollution, employee work conditions, and other situations. When you are communicating information, you are not just reporting; you are also creating or sharing meaning with your audience.

There are many ways to mislead people without giving false information or outright lying—for example, in labeling products to encourage consumers to buy them ("Fights germs better than any other mouthwash!") or in making promises to environmental groups ("We will responsibly manage the levels of toxic waste released into the environment...."), and so forth. The recent tobacco controversies point to false advertising, targeting improper audiences (Joe Camel's appeal to the youth market), and an unwillingness on the part of some companies to admit they have included higher levels of nicotine in their products than those of which consumers are aware. These practices are unethical because they either deceive the consumer outright, encourage people to participate in activities that can damage their health, or do not include all the information people need to make good purchasing decisions.

You may be faced with the temptation—or even the outright order—to make false claims about your company's product: that it passed a safety test with flying colors; that it outperforms the competition; that it has an excellent repair record. If these claims are false or even exaggerated, then you have made an unethical statement.

Organizational Relationships

This category of ethical issues deals with the behavior of organization members toward customers, subordinates, peers, supervisors, and others. Ethical employees try to maintain confidentiality in relationships and to meet obligations and responsibilities. One ethical issue related to relationships is *plagiarism*, derived from the Latin word for "kidnapping." Plagiarism is an act of stealing: a person appropriates without permission or acknowledgment the ideas, facts, or words that were reported or originated by someone else. In the business world plagiarism is as unacceptable as it is in the academic world, though slightly different situations may arise.

For example, many organizations downplay the role of the individual writer. Whereas academic documents list the name of every individual who contributed ideas, criticism, or words, some companies prefer to show the name of the entire department, division, or company as the author of a technical document. Another example is the memo, letter, or other document that you write but that is issued under someone else's name—your supervisor or another colleague.

Be especially careful, however, about repeating information protected by copyright. When you want to repeat information from books, published articles, songs, and other copyrighted materials, be sure to avoid infringing on the original author's legal rights. Although ideas can't be copyrighted, words, illustrations, graphs, maps, cartoons, poetry, and other creative expressions of ideas can be legally protected against unauthorized use by others. To be safe, talk to your company's attorney before you repeat information or reprint artwork that is protected by copyright. (See Chapter 2, pp. 45-48, for more details about plagiarism.)

If you are aware of these four areas where ethical dilemmas may arise, you may be able to prepare yourself not only to recognize the problems when they occur, but also to have some established guidelines for dealing with them. No one can prepare totally for ethical choice—critical thinking in each instance is always a key factor—but you can build your own decision-making framework and understand why you make the choices you do.

Guidelines for Ethical Choices

The term "ethical dilemma" means that you are faced with a decision where the rules aren't clear. In making the choices necessary to solve any such dilemma, you rely on your internal moral sense and the ethical climate of the environment where you work. It's important to strike a balance between the two poles. One way of looking at this need for balance is to consider the difference between *ethical relativism* and *absolutism*.

Ethical Relativism Versus Absolutism

When companies have no written code of ethics and believe that such decisions are personal ones, the climate is right for individuals to say, "My way is right because I say so!" This ethical relativism suggests that any action is justified if the person who is acting thinks he or she is correct, no matter what the effects are on others. Not only does this tactic violate the individual's responsibility to organizational relationships, it is also dangerous and can produce fanaticism.

On the other hand, if your company has an ethics policy with absolute rules governing ethical behavior, you may be tempted to abide by the letter of the law without considering how it fits the particular situation. It's as dangerous to apply rigid rules as it is to allow people to act according to their own relativism. While ethical policies are desirable, there is the danger that they will be absolute in their application, when the very nature of an ethical dilemma means that no firm rules

apply. Instead of thinking of your company's code of ethics as rigid rules, think of each policy as a guideline to help you in using your own critical thinking skills to solve the problem. Think back to the section on social responsibility earlier in this chapter to give you some more input on the decision-making process. If you consider carefully and balance all of the ways you as a professional should be responsible, you are more likely to make the best choice for the specific situation. As we discussed in Chapter 5 on editing, ethics should be the foundation for every writing choice you make.

Information Liability

Although making ethical decisions on the job is largely a matter of personal moral standards, making the wrong choices can involve far-reaching issues of liability. Even when not faced with an ethical decision, as the above example shows, the choices writers make about a document's design and text can create an avalanche of lawsuits.

For example, when election officials in Palm Beach County, Florida, decided to redesign their ballot, they had no idea that the outcome of the 2000 presidential election would turn on their decisions. The official responsible for the new design had rearranged the text to make it easier for elderly voters to read—or so she thought. The resulting ballot proved so confusing to voters that 19,000 votes were in danger of being invalidated in an election where a 300-vote margin separated the winner from the loser. The entire country held its breath as lawyers for both candidates threatened legal action, and the future of the election process in this country was called into question.

It's no secret that our society is becoming more and more litigious. As the number of lawsuits increases, technical communicators need to pay special attention to areas in their work where they may be vulnerable to legal action. While many companies protect their individual employees from such lawsuits, independent contractors are not protected, nor are technical professionals in companies who do not specifically indemnify their employees. Since the mid-1980s, there has been a proliferation of "information liability" lawsuits focusing on written information under product liability and other federal laws.

Understanding Product Liability Law

In the U.S. legal system, the written material that accompanies or advertises a product is often considered part of that product. That means that when a consumer suffers damages because of a defective product, the written documentation may be at fault. The legal claim brought against the technical communicator in these cases is usually based on one of three theories of product liability law: (1) negligence, (2) breach of warranty, or (3) strict liability in tort.

Negligence

If a person or that person's property is damaged physically or economically by an allegedly defective product, it can be argued that the manufacturer or the writer of product documentation negligently created an unsafe condition by failing to give proper directions for the product's use or sufficient warnings about potential dangers. Applying this legal theory to the writer means that the writer of product information has a *duty of reasonable care* to document foreseeable dangers so that the average person will not be harmed. If the courts find that an average reasonable person might be misled by the written material or might not be able to understand it, then the writer may be liable for the damages. In the eyes of the law, the writer should have taken more effective precautions to make sure the information was clear to the intended audience. Not doing so creates a breach of legal duty, and the writer can be found negligent.

In light of this possibility, audience analysis takes on a new importance. (See Chapter 1 for a discussion of audience analysis.) Writing effective product safety information and effective user instructions requires that you conduct sufficient research to be sure that users can understand the material easily. It's up to you as the writer to do a thorough analysis of your intended audience and then to test the documents you write with a sampling of people from that audience before you release the material for distribution with a product.

Breach of Warranty

According to *Black's Law Dictionary*, a warrant)' is a "promise that a proposition of fact is true." In other words, if you call the product you manufacture a lawn mower, then it stands to reason that the product should be able to cut grass. Under product liability law, a product must be of sufficient quality to be fit for its intended purpose. If the written documentation doesn't accurately reflect the product's quality or fitness for use, then the writer may be liable for breach of warranty.

For writers who are asked to write primarily from product specifications and never actually see the product they're documenting, this possible area of litigation becomes a problem. If you find yourself in that situation, make every effort to obtain and use the product yourself to make sure what you're writing is true. In some instances, however, you may not be able to do so: if you are writing about a proposed building, for example, or new-model car. When that happens, try to talk to as many people as possible who are involved in designing the product. It would be especially useful to see any prototypes that are available or any components that are already constructed.

Strict Liability in Tort

Strict liability in tort is a legal theory that is a sort of catchall for legal actions where the plaintiff may not be able to prove negligence or breach of warranty but wants to bring suit anyway. (A *tort* is an unlawful action that can result in a civil suit. It

does not include breach of contract.) By law, a marketed product is assumed to be fit for use. Basically, the law says that when a manufacturer puts a product on the market, that act implies that the product is safe and of a fit quality for use, whether or not a warranty exists or whether or not the manufacturer has been negligent in taking reasonable care in producing the product. The manufacturer, who created the risk to consumers, should thus bear the burden of cost for damages, not the consumers who fell victim to the defective product.

In most legal jurisdictions, the written materials accompanying a product are classified either as a part of the product or as products themselves. In either instance, you as the writer are the manufacturer of the documents, and these rules apply to you.

Liability in Writing Marketing Material

The marketing of goods and services is a minefield of potential lawsuits. The main legal issue for marketing writers is product liability, as described above, including the Uniform Commercial Code (UCC). Under the UCC, companies are held to an "express warranty of description," which means that the description of a product is an important element in the buyer's decision to buy. If the marketing language makes false claims or in any way deceives the buyer, the company—and often the writer—is liable, even if a disclaimer appears in the written material. If you are a marketing writer composing sales material for either goods (such as computer hardware or software, laboratory equipment, medical instruments) or services (such as engineering capabilities, scientific testing), you should be aware that the audience has the ultimate right of interpretation.

Marketing Goods

A company may claim in an advertisement that the exterior house paint they make will last ten years without peeling. In the fine print, they add the disclaimer that various conditions may affect the paint's longevity. Nonetheless, because the ad's main thrust is the promise of long paint life, the buyer can bring suit if the paint peels sooner than expected. He or she can argue that the disclaimer was not sufficiently noticeable, and thus was misleading. This scenario is just one of many instances where you as the writer bear the "burden of proof" for seeing that the information you convey does not mislead consumers. See Checklist: Communicating Ethically for specific pitfalls to avoid when writing marketing materials. All are actionable in court.

Use this checklist yourself as you write—are there any instances where you may be unintentionally manipulating the information? If so, be sure to correct your writing before it goes out to the public. Once your prose is in the hands of a consumer, it will be too late for you to correct any misconceptions—misconceptions that can be costly to your company and to you.

CHECKLIST Communicating Ethically

- Have I created a false impression? Customers can sue for false advertising. For example, a local discount mattress company advertises a special sale and includes sale prices in their advertisements. After the sale is finished, the sale prices are still available.
- Have I used imprecise language? An advertising claim such as "This product leaves our competition in the dust" or "Taste tests show that our product is preferred 10 to 1 over the other brand" open the door for lawsuits because the language isn't sufficiently specific. How will your product beat the competition? Always? Sometimes? Under what circumstances? And what were the taste tests? A biased evaluation in the office? An independently run national sampling?
- D Have I omitted information? Any time you omit information, you can be accused of intentionally concealing material to mislead the consumer. For example, a mortgage company may advertise an incredibly low annual percentage rate but fail to mention the exorbitant closing costs and required taxes.
- Have I included false or inaccurate information? If you include false information in your documents, you can be accused of lying, whether or not you knew the information was false. Packard Bell brought suit against Compaq Computer, for example, charging that Compaq was selling computers with used parts and altering serial numbers on the components to hide their prior use. It pays to check the accuracy of any information you publish—even when your supervisors insist that it's correct. The best way to protect yourself in such circumstances is to get those assurances in writing.
- Have I de-emphasized information? In some advertisements, the positive features of a product are displayed in large type, while the disclaimers and negative information are in type so tiny you need a magnifying glass to see it.

Low-cost round-trip flights to Europe!

(available only for travel from Erie, Pennsylvania, on January 1 at midnight.)

Companies running these ads may think they have properly indicated all sides of the story, but the consumers may successfully argue that the disclaimer is too small for a normal person to notice.

Marketing Services

Companies such as consulting engineering firms who market their services by writing proposals, compliance statements, and other promotional literature are especially vulnerable to litigation. In attempting to project a positive corporate image, writers can slip into misleading language. For example, the following language errors can lead to lawsuits if the audience expects one thing and you deliver another:

- *The use of extreme words:* Writers may have a tendency to exaggerate or to use words that indicate a definite situation where such circumstances aren't realistic or even possible. For example, "ABC Corporation guarantees the

safety of this equipment" is a blanket statement that doesn't take into consideration the possible negligent behavior of the person operating the equipment or potential situations where the external environment may cause the safety features to malfunction.

- *The need to please:* Writers may make promises when there's no need to do so or when it's impossible to fulfill the commitment made. For example, "We can complete the project in less than 30 days" may not even be a requirement, but the writer has now made a promise that could backfire if circumstances prevent meeting that deadline.
- *The "good sport" syndrome:* On occasion, technical professionals may decide to admit minor fault for something to enhance their company's image as a truthful, fair player: "Because we made an error in shipping the software before it had been completely debugged, we are now offering you our upgraded version at a substantial discount." The general rule, of course, is to delay admissions of blame pending thorough investigation. It is almost impossible to retreat from an "it's my fault" statement. For example, "We realize that our technical personnel may have **misgauged** the importance of the measurements, but their hasty calculations are not the reason for the product's failure." Statements such as this one tarnish your company's image.
- *The use of words with multiple meanings:* You may inadvertently mislead your audience by choosing words that have multiple definitions. In engineering reports, for instance, the following words are particularly problematic:

Inspection has a broader meaning than just "looking": it means to **examine** carefully or critically, investigate and test **officially**, especially in a critical investigation or scrutiny. Preferable words are *review, study, tour the facility*.

Determine means to come to a decision, to decide, to resolve. Preferable words are *evaluate, assess, analyze*.

Assure has several meanings: *promise, pledge, render safe, make secure, give confidence to, put a person beyond doubt, to convince*. Preferable words are *facilitate, provide further confidence, enhance the reliability of*.

To show you how these language errors can create real problems in the **marketing** of services, note the following statement from an engineering proposal:

The engineer will thoroughly inspect the premises and certify that the construction has been completed in complete conformity with the contract documents, and that no hazardous wastes or hazardous waste residues exist at the facility.

If the client accepts this proposal, then this statement becomes a type of contract or promise to complete the work in exactly this fashion. Think how much more protected the engineering firm would be if the writer had phrased the statement this way:

After completing the services, the engineer will prepare a report for the owner. The report will include an opinion regarding the conformance of the completed work to

the technical specifications. The engineer will also prepare a statement of opinion regarding the presence of hazardous wastes or hazardous waste residues at the portions of the facility the owner identifies.

Instead of using "certify" and guaranteeing "complete conformity" and the total absence of hazardous waste, the engineer in the new version presents the information in far less absolute terms. The pivotal word in the revision is "opinion"—a professional opinion is not the same as a concrete statement of fact. As this example illustrates, the key to avoiding litigation when you're marketing services is to qualify your communications so that clients understand they are purchasing expertise, not guarantees.

Liability in Writing Safety Information

In this category, writers are dealing not only with potential liability but also with protecting people and property from physical harm or other damages. Hazard messages generally fall into four categories, depending on the degree of the danger: (1) *note*, (2) *caution*, (3) *warning*, and (4) *danger*. As you write, it's important to choose the type of notice appropriate for the information you're providing and to label it appropriately.

Degrees of Danger

- *Note* indicates information that might be of special importance to the user. It's almost a tip for operation and may not be about a hazardous situation at all.

NOTE: Write down the path of the directories and files you want to compare before stalling the operation.

- * *Caution* indicates information that the user needs to know to avoid damaging the software, or hardware, or other physical equipment.

CAUTION: To avoid damaging the equipment, DO NOT plug in the server power cord until the instructions in this manual tell you to do so.

- *Warning* indicates information that is essential to people's safety.

WARNING: DO NOT look into a fiber-optic cable. The light emitted may cause eye damage.

- *Danger* indicates information that the user needs to know to avoid serious injury or even death.

DANGER! High-voltage wires can cause electrocution if you touch them.

Figure 8.1 illustrates the standard symbol for hazard alert messages: triangle with an exclamation point or another eye-catching icon in its center.

Figure 8.1

Standard Hazard Alert Symbol**Hazard Messages**

Because of the potential for lawsuits pertaining to inadequate safety information, this category has received a great deal of attention in the technical communications field. For a warning to be effective, it must do more than announce danger; it must also tell people how to use the product safely. That means that the language must do more than convey a passive message; it must also compel action. It's not enough to say "*Don't*"—you must also explain what will result if the user ignores the warning. By indicating the consequences along with the alert, you give users enough information to make a reasonable choice about their actions: they are fairly warned (see Guidelines: Writing Effective Hazard Messages). Figure 8.2 shows effective hazard messages that combine graphics, warnings, and consequences.

Figure 8.2

Hazard Alert Messages Using Graphics and Text

A WARNING: MOVING PARTS can cut off hand or fingers. **DO NOT TOUCH.**



A CAUTION: HOT PARTS can cause burns. **DO NOT TOUCH UNTIL COOL.**

GUIDELINES Writing Effective Hazard Messages

- Consider all aspects of the hazard: the nature of the product, its use, the experience of the user, the frequency and seriousness of the potential injuries, the obviousness of the danger, and the foreseeability of misuse.
- Comply with any existing standards, either **in-house** or **out-of-house**, for writing warnings. Some companies have guidelines published in their corporate style guides. The American National Standards Institute (ANSI) has established a set of standards to guide technical communicators in the development of effective hazard alert messages.
- Consider the urgency, specificity, and clarity of the wording.
- Place the warning in a location most appropriate for the user.
- Consider the durability of the warning.
- Convey only one message in each warning. Multiple messages are confusing to the user.
- Give a clear reason for avoiding the hazard. The consequences of ignoring the warning should be spelled out in the message.
- Use as few words as possible so that the message is not surrounded by unnecessary clutter.
- Use the active voice, not the passive. The active voice expresses more urgency and is easier to read.
- Consider design elements that will make the message highly visible: icons, boxes, boldface type, color, pictures, and so on. Use these elements consistently.

Liability in Writing Employee Information

Another category where language may invite litigation includes material published for employees. Employment law has expanded to encompass a number of issues, including defamation of character, invasion of privacy, discrimination, and wrongful discharge. The main documents vulnerable to lawsuits are employee handbooks, employment letters, and performance evaluations.

Employee Handbooks

In wrongful-discharge cases, plaintiffs may look to employee handbooks or other employee information to corroborate their claims. When writing such information, think carefully about the claims you're making. In trying to project a pleasant corporate image, you may fall into the trap of using marketing language that leaves your company wide open for a lawsuit if you have to discharge someone. For instance, if the company handbook contains a statement such as: "At ABCO, we encourage hard work and team spirit by rewarding everyone who does a good job," a discharged

employee could argue that the quality of the job is open for interpretation, and therefore the termination was wrongful discharge. To avoid such situations, companies should examine the implied contracts contained in their employee handbooks. Is the language in these in-house documents trustworthy, or is it marketing hype? Does it suggest absolutes where qualified language is more appropriate?

Employment Letters

Be cautious about what you write in letters of recommendation or in employment offers or letters of rejection. For instance, you may interview several candidates for a job and choose one. The letter you write to the other unsuccessful candidates should NOT suggest the specific characteristics of the person you hired. This paragraph invites a lawsuit:

ORIGINAL

We have, after a good deal of consideration, decided to hire another candidate for the position—a candidate with considerable professional experience in substantive editing of work on technical and scientific topics, as well as experience in developing documentation specifications.

If an unsuccessful candidate can argue that her qualifications are equal to those described in such detail, or that the person hired really doesn't have those qualifications, then she has the option of bringing suit against the employer. It would have been much safer for the employer to write simply:

BETTER

We have, after a good deal of consideration, decided to hire another candidate whom we feel is best suited for the job.

Tip: *Employees have sued former employers for libel and slander based on evaluative statements made in recommendation letters to prospective employers and for promises to applicants not kept once employment had begun. Legal experts suggest communicating only indisputable facts in such letters: dates, positions held, and duties required.*

This version doesn't make claims about professional qualifications that may not be able to be substantiated. Instead, it makes a broad statement about the hiring committee's choice, leaving little room for misinterpretation or argument.

Performance Evaluations

If you are in a position to supervise other workers, you should get in the habit of documenting important information such as disciplinary interviews, termination interviews, and regular performance evaluations. Such documentation provides a clear record—a paper trail, if you will—of all proceedings that precludes speculation and misunderstandings.

In performance evaluations, in particular, it's important to be candid. Employees who have been fired may sue companies for wrongful discharge because their performance evaluations look little different from those of employees who were

not terminated. Be sure evaluations include specific discussions of how employees are not meeting expectations for their positions. When writing evaluative materials, use objective language: evaluate work behaviors, not intangible factors such as attitudes. Avoid any comments based on age, gender, race, religion, sexual orientation, place of national origin, or disability.

For example, avoid ambiguous communication such as "Ms. Lewis has the opportunity to improve relations with her coworkers." While this phrasing is diplomatic, it doesn't convey what you really mean to say. A better, less ambiguous version is "Several of Ms. Lewis's coworkers have asked that she be more cooperative in team meetings." The language in the revised version is direct and firm while remaining objective and sticking to the facts.

Writing effective employee information is a matter of avoiding marketing language and specifics that may invite contradiction. Unfortunately, it's a good idea to think in terms of a hostile audience when you're writing such information, rather than assuming goodwill. Once you've reviewed your documents from this negative perspective, you can then work on revising them to present a friendly corporate image, while still protecting yourself from possible misinterpretation.

Understanding Intellectual Property Law

With the growth of e-commerce and the use of the World Wide Web, the legal questions surrounding the use of intellectual property are especially controversial. "Intellectual property" is the property of your mind or intellect. In business, this term also means your proprietary knowledge, such as confidential product development plans. Intellectual property law (frequently shortened to "IP") is developing rapidly, but the legal system moves much more slowly than Web technology. At the heart of the controversy for technical communicators is the idea of "implied license." The following is a brief explanation of intellectual property law and its issues.

In general, intellectual property law is divided into three categories:

- Patents
- Trademarks
- Copyrights

A *patent* is a document that protects the inventor and gives him or her the exclusive rights to manufacture and sell his or her invention for a determined amount of time. An emerging issue here is whether someone can patent the "look and feel" of software programs. For example, is Microsoft's graphical user interface too similar to that of Apple Macintosh? Does that constitute a violation of patent?

A *trademark* is an officially registered name, slogan, or design (such as the red Coca-Cola logo or Nike's "Just Do It" slogan) that distinguishes one manufacturer's goods from another's. Using a trademarked name on a product not associated with the original manufacturer is illegal.

A *copyright* is the legal right of an author, composer, publisher, and so forth to be solely responsible for giving permission for publishing and reproducing his or

her work. After a specific length of time, copyright protection ends and the work is said to become part of the "public domain," where it can be reproduced without permission.

With hardcopy documents, many of these legal rights are clear, and people who violate the law in regard to these secured rights can be sued. But information published on the Web is not as easy to legislate. For instance, when someone posts something on a Web page, it would seem that the person has given "implied license" for anyone to copy or use that information without first securing permission. Nonetheless, this implication is not necessarily true. For example, if you download information from a Web site and post it on your site, have you violated copyright? The law is not clear on this point, and Congress is busy introducing legislation that speaks to these electronic issues. As the law develops, here are some of the key questions you may face and some emerging answers:

- *May I freely link to other Web sites?* Yes, unless there is a statement on the site to which you want to link saying such links are prohibited.
- *May I scan images from a Web site and post them on my own?* No, because the material is not your "property." Only if the images are legally considered in the public domain (that is, no longer under copyright) can you scan them without permission.
- *May I freely copy, print, or e-mail information from a Web site?* Like any written document, information on the Web requires the Webmaster's permission to reproduce the material in any way. However, that assumes that the Webmaster owns the copyright on all the material displayed, a situation that is rare.

For more information on intellectual property law and other "Web law," check this Internet address: <http://www.patents.com/weblaw.htm>.

Almost all litigation involving language is a matter of interpreting what was said, what was meant, and what was understood. Given the ambiguity of these situations, you must be scrupulous about considering your documents from the audience's point of view and taking the precautions needed to write responsible prose in the first place.

Tips for International Communication

The globalization of business has encouraged various organizations to establish several international codes of ethics. For example, William Frederick, a business ethicist, has developed the *Moral Authority of Transnational Corporate Codes (MATCC)*, a code that divides ethical values for multinational corporations (MNCs) into five universal business areas: (1) employee practices and policies, (2) basic human rights and fundamental freedoms, (3) consumer protection, (4) environmental protection, and (5) political payments and involvement. In Switzerland, the Caux Roundtable has collaborated with representatives from Europe and the United States to create an international code based on thirteen

principles of social responsibility and ethics. The Society for Technical Communication has developed a national code of ethics for professional technical writers in the United States and is encouraging its use internationally. These and other codes being developed are attempts to reduce the cultural relativism of ethical behavior. As business and industry cross more national boundaries in the global marketplace, the moral values of individual cultures will be less and less likely to dictate ethical behavior in transnational business practices.

Your sense of ethics is a combination of your own moral values and the values your specific environment encourages. When the two diverge, you face choices that are not easy. By understanding the nature of your own ethical structures and those around you, you can be better prepared to make choices you can live with later.

When you are preparing documents for other countries, be aware that the laws governing communication differ in different lands. It's a good idea to research the product liability law in the target culture to understand the standards that apply. In most countries, you can gather this information by contacting the U.S. embassy in the area. If the information is handy, the embassy officials may send it to you. If not, they can tell you where to find it.

It's also a good idea to collect some sample cases where communication has been found liable. Such cases may provide valuable information about the culture's response to certain types of communication and where the pitfalls lie. Assuming that all people respond to text and design the same way consumers in the United States do is a serious mistake. For instance, in a culture where the people read from right to left, featuring a hazard message in the top left corner of the page is not appropriate. Readers might not see it until too late.

For more about cross-cultural communication, see Chapter 7.

Quick Review

As a technical communicator, you *need* to adjust your prose and your document design to fit various audiences, but you should never adjust your sense of what is morally right and what is wrong. The term *ethics*, as applied to technical communication, encompasses the specific moral choices you must make as you communicate technical information. These choices often involve situations beyond the scope of legal codes or standards, and you must make judgments based on internal codes of behavior. Nonetheless, many businesses and industries are turning their attention to social responsibility issues and are beginning to develop codes of ethics to encourage their employees to act responsibly and ethically when faced with moral choices.

- In business and industry, social responsibility comprises four categories: economic, legal, ethical, and voluntary responsibility.
- Types of ethical issues relevant in the business world fall into four broad categories: conflict of interest, trustworthiness, communications, and organizational relationships.

- Technical communicators can follow these guidelines: don't suppress knowledge or data; don't exaggerate claims or favorable data; give your readers a clear understanding of what the information means; respect copyrighted information.

Technical communicators also need to be aware of the potential for liability in the language they use. Increasingly, consumers are bringing "information liability" lawsuits against companies—and sometimes against individual writers themselves. The three main areas of litigation for technical communicators are (1) product liability law, (2) employment law governing wrongful discharge and discrimination, and (3) intellectual property law.

- Product liability law includes negligence, breach of warranty, and strict liability in tort. These legal elements apply to the following areas of technical communication:

Marketing of goods (such as writing ad copy or promotional material)
Marketing of services (such as writing consulting brochures or contracts)
Writing safety information (such as hazard messages)

- Employment law includes the following material published for or about employees:

Employee handbooks
Employment letters
Performance evaluations

- Intellectual property law as it applies to the World Wide Web is emerging and includes rules governing patents, trademarks, and copyrights of material published on the Web.



Exercises

1. Research the news media for the last five years and find at least one case where ethics in communication played a role in a national or international problem (such as the Firestone Tire case, the tobacco lobby, and so on). Explain in writing what the ethical issues are and how they fit into the categories discussed in this chapter.
2. Find an example of safety information that you think is insufficient. Write a brief explanation of why the hazard message is inadequate and revise it to provide proper information.
3. Find advertisements in a magazine or newspaper, or online to illustrate at least three of the following categories of inappropriate advertising:

Creating false impressions
Using imprecise language

- Omitting information
- Including false or inaccurate information
- De-emphasizing information



Community Action Project

Using the ideas and material in this chapter, volunteer to help an organization or a company develop a written code of ethics governing its communication practices. The actual content of the code may address issues relating to policies and procedures; government laws and regulations; marketing materials; communication with customers, suppliers, and competitors; handling of proprietary information and trade secrets; and so on. Be sure to involve all levels of the organization in developing the code and get management's agreement to enforce the code once it's completed.

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PROFILES IN PRACTICE

Exploring Online Capabilities

Gail White-Dixon

*Adjunct Professor
Professional Foundations
Franklin University*

When most people think of online media, they think of computer-based training, CD-ROMs, and maybe Web sites with endless interconnections. But there can be far more to online capability than that, according to Gail White-Dixon, whose years in the telecommunications industry led her to teach online learning concepts at the college level. Online media offer not only finished products but effective ways of producing these products as well.

Powerful new tools let people work together in new ways. Internet resources, audio/video conferencing, electronic whiteboards, group chat rooms, electronic bulletin boards, and new generations of collaborative software that allow distant groups to coproduce a product are examples of online tools that can be used during product development "We're talking about using online media as you work," White-Dixon points out.

There's also nothing that says these tools can't be adapted for innovative information products either. "Technology is available to do the work," White-Dixon says. Planning a two-day "virtual retreat" is a possible option for a presentation or training session. Each person participates from his or her own site. "One of the things you can do is present information several ways to accommodate different learning styles. People won't stay with it if they're not engaged," White-Dixon notes. She suggests adding interactivity by polling the audience via the Internet or allowing them to choose among topics to pursue.

White-Dixon sees the potential for online communication of technical information as almost unlimited. "Once people are comfortable with the tools, the technology fades into the background," she says. Still, she recognizes that at its heart, communication is a human skill. "We add technology and people think that's the fix for communication. You still have to deal with people." In a question that applies to both advancing technology and the humans who will communicate with it, White-Dixon asks "How are you going to make sure everyone is ready?"

PROFILES IN PRACTICE

Tony Machosky*Senior Technical Editor**Sterling Commerce***Rereading E-Mail**

At Sterling Commerce, a company that provides software and services that enable electronic business transactions, there are two things you can't survive without: speed and accuracy. Tony Machosky, a senior technical editor at Sterling, knows that he can compromise neither. Much of his business depends on e-mail communications. "We get memos," Machosky says, "but they're usually repetitions of e-mails." He notes industry's increasing reliance on e-mail for official communications: "It's an e-mail world, but it's one that requires caution."

There are two ways to think of e-mail. One is to regard it as a quick, electronic conversation. The other is to regard it as a formal **document—written** on screen rather than on paper. Machosky prefers the second view. "If it's written down, it ought to be revised and proofread," Machosky counsels. Because anyone may forward e-mail to large numbers of people, there's no way to control who might eventually read something. "It can go anywhere other than where you expected it to go," he says, advising discretion. That e-mail you just dashed off may be "the final representative of you and the company to the outside world."

Machosky has encountered another danger with e-mail and the Internet. "It becomes very easy to copy and paste and pass something off as your own," he warns, and cited a case in which someone proposed an entire plan, complete with proprietary name, that had originated at another company. Luckily, Machosky recognized the name and headed off serious trouble. "You just don't do that," he says.

Machosky enjoys his work, but he recognizes that technical communicators aren't always sufficiently valued. "You may encounter low levels of appreciation sometimes," he says, "and you really have to do things more for your own sense of what's right."

GUIDELINES Writing E-Mail

- Organize each message the same way **you** would a paper **document** of the same length.
- Avoid using fancy formatting, like italics, boldface, tab spacing, and so forth.
- Look good online. Check your message for spelling and grammar before you send it.
- Don't write in all capital letters.
- Don't assume that just because you've sent people messages, they've necessarily received or read them.
- Consider the ethics of using e-mail. Don't forward confidential correspondence without getting the author's permission.
- Be aware of privacy issues. Don't put anything in e-mail that you wouldn't put on paper.
- Use your company's e-mail system only for professional business.
- Be polite.
- Adhere to the conventions of "cyberspeak."

Internet Resources for Chapter 9

About.com's Technical Writing: How to Write Letters

<http://www.techwriting.about.com/cs/letters/index.htm>

Many tips on letter writing, samples, and other technical writing resources and links.

Business-Letters.com

<http://www.business-letters.com/>

A collection of letter templates on a wide variety of business topics.

Letters, Letter-Writing and Other Intimate Discourse

<http://www.wendv.com/letterwriting/>

This Web site features a comprehensive set of links to various sites that feature information and tips on letter writing.

Netiquette

<http://www.albion.com/netiquette/>

This site covers both common courtesy online and the informal "rules of the road" of cyberspace and provides links to both summary and detail information about Netiquette.

The Art of Writing E-mail

<http://www.net-market.com/email.htm>

This article by Gerardo San Diego includes many helpful tips on writing e-mail messages.

Memos, Letters, and E-Mail Correspondence

Memos, letters, and electronic mail are the workhorses of the business world. In companies and institutions around the world, memos constantly convey messages from supervisors to staff, colleague to colleague, project team members to team managers—and beyond to clients and customers in other companies. When a situation requires formal correspondence, writers send letters. Today, e-mail increasingly gives people yet another method for written communication.

Comparing Correspondence Modes

Writers in any type of workplace will agree that memos, letters, and e-mail are the three essential types of correspondence. They may seem similar at first, but each has a different effect on readers. As anyone who lives or works where computers are present knows, e-mail has become the preferred form of communication for almost all tasks: from sending quick messages and updates to purchasing equipment and acknowledging receipt of products. Electronic mail has the advantage of speed and efficiency, and it is a potential means of fast communication wherever a telephone wire meets a modem.

But even with the advent of e-mail, memos and letters still provide the formal records of most transactions. It's important to know that providing a "paper trail" of hardcopy correspondence serves you well in several ways: it establishes a record of your efforts, seems more personal than electronic communication, and makes your project more visible to colleagues. One of the reasons these forms of correspondence work so well as record-keeping devices is that only on paper can writers provide signatures—either for signing off on (acknowledging) something or signing the document to make it legally binding. If a memo goes out with your signature on it, you are responsible for its contents. And that signature also adds a human touch so important in transactions between people. Electronic communication is quick and useful, but it lacks the personal element.

r **Tip:** *Some people use memos and letters interchangeably. Sometimes a message in memo format will have a greeting ("Dear . . .") at the top and a closing ("Sincerely") at the bottom. And sometimes a letter will have the heading "MEMORANDUM" across the top of the page. These kinds of hybrid correspondences are common but often confusing for the recipient. Memos and letters are separate forms of communication and have different purposes.*

Another benefit of sending letters and memos is that doing so keeps your project in the forefront of your colleagues' consciousness. As you complete various phases of your work, it's a good idea to send update memos to those working with you. And when you need information from someone or are asked to send material to a coworker, follow the phone call or e-mail with hardcopy correspondence. This practice further establishes your professionalism and suggests that you regard the recipient seriously enough to take the time to write.

Because paper correspondence can have such a powerful effect and is often not used to its full potential—or is misused—this chapter discusses hardcopy memos and letters first and then turns to a discussion of e-mail.

Planning and Researching

No matter how short a document is, it always benefits from planning and researching the audience and the facts you want to convey. The longer the document, the more planning required. With memos and letters, the preliminary thinking needn't take too long, but it is necessary. Writers who ignore this step and plunge right into composing the piece often cause readers confusion and frustration as they waste time deciphering the message. Another side effect of this hasty work is that writers give an impression of sloppiness. Even short letters can signal muddled thinking and unprofessional habits if they are not planned well.

Developing a Rhetorical Strategy

Before writing any correspondence, careful writers take the time to consider the rhetorical situation for their messages. As discussed in Chapter 1 (pp. 9-10), their goal is to prepare quick strategies that include thoughtful consideration of *purpose*, *audience*, and *writing techniques*. Developing a rhetorical strategy is sometimes simple because the situation is often clear-cut. (See Steps to . . . Creating a Rhetorically Effective Letter.) You are probably writing to a specific person (or small group of people) and can determine their needs more accurately. The few minutes it takes to plan your strategy can make a real difference in the power and effectiveness of your correspondence.

By taking the few minutes necessary to jot down a rhetorical strategy, you ultimately save yourself a great deal of time. Without such a plan, you may get halfway through the letter before you really know what you want to say—which means you'll have to scrap the work you've already done. Or, even worse, you may not

Steps
to ...

CREATING A RHETORICALLY EFFECTIVE LETTER

1. Establish your purpose. In the example below, the writer has taken the time to ask herself what her real purpose is. What does she want to have happen as a result of this letter? What does she need? When you sit down and ask yourself these questions, you may be surprised at the layers of needs you have. What seemed a one-dimensional writing task suddenly reveals itself to be far more intricate.

<i>Purpose</i>	<i>Send site preparation specs and alert client to changes, need to convince him that changes are necessary.</i>
<i>Audience</i>	<i>Donald Grant, Project Liaison. He needs the specs now, but he may resist the changes because of cost increases. He needs to have confidence we are not raising costs unnecessarily.</i>
<i>Writing Techniques</i>	<i>State up front the good news: Specs are ready. Then give the specific changes, explain now these changes benefit his company. Give logical reasons, but don't dwell on explaining and justifying. Sound confident.</i>

2. Identify your audience. Target a specific audience and figure out its needs. What do people want from this document? What biases or special concerns might they have?
3. Clarify what you want and what your reader wants. You can decide to downplay certain elements that might conflict with the audience's biases and emphasize information that best conforms to their wishes. You can also make decisions about what tone to use and even how long the document should be.

bother to edit what you've done and send the reader into a confusing maze of thoughts.

Determining Your Purpose

In most business settings, memos—more formally called *memoranda* (plural) and *memorandum* (singular)—are the workhorses of the organization. They are the vehicles for internal correspondence while letters are usually reserved for external communication. But you will occasionally find yourself in situations where you need to write formal letters to people within your company and memos to colleagues in other organizations. You need to know specifically when it's appropriate to use each type of communication.

A memo usually passes between people who have already established contact and are getting further business done on a project. A memo is part of an ongoing conversation between colleagues, whether the colleagues are within the same

company or working together on a joint project involving several companies. In technical environments, memos are often sent so that they can be added to the project file, creating a paper trail that may be useful later if a history of the process is needed for legal or management purposes.

Letters, on the other hand, are more formal documents used to initiate correspondence or formally acknowledge the transmittal of information. For example, a technical project may begin with a letter accompanying the project proposal and end with another letter attached to the final report, while the project file fills with memos during the work process. In these instances, a letter may serve as a type of legal contract (complete with signature) and as a polite, firm handshake signaling the important milestones of the project.

For housekeeping purposes, use the appropriate kind of correspondence for the situation and keep letters and memos separate in the project file.

Analyzing Your Audience

An important element of planning is determining the best psychological approach to take with a particular audience. As discussed in Chapter 3, the most efficient strategy for most technical documents is *deductive organization* where writers *frontload* the most important information at the beginning of the text. In letters and memos, that is usually the most efficient approach, but occasionally the receiver might need to have the message softened. For those situations, frontloading might not work well.

The Direct Approach The most common organization for effective memos and letters is the direct approach, used when the audience you're writing to is friendly (or neutral) to your message. In this organizational pattern, you begin right up front with your main point. For example, if you want someone to take a particular action, ask right away, then give details. If you have good news to convey, say so in the first paragraph of your letter. Being direct has the benefit of stating your purpose at the outset and saving the reader's time.

The direct approach has five elements:

1. Introductory greeting (not necessary in some memos)
2. Main point of the letter or memo
3. Details
4. Action step (if necessary)
5. Closing

Note how the memo in Figure 9.1 goes straight to the point without any preliminary throat clearing.

As you can see, this memo is an example of routine correspondence. But technical communicators frequently must write messages that carry emotional weight for employees, clients, or the public. Writing these messages well requires skills not often used in straightforward technical prose, even when the content of the letter or memo is positive.

Figure 9.1

Direct Approach Memo

Memorandum
<p>Date: October 1,2007</p> <p>To: K. Thompson, Accounting</p> <p>From: D. Rosen, Hotcell Installation Project Supervisor</p> <p>Subject: Hotcell Installation Cost Adjustments</p> <p>After reviewing the final phase of the Hotcell Installation, we believe that certain items as described on the attachment will cause a cost deduction from the purchase price of our P.O. #73200. In addition, we have found that some items will add to the cost of the final project.</p> <p>Please use the attached lists to provide a breakdown of the cost additions and deductions so we can finalize the billing. We will need the final figures by Tuesday, October 7.</p> <p>Thanks for your help.</p>

Good-news messages are the easiest to write: a promotion announcement, a message of appreciation, an appointment notice, and so forth (see sample on p. 215). As you might expect, the direct approach is the best technique in good-news situations. Generally, these memos and letters follow the standard direct order: clear statement of the news, the necessary explanatory details, and a warm closing. Because this organization *is* so standard, the result can appear routine rather than sincere. When sending good news, writers need to be as specific as possible and avoid the impression of a clichéd form letter. For instance, compare these two openings to a letter of appointment:

CUCHED It is my pleasure to inform you that, after careful deliberation, the vice president and the personnel committee have recommended you for appointment as an ABCO field engineer, employment to begin on July 1.

DIRECT Congratulations. You have been selected to join ABCO as a field engineer beginning July 1.

The first example sounds as if it were a “fill-in-the-blanks” form letter written by someone not at all sincere in the congratulations. Along with the good news of the appointment, such communiques also send the subtle message that the company could be a dry, stilted place to work. Make sure your introductory sentences convey a warm, sincere tone and don't clutter the essence of the message with unnecessary words. Get to the point and express it personally.

The middle of the good-news message is typically the longest section because it contains the details. In these paragraphs, maintain the same warm tone you established at the outset and order the information as clearly and as directly as possible. Messages that begin with hearty congratulations and then slip into corporate boilerplate by the second paragraph flag their insincerity to the reader. Similarly, if the letter's closing seems mechanical and insincere, you will leave a negative impression with the reader. Finish the message with a courteous close that adds a personal touch:

BOILERPLATE We look forward to working with you.

Regards,

Joseph Sheridan

Joseph Sheridan
ABCO, INC.

PERSONAL Once again, congratulations on joining the company. We will see you on July 1 at 9 a.m. for coffee and an introduction to your new colleagues.

Yours truly,

Joseph P. Sheridan

Joseph P. Sheridan
ABCO, INC.

Writing such real messages takes a little more time—a luxury that many business people think they don't have. Nonetheless, writing a sincere letter or memo to a person is worth the time. Find a quiet place and think about what you want to say. Don't plug in names and dates into a boilerplate letter already on the computer. To the extent possible—even when reporting good news—take the reader into consideration and write a message specifically tailored for that person.

The Indirect Approach The indirect approach is the best strategy when your audience is likely to resist your point or when you have bad or unexpected news to convey: rejection letters, notices of late payments, messages about increased costs, and so forth. In these situations, begin with *buffer* material that will win your audience's trust and goodwill. One of the best ways to accomplish this task is to start by showing that you understand the audience's point of view and share its concerns. Usually, this technique encourages readers to be more sympathetic to what you have to say. Here are a few of the most common types of buffers:

Agreement: Find a point on which you and the reader share similar views.

Appreciation: Express sincere thanks.

Cooperation: Convey your willingness to help.

Fairness: Assure readers that you've considered all aspects of the situation.

Good news: Start with the part of your message that's favorable.

Praise: Compliment an achievement or an attribute.

Understanding: Demonstrate that you understand the readers' needs.*

Once you have gained the audience's trust, introduce your own issues in a logical, nonthreatening manner. Present your opinions reasonably and clearly without adding emotional rhetoric that might spark an angry response. Close with a reassurance that you have given every possible consideration to the entire situation and hope the reader can see your point of view. The indirect approach looks like this:

1. Introductory greeting
2. Buffer: affirmation of readers' perspective
3. Proof that you have looked at all sides of the situation
4. Your opinion presented in a reasonable, nonthreatening manner
5. Action step (if necessary)
6. Closing

If you are delivering bad news, state the news clearly but considerately and give specific reasons for the unpleasant situation (see samples on pp. 216 and 217). It's important to provide sufficient detail for the audience to understand the rationale for the situation, but be concise. Long-winded explanations can seem defensive and insincere. Close the letter in an upbeat manner with a suggestion for positive action and a look toward the future. Do not repeat the bad news in the closing, nor end on an apologetic note. If an apology is warranted, include it in the body of the letter and move on. For example, in a letter turning down someone for a job, a closing such as the following leaves a good impression with the recipient: "I wish you the best of luck finding a job that matches your expertise. Thank you for taking the time to interview with us." On the other hand, a carelessly worded closing emphasizes the bad news and leaves a sour taste in the recipient's mouth: "I am sorry we are unable to offer you a position and wish you luck finding other employment." Remember that the ending is the last impression that readers will carry away with them; make that impression a positive one, even if the overall message is difficult.

The memo in Figure 9.2 from a computer systems manager to a senior vice president illustrates the indirect approach. Notice how even in a short piece such as this one, all six elements are present.

When using the indirect approach, be careful not to bury your point so subtly into the text that it becomes lost. While it is welcome courtesy to show appreciation for and understanding of other points of view, the clarity of your own reasoned opinion indicates confidence and professionalism.

Knowing how to approach professional correspondence is a vital skill for your success in the work world. By evaluating the rhetorical situation, you can decide whether to use the direct method or the indirect method in the letters and memos you write.

For more information on planning and researching, see Chapters 1 and 2.

*Adapted from Courtland Bovee and John Thill. *Business Communication Today*, 7th ed. (New York: Prentice Hall, 2002).

Figure 9.2

Indirect Approach Memo**Memorandum****Date:** February 11, 2007**To:** S. H. Goodson, VP, Operations**From:** C. Davis, Systems Maintenance**Subject:** Solutions to Recent System Outages

As you know, we experienced a major system outage on Tuesday, February 3, caused when the central processor failed from 9:30 a.m. to 1:30 p.m. Finding ways to prevent this situation from happening again is a top priority for everyone in the company, especially your division.

The present solution is to release the failing unit and repair it on weekends or during off-hours on weekdays. Unfortunately, doing so often keeps the failing box out of commission for several days and increases the extra maintenance billing for corrective measures taken outside of contracted hours. While I understand the cost issues involved in purchasing new equipment, I believe the money ultimately saved in maintenance costs will more than compensate for the purchase price.

I have reviewed the extra maintenance billing for the past year. It amounts to \$129,731—more than enough to cover the cost of a new system. I strongly recommend that we take the preventative step of buying a new system as soon as possible, before we experience another power outage and lose even more money.

I have prepared a cost analysis of the various systems on the market and will be glad to go over the figures with you. I will stop by your office next week with the material.

Organizing

Understanding how to organize memos and letters for efficient communication is an essential part of a technical communicator's repertoire. Because these documents are relatively short, some writers assume that any order of information is appropriate because readers can skim the whole piece quickly and understand the gist of the material. Not so. In short texts especially, readers expect the main ideas to be clear and the logic straightforward. They don't have time to waste figuring out what the writer meant to say. And the shorter the text, the more obvious disorganized prose becomes.

While most technical writing is objective prose, letters and memos require you to focus on subjective elements and to be sensitive to the readers' feelings in the way

you organize your messages. Whether correspondence is by memo, letter, or even e-mail, there are four main types of messages that technical writing conveys:

1. informative messages,
2. requests for action,
3. inquiries, and
4. appreciation messages. Organization plays a key role in the success of each.

Informative Messages

Technical communicators often have to send progress updates or to convey laboratory results, field-test results, or other data. Organizing informative messages is fairly simple and, more than any other type of message, reflects the classic direct approach: begin with a definite statement of the main point and follow it with the details.

In informative memos and letters it's important to use the first paragraph wisely, because readers want to get the basics right away. If they choose to read the details, they will—but they might not even read the middle of the letter. Long openings that ask readers to follow you as you take them through an entire process will probably annoy them. A much more useful beginning is to state major conclusions and then indicate that the rest of the letter gives the reasons for these results.

For example, consider this opening statement:

OPENING AS a result of your request, the Johnson Company has analyzed a series of interim modifications to the West Grand Avenue Pump Station.

On the surface, it may seem perfectly adequate; readers already know that they have requested the analysis. A better start is:

**REVISED
OPENING** After analyzing a series of interim modifications to the West Grand Avenue Pump Station, Johnson Company recommends replacing the existing pumps and constructing a new force main.

This opener tells readers exactly what they want to know. If the writer follows that statement with a rationale for Johnson Company's decision, the organization of the message works well. (See the complete E. J. Johnson letter in Chapter 3.)

Usually, the main point of an informative letter is to explain the result of an action or a process. Here's another example of an effective beginning that follows the direct approach:

**EFFECTIVE
OPENING** AS a result of a review meeting held in Bethune on March 9, 2004, the following software changes will go into effect immediately.

The software will

- reduce stopping time of card feed rolls
- keep card main cylinder motors running even when metal is detected
- allow card feed rolls to reverse with main cylinders running
- keep ratio of card feed rolls to line speed constant

In this sample, note how the writer comes straight to the point so readers know the purpose of the memo without having to struggle with extensive introductory material. Readers can probably assume that the middle part of the memo explains why these changes are necessary. From the clarity of the first paragraph, readers can also assume that the explanation will be organized clearly and logically. Jumbling facts and figures in any order in the middle of the message frustrates readers and creates a negative impression. The closing should provide an action step, if necessary, and a contact name and number for further information. For example:

EFFECTIVE These changes may cause **some** slowdowns initially as operators learn
CLOSING the new systems. If your staff needs specialized training in these systems, please contact Janet **Keegan** at x4542.

Sometimes, informative messages are really short reports that provide requested information and are meant to be placed in an informational file. Even in these standard communiqués, the direct approach is appropriate. Figure 9.3 shows the introduction to a government memo requesting pro forma information.

Anyone flipping through the file or searching the electronic file will know immediately what the subject of this memo report is and can retrieve the information easily. The rest of the memo contains subheadings and bulleted lists of information designed to make the information quickly accessible.

Figure 9.3

Memo Requesting Information

Memo

To: Mary Hansen, Director, Iowa Department of Public Health
From: Lorinda Inman, Executive Director, Iowa Board of Nursing
Lloyd Jensen, Executive Director, Iowa Board of Pharmacy Examiners
Ann Mowery, Executive Director, Iowa Board of Medical Examiners
Constance Price, Executive Director, Iowa Board of Dental Examiners
Date: 4/15/2007
Subject: Report on sharing of staff (2004 Iowa Acts, SF 2298)

2004 Iowa Acts, Senate File 2298, section 102(10)g requires the Department of Public Health to submit a report by December 1, 2005, regarding the sharing of administrative, clerical and investigative staff by the Board of Medical Examiners, the Board of Pharmacy Examiners, the Board of Dental Examiners, and the Board of Nursing. Pursuant to this act, the Boards of Nursing, Pharmacy, Medical, and Dental Examiners submit the following information.

The boards continue to regularly coordinate efforts and staff in the following areas:_____

Requests for Action

Requests for action are letters and memos asking someone to do something (see sample on p. 220). They may require a direct or an indirect approach, depending on the situation. If you are requesting a routine action, the more direct you can be, the better. But if you are asking someone to do something that person may not want to do, or if you are asking a favor, you may need to fine-tune the order of information.

For instance, the memo discussed earlier (p. 196) asks directly for accounting information. Its approach is absolutely straightforward so the transaction happens quickly and efficiently. It follows the *what*, *why*, and *when* strategy:

1. This is *what* I need.
2. This is *why* I need it.
3. This is *when* I need it.

When couched in courteous prose and organized in this way, requests for action get results fast. Keep in mind that tone is important here: it's easy to sound bossy and demanding when you need something quickly. Make sure you are polite in asking for material, even when it's the person's job to retrieve it for you. Avoid phrases such as "Send me the material immediately" unless you soften the commanding tone with "Please" and "Thank you," and indicate reasons for the urgency.

In instances where readers may not be eager to provide what you need, you may want to begin with a rationale for your request. Helping readers understand why the request is important goes a long way to prompting fast action. For example, "To help us finish the project on time and prevent costly delays, we need your immediate approval for this additional expenditure," or, "Although I realize providing these figures may cause you to take some extra time, we cannot proceed on the project without them," gives readers a reason to act.

The request-for-action memo in Figure 9.4 (p. 198) shows how poor writing can actually miscommunicate a request and create negative impressions.

Reading the subject line of this memo, most employees would get the impression that they were being invited to the conference. But on reading further, they discover that not only are they not invited, they are also being asked to park and eat somewhere else to make room for conference participants. The subject line is misleading and vague, the tone is callous and cold, and the specific request is unclear. Many people would be offended by such a memorandum. Consider the revision in Figure 9.5.

In this version, the subject line sets readers' expectations clearly, and the writer immediately explains the reasons for the inconvenience. Throughout the memo, the writer's tone suggests sincere concern for the employees and gratitude for their cooperation. There is also a more human touch evident here, as is appropriate in such requests—especially if the recipients are being asked to go out of their way to do something. The contact phone number further personalizes the memo, adding the important element of a response mechanism for people who may need to have further information.

Figure 9.4

Request-for-Action Memo

MEMORANDUM

Date: December 8, 2007
To: All employees
FR: G. P. Putnam, Conference Planning Office
RE: Meeting on "Management by Objective," December 10–12

1. On December 10–12 Genetech, Inc., will host a conference on "Management by Objective" which will be held in the Building Six Auditorium.

2. Approximately 500 conference participants are expected, which will cause crowding at some of the corporation's facilities. The Building Six Parking Lot will be reserved for conference attendees. Employees who normally park there should make an effort to use other lots. Also, between 11:30 a.m. and 12:30 p.m., the Administrative Building Cafeteria No. 3 will be occupied by conference attendees. Corporation employees should plan accordingly.

3. As always, your cooperation in these matters is greatly appreciated.

Inquiries

Inquiries ask about something (for example, queries about job openings, requests for information on professional techniques or procedures, requests for clarification of requirements). The basic organization is the same as a request for action letter (see next page), but an inquiry letter should emphasize *what* and *why*—*when* is not especially important here—and also add *who*. In these letters, indicate right away who you are and make clear why you are asking what you ask: "At Textron we are faced with a problem similar to the one you describe in your recent IEEE article on arsenic and groundwater. Because you are the leading authority on these techniques, we would like to request more information on" (See the sample inquiry letter on p. 219 at the end of this chapter.)

Appreciation Messages

Expressing appreciation in writing is an opportunity to create goodwill and to show your sensitivity to others' actions or accomplishments (see sample on p. 218). The key to appreciation messages is timeliness. Express your thoughts about an event within two days of its occurrence. Such promptness shows respect for the reader and indicates the genuineness of your appreciation. Keep the message brief (a page or less) and use a positive tone that emphasizes the recipient rather than yourself. For example, saying "Thank you for your extraordinary

Figure 9.5

Revised Request-for-Action Memo**MEMORANDUM****Date:** December 8, 2007**To:** All employees**FR:** G. P. Putnam, Conference Planning Office**RE:** Alternative Parking and Cafeteria Arrangements

Because of a large conference on "Management by Objective" scheduled for December 10-12, company employees will need to make other arrangements for parking and using the cafeteria on those days. Over 500 participants will be coming to our complex for the conference, giving us increased visibility and publicity in the local press. Nonetheless, accommodating that number of people means some inconvenience for our employees.

We have made special arrangements for those normally using Building Six Parking Lot to park in Building Four Lot those days. Employees who use Administrative Cafeteria No. 3 have special access to Cafeterias No. 2 or 4 during the conference. By December 13, we will resume regular operations.

Thank you for your understanding and patience in this situation. Your consideration will be a great help to the company. If you need to make any other special arrangements or have questions, please call me at x2512.

efforts during the recent push to get our product out on time" focuses much more on the reader's accomplishment than "I would like to take this opportunity to thank you for...." It's also a good idea to say why you are appreciative. Rather than just offering thanks, make the gesture more sincere by emphasizing the results of the person's actions: "Your good work has allowed us to complete the project on schedule."

Effective appreciation letters use the direct approach and are never form letters. Instead, they should be personal and sincere. In many instances, appreciation messages do more than convey gratitude; often they are placed in an employee's file as reference for promotion or other job changes.

For more information on organization, see Chapter 3.

Designing

In general, memos and letters use standard formats with few variations. Many companies have special formats for letters and memos. Your first step in designing correspondence should be to find out what the company formats are.

Although most companies have pre-produced memo stationery and company letterhead stationery, it's a good idea to know the basics of the message design.

Memos

Memos typically have three parts: the heading, the body or text, and the signature.

Headings Memos are most often designed with the label "MEMO" or "MEMORANDUM" either centered or flush left at the top of the page. A few spaces under that label are the heading elements, usually in this order and flush left:

DATE:

TO:

FR: [sometimes "FROM"]

SUBJECT: [sometimes "RE"]

The most important part of this heading material is the subject line. Too often, writers fill in this line with a vague topic that doesn't pin down the memo's subject clearly enough. Remember that readers check the subject line first to get a sense of what the memo is about. It is the writer's first chance to set reader expectations and clarify the point. Be as specific as possible when labeling the subject.

Remember, too, to include the correct date in the appropriate space. Dates on memos allow readers to track the correspondence about projects and organize their files appropriately.

Signature The writer's signature—sometimes just initials—follows the typed name in the "FR:" line. Don't sign a memo at the end of the message.

Text The content of the memo itself begins a few lines after the heading and should follow the rules of effective page design. Even in short memos, bullets and subheadings may be appropriate to break large blocks of text into readable units.

Letters

Letters have a standard format with few variations. Formal letters should be written on quality stationery and single-spaced, usually in a 10- to 12-point type font. Figure 9.6 illustrates the following elements of a business letter.

Letters include at least seven elements: return address or letterhead, date, recipient's address, greeting, body or text, closing, and signature. When appropriate, a letter may also include the preparer's initials, an enclosure notation, and a distribution list.

Letterhead Company letterheads usually appear at the top of the page. If you are not using letterhead stationery, type your return address at the top of the page (centered or aligned at the right margin). It is not necessary to include your name.

Figure 9.6

Business Letter

	1777 Oxford Road	<i>Return</i>
	Orono, MN 55357	<i>Address</i>
March 20, 2007		<i>Date</i>
Dale Arnett, Project Manager		<i>Recipient's Address</i>
Dunn & Bradstreet Software		
9 Technology Drive		
St. Paul, MN 55412		
Dear Dale:		<i>Greeting</i>
Enclosed is the proposed telecommuting policy that we discussed. In addition		<i>Body</i>
to the policy itself, there is a section that lists the benefits and drawbacks of		
telecommuting and another that discusses the current state of telecommuting		
at DBS.		
This policy focuses only on the general guidelines that I feel the company should ad-		
dress. I made a conscious effort to leave most of the specifics of managing telecom-		
muters up to individual managers. I think you'll agree that this is the best course.		
Ellen Hanley has proofread this document. When you feel the time is right, we can		
submit it to others for their review. In the meantime, please look this over and let		
me know what you think of both the policy and the implementation plan.		
Thank you very much for supporting this project.		<i>Closing</i>
Sincerely,		
<i>Steve Straight</i>		<i>Signature</i>
Steve Straight		
Special Projects Consultant		
ss/ge		<i>Preparer's initials</i>
Encl.		<i>Enclosure notation</i>
cc: Beth Hanson		<i>Distribution list</i>
Al Kamona		

Date Place the date aligned at the left margin either two spaces above the recipient's address or two spaces below it. In formal letters, don't use the abbreviated forms for dates; spell out the month and use the complete numerals for the year. Not 2/4/07, but February 4, 2007 (or the European style, 4 February 2007). Note that European style uses no commas.

Inside address The recipient's name and address appear flush left a few spaces under the letterhead. Called the "inside address," it should be identical to the one used on the outside of the envelope. If you are sending a letter to a person whose name you don't know, use the appropriate title in the name line (Hiring Manager, Department Chair, Funding Officer)—but it is always well worth making a real effort to find the person's name. You'll make a much better impression.

Greeting The greeting appears four spaces below the inside address. In formal letters, it is customary to use "Dear" followed by the recipient's title (Dear Dr. Carlson, Dear Professor Walters). Only if you know the reader personally should you use the first name. As in the inside address, it is appropriate to use the position title here (Dear Hiring Manager, Dear Professor, Dear Alumni Director) if you don't know the person's name. Avoid using anonymous (and often sexist) greetings such as "Dear Sirs," "Dear Sir/Madam," or "Gentlemen." Not only do these vague salutations give the impression of insincerity, they also can be offensive if you misgauge the sex of the recipient. Either a comma or a colon should come after the person's name. The colon is more formal.

Body Begin the letter two spaces below the greeting. You can either double space between paragraphs or indent five spaces for each new paragraph. Don't do both. Bullets and subheadings are appropriate to break up dense blocks of text and to serve as reader cues, but use them only if they are necessary.

Closing The closing appears two spaces below the last line of the letter's main text, aligned at the left margin. Use traditional closings: "Sincerely," "Best regards," "Yours truly." Avoid overly personal closings.

Signature Type your name four spaces below the closing and write your signature in ink—preferably black ink for better reproduction—just above the typed version. Your title should either appear on the same line as your typed name (set off from your name by a comma) or be typed one space below your typed name (no comma necessary).

► **Tip:** *It's a good idea to send copies of important letters to everyone who is mentioned in the letter or who may be affected by the letter. Doing so keeps everyone informed, creates a "paper trail," and promotes goodwill.*

Preparer's initials If someone has prepared your letter for your signature, your initials followed by a slash and the typist's initials will appear in lowercase two spaces below your typed name.

Enclosure notation If you are sending one or more items along with your letter, place the word "Enclosure" or "Enclosures" (or "Enc." or "Encl.") aligned left two spaces below the typist's initials. Doing so alerts the reader that the letter comes accompanied by other material. If you have attached the material (with staples or clips), the more appropriate notation is "Attachments."

Distribution list When you need to send copies of your letter to other people, place the lowercase letter c (or *cc* for multiple copies) two spaces below the enclosure notation, followed by a colon. Then list the names of the people you've copied. Generally this list appears vertically, but you can set it up horizontally to save space.

For more information on page design, see Chapter 4.

Editing

Finding the best organization for your prose is only one of the elements you need to consider in your correspondence. To be effective, memos and letters should have a readable style appropriate for the audience and the situation. One of the most frequent complaints from businesspeople about the mail they receive is that clumsy style creates a wrong impression and/or gets in the way of clarity. When you sit down to write, remember these complaints and edit your sentences so that they produce a positive effect. Pay special attention to two elements of style: (1) tone and (2) clarity.

Creating the Right Tone

When you receive a letter or a memo, one of the first things you probably respond to is its tone. Unlike technical reports, proposals, or manuals, this type of correspondence carries with it a personal voice: the message comes from a specific person and goes to specific people. In fact, personality is often what elicits either a favorable or unfavorable response from the readers. When the tone is engaging, readers pay more attention to the content; when the tone is harsh—whether intentional or not—readers are likely to resist the message. The result is lost customers, hurt feelings, demoralized staff, and lower productivity. (See Guidelines: Creating the Right Tone).

Tone in writing isn't created by inflection or decibel level. Instead, the written "voice" depends on *diction* and *sentence structure*.

Diction As you write, keep in mind that the words you choose create the impression readers have of you. Your diction (word choice) paints a picture of the person speaking. If your language is pompous, readers may think of you as self-impressed and arrogant. On the other hand, if your language seems genuine and clear, readers react positively. It's a common myth that large words and elongated phrases sound impressively professional: "Pursuant to your letter of June 25 ..." Or "As per your letter .. ." instead of "As you requested in your letter of June 25 ..." Or "I am in receipt of your materials____" instead of "I have received your materials ..." Using overblown diction wastes space and creates negative impressions. Try to find the clearest, most direct words to express your point. Readers will be grateful for your clarity and will enjoy reading your messages.

Sentence Structure The way you organize individual sentences also contributes to the overall tone of your prose. If all of your sentences follow the same pattern,

GUIDELINES Creating the Right Tone

- Don't write when you're angry. You'll probably regret it the next day. So wait a while before sending that blistering e-mail or memo.
- Motivate, don't browbeat. A systems manager sent a memo chastising programmers who were cluttering the computer with their old documents: "As the reinitialization process deletes anything left on the system disk, we will assume that you do not need any documents remaining on the system after June 22." This "your-silence-assumes-agreement" tactic is a staple of managers who are eager to gain closure but haven't a clue how to motivate people. Instead, show them what they stand to gain by following procedures (fewer computer shutdowns, more chance to finish their work).
- Be courteous. Another common nonmotivating phrase is "Thanking you in advance for your cooperation." This won't motivate people to do something they don't want to do. Also, avoid the overly humble, "Thanks for taking five minutes from your busy schedule____" By using this phrase, you put yourself down and diminish the equality of a professional relationship. Just write: "Thanks for meeting with me."
- Be Positive. When you have to be critical about people's job performance, focus not on shortcomings but on how to remedy the problem. Don't write, "Your problems stem from improper management of your time," when you can write, "A useful goal would be to improve your time management."
- Apologize sincerely not half-heartedly. Don't write "I'm sorry about what happened, but you shouldn't have...." That's not apologizing. Instead, write an apology with no *ifs*, *ands*, or *buts*.
- Before you make a request, give **your** reader a reason to comply. "Send me your check today" is abrupt. More persuasive is "To make **sure** you receive your order by June 15, please mail your check today."
- Give the bad news first. For example: "Although I can't hire you, I'm sending your resume to someone who may have a suitable opening." When you end with the good news, that's what lingers in the reader's mind.
- Avoid stuffy language. Rid your writing of patronizing phrases like "please note," or old-fashioned phrases like "under separate cover" and "pursuant to your request," "I am in receipt of your letter," "herein," "therein," and "wherein." Readers will assume you're as stuffy as the words you use.
- Don't use sarcasm. Recently a manager at a [major] accounting firm sent an e-mail to his staff about the abuses of the firm's flex-time policy. It began: "It seems as if we have this problem regarding the interpretation of what is meant by '8:00 a.m.' in this office For some individuals, '8:00 a.m.' somehow seems to mysteriously translate into '8:05 a.m.' '8:25 a.m.' etc. on a singularly regular basis." Later that same company spent more than a million dollars on a research study to find out how it could improve itself. One of the study's chief recommendations was that "people need to be nicer to each other."

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you establish a repetitive rhythm that ultimately bores readers. That pattern might be in the way your sentences begin, in their lengths, or in their wording. Sometimes writers in a hurry don't think about how repeated patterns affect the audience. Consider this excerpt from a memo sent from the accounting office to a client:

EXAMPLE I have reviewed your account. This review indicates that a refund check was mailed on March 17. The check was for \$328.93. It was mailed to the same address as above. You will find a photocopy of the check enclosed.

Notice how the tone changes when the writer varies the sentence structure:

MSEC On reviewing your account, I have found that a refund check for \$328.93 was mailed to the above address on March 17. A copy of the check is enclosed.

In this version, the rhythm is much less staccato and more readable. The prose no longer seems so harsh.

As you write, remember that how you sound on the page is different from how you sound in person. When you speak face-to-face with someone, your voice inflection, facial gestures, and even hand movements help get your message across the way you intend it. The words are important, but they are only part of the vehicle for communicating your meaning. On paper, you have to rely on written words alone. Their effect can be unintentionally negative if you don't pay attention to how the tone may come across to readers. A good trick is to read your prose aloud at least once to see if it sounds natural to you. If it doesn't, go back and edit it some more.

Achieving Clarity

Communicating technical information is often difficult because the technical content is complex. However, when your prose is overly complicated as well, communication suffers a double blow. When you are writing letters and memos—no matter what their content—try to find the most efficient language to convey the information. Busy readers don't have time to decipher long-winded explanations or sentences weighed down by too many words. Pare down your writing to its most essential elements. Try rearranging sentences to delete excess words and to write as directly as you can, without abandoning sentence variety and effective tone. For more suggestions, see *Guidelines: Achieving Clarity*.

Letters and memos are effective when their style is engaging and clear. When you send a message to someone, you don't go along with it to clarify any confusing passages—you're not standing beside the reader, saying "What I really meant to say here is ..." Even follow-up phone calls or personal visits are not always possible; the prose must stand on its own. Take the time to edit your prose to create the best possible impression. It will stand with your name on it long after the short time it takes to edit your words.

For more information on editing, see Chapter 5.

GUIDELINES Achieving Clarity

- Plan ahead. When you know what you want to say before you begin to write, you will express yourself more clearly. Much wordiness in technical memos and letters is a result of writers in a hurry and who do their thinking on the page. Taking the time to jot an outline or compose a rough draft will go a long way toward creating clarity in the final product.
- Avoid nominalizations, passives, and strings of qualifiers. These unnecessary structures dull your writing. Instead of providing easy access to information, phrases such as "use a distilling process" for "distill" slow readers' understanding. Passive constructions such as "It is estimated" sound falsely formal and are less efficient than "We estimate." Unfortunately, writers sometimes use these elements unwittingly out of habit or haste. Take the time to recognize them and edit them out.
- Avoid splitting subjects from verbs. Wordiness often occurs when writers begin a sentence with a subject and then include strings of qualifiers before they finally get to the verb. By keeping the subject and verb unit intact, you can at least ensure that readers understand the basic engine of the sentence. Other qualifying information can come either before or after that unit.
- Avoid using "pre-fab phrases." Because we hear certain phrases all the time, we tend to use them instead of thinking of more efficient ways to express the same information. These clichéd phrases become shortcuts for writers but add the weight of more words to sentences. Even worse, they may make the writer seem insincere. For example, the following phrases can easily be compressed into less wordy forms:

due to the fact that	because
at this point in time	now <i>or</i> currently
as per your request	as requested
first and foremost	first
please do not hesitate to contact me	give me a call <i>or</i> please let me know
enclosed please find	enclosed is <i>or</i> I am enclosing

E-Mail

Increasingly, electronic mail has become a medium of choice for business communication, combining the immediacy of the telephone with the power and paper-trail capabilities of letters. According to a 2003 survey from the American Management Institute, the average employee spends 25 percent of the workday on e-mail. Like any technology, e-mail has both strengths and weaknesses that translate to advantages and disadvantages for users.

Advantages

The convenience of quick delivery, the minimal cost of sending a message almost anywhere in the world, and the effect of words printed on a screen (as opposed to a disembodied voice over the telephone) have made e-mail especially useful.

Furthermore, e-mail has opened new channels of communication inside organizations. With most e-mail systems, anybody can send messages to just about anybody else. Lower-level employees who may otherwise have no contact with upper management can send e-mail messages to top managers as easily as to their own colleagues.

Another advantage of e-mail is that it allows you to send your message to many people at once. The "cc" (copies to) line in the heading lets you type in as many names as you wish; your message is sent to everyone simultaneously, saving time, duplicating costs, and paper.

A further advantage is that e-mail is extremely useful for collaborative efforts. People working together on team projects or research can keep in touch over long distances via e-mail and can attach files to send electronically for the receiver to download. Collaborators can send drafts of their portions of reports or other documents to all of their cowriters and can get immediate feedback. Various portions can then be edited and compiled into a final document—all at long distance. (See Chapter 7, pp 00-00 for more on e-mail in the global workplace.)

Disadvantages

Because e-mail messages are informal and quick, writers may be sloppy in transferring their thoughts to the screen. Misspellings and ungrammatical sentences can project a negative image if users don't take time to edit what they write—even on e-mail. Second, the messages are sent and read online, often leaving no paper trail at all. It's easy to read your electronic mail and delete it instead of printing out a copy of the message to keep in a file or filing the message electronically in your e-mail file folder. As a result, some important messages are forgotten or lost. It's a good idea to think twice before deleting a message. If you're not sure, file it.

Although generally thought of as a quick method of communication, e-mail's efficiency is only as good as the recipient's care in routinely checking e-mail messages. Electronic communication can be slow if people don't check their messages.

Another disadvantage is the increasing use of e-mail as a replacement for personal contact. Rather than picking up the phone or making a site visit, many people are opting to use e-mail as their primary form of communication. Even though messages sent over the telephone wires are quick and can be informal, they do not have the same effect as face-to-face conversations or the warmth and personality of a person's voice over the phone.

Finally, writing on a computer screen often encourages people to drop inhibitions. It's not unusual for people to write things in e-mail that they would never write in a paper letter or say over the telephone. This new freedom of communication can be beneficial, opening lines of honest communication, but it can also create some potentially awkward situations. When you send messages over the computer lines, remember that you are not talking to yourself. **Your** audience expects professional and courteous behavior.

It's up to you to balance these advantages and disadvantages and decide when it's appropriate to use e-mail and when it would be a better strategy to use paper correspondence, the telephone, or a personal visit.

Tone in E-Mail

A frequent problem in e-mail correspondence arises when writers dash off a quick message and forget to think about how its abruptness might "sound" to readers. For example the following quick line: "Here is the contact information. Call her now" can seem much bossier than the writer intended. "Here's the contact information. Give her a call" softens the harsh tone. While we often use e-mail in rapid-fire conversations, before you hit the "send" button, take a minute to consider how your words might affect readers and be sure the voice you create on the page genuinely reflects the voice you want the reader to hear.

E-Mail and Conflict Management

E-mail is now the most frequent form of office communication. As such, it has also become a powerful tool that can be used for good ends and for bad. When conflicts arise in an organization, some people may use a barrage of e-mails—copied to all in the organization—as a weapon. Because senders don't have to immediately face the targets of their anger but instead can write scathing remarks and, with the touch of a button, broadcast their negative views across the company, they are tempted to take advantage of the electronic communication system. "E-mail wars" is a term instantly recognizable in offices throughout the United States and beyond. Through the use of e-mail, one person's anger can infect an entire organization and create a malignant atmosphere not healthy for any productive workplace.

To help ensure that e-mail isn't used to escalate conflict, always try to speak to the person face-to-face before putting anything negative or sarcastic in writing. Subsequently, if you find that an e-mail is appropriate, copy only the absolutely necessary people and maintain a professional, courteous tone online. Be sure, too, that you clearly indicate who has been copied—avoid blind-copying people to keep them hidden from the reader.

If you are a group manager, pay particular attention to how the group uses e-mail. Dialogue and informational messages are the proper uses of electronic communication; negativity is not.

Issues of Privacy

When you are sitting in front of your computer screen composing an e-mail message, you may think the message is as much a private correspondence as a non-recorded telephone call or a confidential letter. It isn't. The 1986 Electronic Communications Privacy Act prohibits phone and data line taps with two exceptions: law enforcement agencies and employers. The Act considers e-mail to be the property of the company paying for the mail system. Although your company may not be monitoring your e-mail, assume that any message is going to a taped backup system and is retrievable. (Many employers make a habit of checking their employees' e-mail periodically to be sure there is no abuse of the system, and some employers download the e-mail files of employees who leave the company for one reason or another.) In any electronic environment, it's also possible for signals to

get crossed by electronic or human error and for a message intended for one person to be sent to the wrong address.

Another thing to keep in mind when thinking about privacy is that the person who receives your e-mail may forward your message without your permission. Your words may end up on numerous computer screens although you intended it to go to only one person. Forwarding e-mail without permission is a matter of ethics—would you forward hardcopy mail without notifying the sender? In most instances, avoid forwarding e-mail unless you have specific permission to do so, but don't assume others will give you the same courtesy.

Always understand that anything you e-mail is a public document. Write accordingly. (See Guidelines: Writing E-Mail.)

GUIDELINES Writing E-Mail

- Organize each message the same way you would a paper document of the same length. Pay attention to deductive organization strategies and techniques for guiding readers through your message. Although these strategies are always important, they are especially critical in e-mail when readers usually are in a hurry and are reading on screen. They need your help in guiding them to the main points quickly.
- Avoid using fancy formatting (italics, boldface, tab spacing, and so forth). The recipient of your message may not have the same e-mail system you do, and the formatting will get lost in the transmission of the document. It's a common frustration for people to receive garbled e-mail messages because the sender used too many formatting commands in the message.
- Look good online. Check your message for spelling and grammar before you send it. Too often, people dash off e-mail messages so hastily that they make careless mistakes.
- Don't write in all capital letters. **MESSAGES IN ALL CAPS ARE HARD TO READ AND GIVE THE IMPRESSION OF SHOUTING AT THE RECIPIENT.**

➤ *Tip: Many e-mail programs allow you to check on whether your e-mail has been read. Make a habit of using that function when you send important messages.*

- Don't assume that people have necessarily received or read your e-mails. Unlike a telephone call, when you know the listener immediately hears what you say—or at least that your voice has been recorded on voice mail—e-mail requires users to log on to their computers to read their mail. Many people don't do so regularly.
- Consider the ethics of using e-mail. Don't forward confidential correspondence without getting the author's permission. Another area that may cause an ethical dilemma is the use of the "bcc" (blind carbon copy). Consider carefully before sending such copies; secretly copying a message to someone is a form of hiding the truth.

continued

Guidelines Writing E-Mail, *continued*

- Be aware of privacy issues. Although your company may not be monitoring your e-mail, assume that any message is going to a taped backup system and is retrievable. In addition, your e-mail could be forwarded almost **limitlessly**. Don't put anything in e-mail that you wouldn't put on paper—but remember that you can't "shred" e-mails.
- Use your company's e-mail system only for professional business. Don't use it for personal communications. It costs your company money, and the messages may also be intercepted.
- Be polite. The written word sounds stronger than speech, so treat your online readers with respect. Be careful with **sarcasm**—and don't assume that your audience will tell the difference between seriousness and satire. Don't "flame" (send offensive messages).
- Use "cyberspeak" appropriately. Without the benefit of either facial expressions or voice inflections, "cyberspeak" can help convey a combination of both feeling and meaning through acronyms and "emoticons" (punctuation symbols that, when viewed sideways, look like faces):

Common Acronyms

BTW	by the way
FWIW	for what it's worth
FYI	for your information
IOW	in other words
EOM	end of message
TIA	thanks in advance
WRT	with respect to

Common Emoticons

:]	a smile
;-!	a wink
:(a frown

However, before using cyberspeak conventions, think about whether they are appropriate for your audience. They may be too informal for professional writing situations.

➤ **Tip:** *Most e-mail messages should be kept short. Although there are no length restrictions, it's hard to read long messages on screen, and your recipient will probably have to take time to print the message in order to read it carefully. Longer correspondence should be sent by fax or through the regular postal system.*

E-mail is a fast method of correspondence, but you should approach it with the same professionalism as you would a hardcopy letter or memo. Remember that your words represent you in their content as well as their form and that your message may be placed in someone's permanent hardcopy file. Printed copies of stream-of-consciousness thinking—replete with misspellings and grammatical errors—can be an embarrassment.

E-Mail Format

E-mails are almost always informal messages in memorandum format. Various systems have different formats, but the parts are generally the

same. When you prepare to send a message online, the computer presents you with a standard form for a heading, parts of which you need to fill in (see Figure 9.7).

When the recipients get your message, they can usually answer you quickly by using the "reply" or "answer" function—they don't even have to take the time to address the message.

E-Mail Attachments

An attachment is an electronic file (such as a word-processed document or a spreadsheet) that rides along with an e-mail message. This file is transmitted from your computer in binary code and must be processed on the receiving end and decoded into readable text. While almost all e-mail systems can exchange attachments, some systems are not compatible with each other and the message may appear as gibberish when the recipient downloads the text onto his or her screen. This problem is increasingly rare, however, as common encoding standards are gaining acceptance across e-mail platforms.

To send an attached file, look in your computer online mail menu for a category such as "Send Attachments" or "Attach a File" and follow the instructions. To read an attachment you receive, check the mail menu for "Download" or "Download Attachments" and follow those instructions.

Figure 9.7

E-Mail Format

The screenshot shows an email composition window with the following fields and instructions:

- To:** (Type the intended receiver's e-mail address.)
- Cc:** [Type e-mail address of each person you *want* to receive a copy. This is an optional step.]
- Bcc:** [Type the e-mail *address* of each person you *want* to send a blind *copy*—i.e., these people are not shown on the "cc" list to *the* other recipients of the e-mail. This is an optional step and can present an ethical dilemma.]
- From:** [This part is also automatically filled in.]
- Subject:** [Be specific and *concise*.]
- Date:** [The Program *automatically* inserts this for *you*.]

Below the fields, there is an "Attachments" section showing "none". A toolbar is visible with options for text formatting (Bold, Underline, Italic) and alignment (Left, Center, Right).

Tips for International Communication

In business correspondence with readers from other cultures, you should be aware of the customs governing the organization and tone of letters and memoranda—and e-mail as well. One of the most important elements to consider when writing international mail is the degree to which the recipients expect **power distance**:

According to the work of the Dutch researcher Hofstede, power distance in the United States is comparatively small. That means that the social distance between the highest and the lowest members of society is generally smaller than in cultures with a great power distance. Cultures with a smaller power distance are more horizontal, less hierarchical, and less authoritarian than cultures with high power distance. A friendly and considerate tone is important in business communication in the United States.*

In direct-mail letters written by Americans to American audiences, writers customarily attempt to reduce the power distance by using words and phrases that focus on the similarity between the sender and the receiver:

Dear Friend,

Because you are one of our valued customers, we'd like to extend to you a special offer. Like most of us, you probably worry about money

But in cultures with a high power distance (Japan, Asia, and so forth—even Canada, to some extent), the power distance is emphasized rather than reduced. In these countries, letters are more formal and writers don't attempt to establish a sense of equality. While writers in the United States assume friendship with their readers, most other cultures require a building of trust first.

In China, for example, the emphasis on building trust affects the organization of the correspondence. In the United States, letters are written deductively with the main point placed up front followed by details. Asian correspondence is inductive: details about a product come first, and the sales pitch comes later. Furthermore, in these more formal countries, writers usually begin with polite inquiries about the family before they come to the main point of the letter.

While in this country it is typical for a writer to begin a letter with "Dear Tom," that salutation is considered offensive to traditional Japanese. In Japan, employers and employees rarely address each other by their first names, and this formality carries over into business correspondence. Chinese correspondents avoid using the form letter salutation ("Dear Sir or Madam"), but instead always use the reader's name ("Dear Mr. Yen Chin Li").

These are just some of the many examples of differences in letter-writing customs. Before you write a letter or memo or send e-mail, take the time to find out what the cultural expectations are for your readers. While cultural sensitivity is a two-way street—your audience should also realize that you are writing from your own customs—it is polite to illustrate an understanding of your readers'

*L. Beamer and I. Vamer, *Intercultural Communication in the Global Workplace*. 2nd ed. (Chicago: McGraw-Hill/Irwin, 2000).

GUIDELINES **International** Correspondence

- Use correct job titles in all addresses, both on the outside of the envelope and in the inside address.
- Do not use first names in correspondence unless you are invited to do so.
- Learn the differences between first and last **names**, especially in Asian cultures. (The Chinese surname is placed first and the given name last. For example, Chen Behai is Ms. Chen, not Ms. Behai.)
- Follow the customs **of** the target country when addressing the outside envelope.
- Type the name of the country in all capital letters below the address:

Putnam and Son, Inc.
1225 South Maple Street, Suite 22C
Ann Arbor, MI 36902-5810
USA

Ms. Naoko Kumada
Kyocera Corporation
2-7-22-710 Sengawa, 3-chome
Chofu-shi, Tokyo 182
JAPAN

- Do not use emoticons in international e-mail correspondence because the facial expressions may be misunderstood. Furthermore, these symbols are often intended to be humorous, and most humor is culturally biased.
- Realize that e-mail is subject to the same cultural contexts as hardcopy correspondence. High-context cultures, such as Japan, Russia, and Latin America, expect a more indirect approach even online. Low-context cultures, such as the United States, Germany, and Scandinavia, expect directness.

culture by the way you write to them. For basic advice see Guidelines: International Correspondence.

For more about cross-cultural communication, see Chapter 7.

Quick Review

Memos and letters are a constant in the business world. Even with the advent of e-mail, hardcopy correspondence is essential to the workplace because it provides a paper trail of signed records for the file.

- In general, use memos for internal communication—within an organization—and letters for external communication between organizations.

- Use memos when you have already initiated contact with the recipient; use letters for more formal situations such as initiating a project and marking important milestones.
- The most common types of correspondence for technical communicators are informative messages, requests for action, inquiries, and appreciation messages.
- The direct approach works best when the audience is likely to agree with your information. The indirect approach works best when the audience is likely to be resistant to the information.
- Editing even the shortest correspondence for tone and concision pays big dividends. Memos and letters are more personal than oilier kinds of technical documents and they convey emotional overtones as well as objective information.
- E-mail is a fast and efficient way to communicate. Be sure to consider both the advantages and disadvantages and to find the most appropriate form of correspondence to use for each situation. Take the time to present your message professionally—without typographical and grammatical errors—and be sure to respect the cultural expectations of the target audience.



Exercises

Write a one-page letter for each of the situations described below. Be sure to prepare a rhetorical strategy as part of the planning process for each letter. If this is a classroom project, attach the strategy to the letter you turn in to your instructor.

- a. You are a hiring manager in a technical company (you pick the company). You have interviewed several job applicants and are ready to make an offer. Write an offer letter to the candidate of your choice.
- b. After you have written the offer letter and the candidate has accepted the position, write letters to the other two finalists telling them that they will not get the job. Remember that these applicants have spent several hours interviewing with your company and will be disappointed to receive the news in your letter.
- c. Now that the new hire is in place, you want to convene a group of employees to review hiring procedures and suggest ways to improve them. Send an e-mail to your department managers, asking them to come to a meeting for this purpose.



fc Community Action Project

Most organizations produce mounds of correspondence daily, so the impact of poor communication techniques can be extensive. To help increase the efficiency and productivity of a local organization, develop a brown bag discussion on "Effective Correspondence" and invite people to come and share ideas about writing letters, memos, and e-mail. Provide some guidelines on writing and some material for participants to take away with them, but keep the main focus on the participants' own stories and suggestions.

Good-News Letter: Direct Approach

Parametrics, Inc.

*350 South Street
Pittsburgh PA 15213-1821*

15 January 2007

Terry Miller
238 Chestnut Street, #3B
Butler, PA 16001-0238

Dear Ms. Miller:

It gives me great pleasure to confirm our verbal offer and your acceptance to join Parametrics, Inc., as a technical documentation specialist in the engineering division.

Your compensation will include your monthly salary of \$XXXX (which is equivalent to \$XXXXX annually) plus the benefits outlined in the enclosed summary. After three months of probation, you will be eligible to receive fourteen days vacation during 2004. According to the terms of our current policy, your performance and salary will be reviewed in 2005. Our regular working hours are from 9:00 a.m. to 5:00 p.m., Monday through Friday.

On your first day, please report directly to the Human Resources Department at 9:00 a.m. to be entered onto payroll, arrange orientation, and initiate the administrative procedures. As part of these procedures, and as a matter of compliance with federal law, we require you to bring proof of your eligibility to work at that time. Please refer to the enclosed pink sheet for specifics regarding which credentials to bring. If you have any questions, please give me a call.

We believe that you will make a significant contribution to Parametrics, and at the same time will realize the professional growth you seek.

As soon as possible, please acknowledge your acceptance of this job offer by signing the enclosed copy of this letter and returning it to me. We very much look forward to your joining the company on February 1.

Best regards,

Accepted by:

Ross Wagner

Ross Wagner

Senior Employee Relations Representative

Enclosures

cc: Human Resources Files

Main idea

General details

Specific instructions

Personal touch

Ego boost

Closing with specific date

Bad-News Letter: Indirect Approach

Walker *Envirotech*

Walker Engineering Corporation
100 Taylor Street
Martinsburg, MA 01822
Tel: 508-482-1980
Fax: 508-482-1957

*European
style date,
no commas*

15 May 2006
Donald W Grant
General Electric Company
1000 Western Avenue
Mail Drop 17412
Lynn, MA 01910-2478

*Good news
at beginning*

Dear Mr. Grant:

Bad news

Enclosed are the specifications for the preparation of the area to be used for the bioremediation of soils contaminated with lubricating oil in the vicinity of storm drain 28. You will note that we have increased the height of the bituminous concrete berm to ten inches and added a secondary berm constructed of hay or soil. Although these changes will cost more to implement, we believe they are necessary to assure the State there will be minimal possibility of surface runoff leaving the site, and also to provide added protection if GE is unable to pump excess water in a timely manner.

Buffer

If you have any questions, please call me or Brendan Coffey at extension 2006.

*Personal
closing*

Sincerely,

Allyson Bennett

Allyson Bennett
Project Manager

AB/ps

Encl.

cc: B. Coffey
P. Gillespie
C. Myette

Bad-News Letter

Eastlake Hospital
4400 Franklin Street
Towson, Virginia 24329
540-944-4978
www.elh.org

May11, 2006

Dr. Stephen Brightman
901 West 11 th Street
Richmond, Virginia 23284

Dear Dr. Brightman:

Thank you for your interest in the Director of Anesthesiology position at Eastlake Hospital. The **search** committee has reviewed the credentials of a large number of candidates in order to select a smaller number of people for further consideration. Because of the outstanding quality of the candidates, this task has been difficult. Not only have we been trying to assess certain qualities from resumes, but we have also been attempting to judge those qualities as they relate to the particular needs of Eastlake Hospital at this time.

While you are not among the candidates whose strengths appear to fit our current needs most closely, we thank you for your interest in Eastlake Hospital, the thought you have given to its needs, and the privilege of reviewing your credentials. On behalf of the search committee, I convey our best wishes for your continued professional success.

Sincerely,

M. C. Davies

Mary C. Davies, MD, PhD
Search Committee Chair

Good news

Praise

Fairness

Rationale for
bad news

Appreciation

Upbeat close

Appreciation Letter

BioTechnology, Inc.

2846 Sixth Avenue
Seattle, Washington 98121
Phone:206-441-8577
Fax: 206-728-4429

April 27, 2006

Dr. Betsy Geist
Laboratory C-2
Building 6

*Direct
approach*

Dear Betsy:

*Emphasis on
reader, not
sender*

Thank you for your extraordinary service on the CHR4-pill project. Your colleagues have expressed to me their gratitude for your willingness to work overtime to provide them with the essential technical expertise they needed to complete the project on time. Without your expertise and help, we could not have met the necessary deadlines.

*Specific,
positive
results*

As a result of your efforts, BioTechnology was able to submit the CHR4 prototype for beta tests ahead of our nearest competitors. Because of your dedication, BTI remains a leader in pharmaceutical research.

Sincerely,

Paul Smith

Paul W Smith
Vice President for Research

Inquiry Letter

SplainCO

One Patriot's Park
Westfield, Ohio
4018 6
(215) 275-7000
Fax (215) 275-7470
TELEX 951072
<http://www.splainco.com>

September 14, 2006

Government Industrial Research Institute
Nagoya, 1, Hirate-cho 1-chome
Kita-ku, Nagoya City
Aichi 472
Japan

Dear Ion Implantation Group Project Manager:

We have recently discovered your work with computer simulation of the ion implantation process (in *Advanced Coatings & Surface Technology*, August 2002) and are interested in discussing this work with you. SplainCo is a provider of ion implantation services to the medical community. We often have a need to analyze complex implantation schemes. A computer program which accurately estimates the resultant depth composition, and so forth, would be most helpful to us.

We are very interested in the capabilities of your computer program and would like to obtain an electronic copy. Our computer systems can run a program from any IBM-compatible 3 $\frac{1}{2}$ inch disk or CD-ROM.

If you have any questions for us or would like to talk about ways we might work together on future research projects, please call me at (215) 275-7000, extension 328, between 8:30 a.m. and 5:30 p.m. Eastern Standard Time, Monday through Friday. Thank you very much for your time and your help.

A brochure describing our company's research interests is enclosed.

Sincerely,

Douglas Ferguson

Douglas Ferguson
Quality Regulatory Manager

Enclosure

Greeting addresses a position because the writer doesn't know the name of the person

Complimentary opening

Why

What

When

Complimentary close

Request for Action Memo

Memorandum

Date: 6 March 2006

To: Maria Ramirez, Task Coordinator

KMB

From: Kevin M. Burger, Manager, Environmental Services Department

Subject: Schedule Changes, QUAFSS Project "Flint Pond Site," Project No. 51044

Direct request

What and why

We have received the project number for the Flint Pond Site *and have* begun work on the project. *However*, the scheduled date for project completion may be unrealistic. We believe the schedule should be updated to reflect the actual project start date (2/24/04), *and* to reflect other time-sensitive elements such as the following items:

Bullets highlight areas

- bidding period
- contract review and *award period*
- contractor's mobilization time

I Provides necessary, useful information

To facilitate your review of this matter, we have updated the original Attachment I: Task Schedule *and have* included a copy of the schedule with this memo.

After reviewing this material, please let *us know* if it meets with your approval.

Complimentary close indicating next step

KMB/kl

End.

cc: F. Sciannameo, A. Heffron, J. Wolf

E-Mails

Thursday, February 19, 2006 10:08:03 AM
TO: chrisb@blackcitynews.net
FROM: cmorgan@CCOC.org
SUBJECT: Advertising?

Chris,
I've spent some time today reviewing your online newspaper and am fascinated by its comprehensiveness and usefulness for the target audience. I also wonder if there's a way the Center for Creative Organizational Change could purchase an ad and/or do a brief article on designing and managing organizational change. Are you the right person to contact about this? If not, would you mind forwarding me to the appropriate person? I'd really like to be in touch with the audience you have.

Thanks so much,
Carter Morgan
Director, Center for Creative Organizational Change

Thursday, February 19, 2006 1:15:10 PM
TO: cmorgan@CCOC.org
FROM: chrisb@blackcitynews.net
SUBJECT: RE: Advertising?

Hi Carter,
Thanks for your e-mail. Yes, I'm the right person to speak with regarding your inquiry.
You can purchase an ad or place an article or a combination of the two____
If you go to our Website and click on the Casey Family Foundation banner ad (on most pages), you'll see something similar to what you're looking for.
Please feel free to contact me at (425) 369-5100 x109
Chris B. Bennet
Associate Publisher

Short but clear subject that identifies the e-mail's purpose

IE

Appreciative opening

Main point

Polite request

Complimentary close

Name and title (Often the address and phone number is listed as well.)

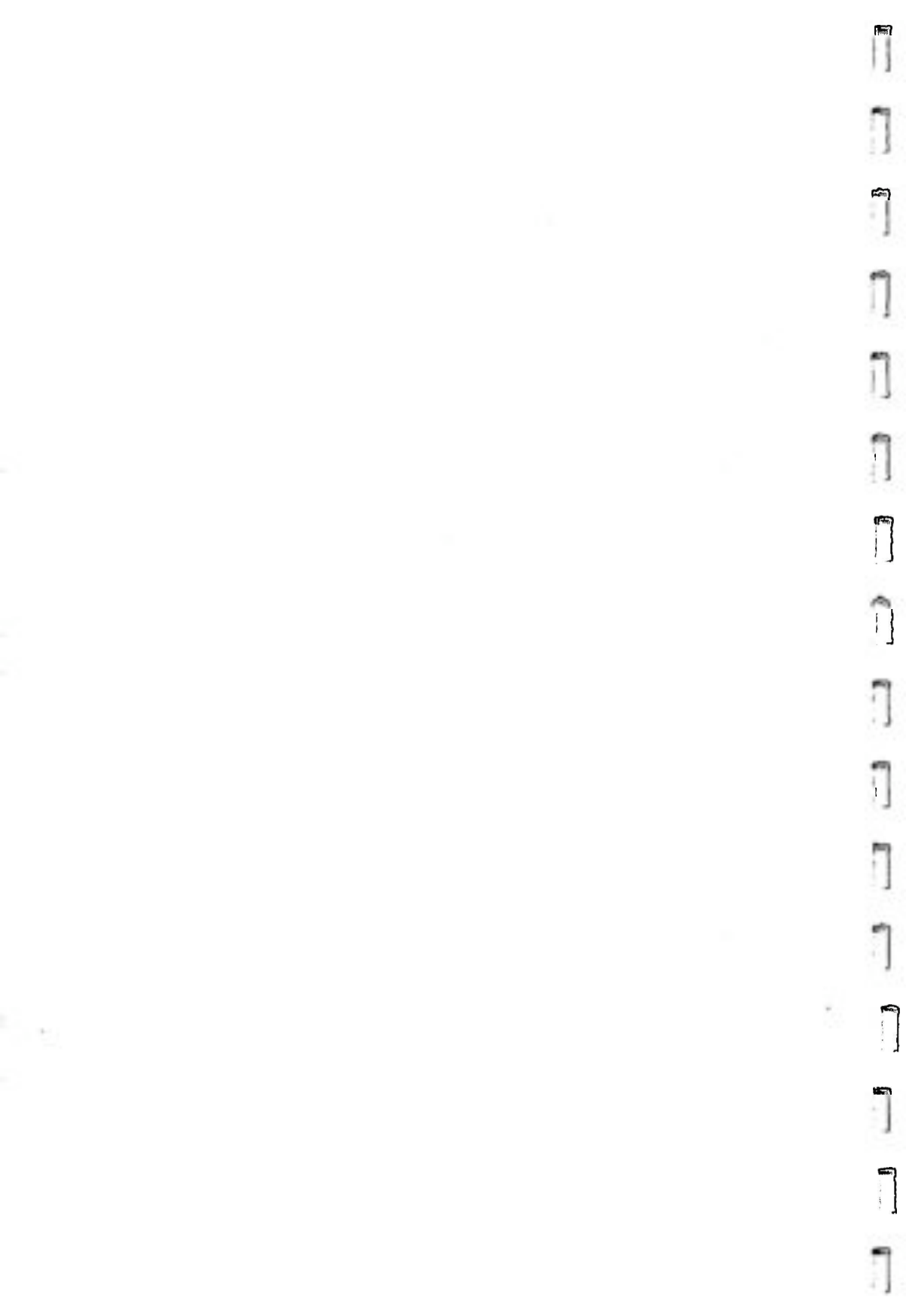
Note prompt response time

Begin with appreciation

Directly gets to main point

Specific instructions

Contact information



PROFILES IN PRACTICE

Communicating Fully

Don Adams has learned a dual benefit to carefully written employee communications: Clear management information, job descriptions, and performance evaluations not only protect companies from potential problems, they also create a climate of understanding and shared responsibility. That climate helps in employee retention, a critical issue in business today, where it is important to keep valuable and experienced employees. Of course, employee communications must detail policies and procedures accurately.

Adams concentrates on precise job descriptions for all 3,500 types of jobs that Nationwide's 28,000 employees perform. This often-overlooked area may come into play should a dispute go to court. "A judge may look at a job description to decide" whether performance or promotion was fairly evaluated, Adams notes. Good job descriptions focus on skills, such as technical writing, rather than specific duties, such as preparing a particular report, because duties may change with the needs of business.

Adams trains managers to conduct evaluations. "A lot of managers used to spend five minutes on them, because they didn't know how," he says. Clearly written objectives are key, according to Adams. "What makes them good is clarity," he says. "Provide examples of what an objective means" and ways a person met or did not meet it. Include specific, measurable standards, such as "a financial figure or a level on a customer survey." Leave no doubt in the employee's or manager's mind. "It's important to write down any area where a manager has discretion," Adams advises.

Effective employee communication fosters trust, according to Adams, and trust contributes to an environment in which people do their best. "Money is the third of three factors in job satisfaction," Adams notes. "Recognition and environment are far more important to most people." Good communication helps in developing both.

Don Adams*Manager, Employee**Performance and Rewards**Nationwide Insurance**Companies*

GUIDELINES Organizing Instructions and Procedures

- Organize in task-oriented, sequential steps. As a rule of thumb, keep the number of steps to fewer than ten.
- Construct deductive frameworks. Set user expectations by forecasting what's coming next.
- List tools or equipment necessary to complete the task.
- Separate instructions from explanations. Use numbers *or* bullets to list instructions and procedures.
- Organize similar types of information similarly. To set user expectations and maintain uniformity, always present the same kind of information in the same way.
- Separate user actions from system reactions. Make sure that each step in the instructions is a user action. Anything the system or product does in response to that action should not appear in the same format as the step.

Internet Resources for Chapter 10

Understanding Your Audience

<http://writing.colostate.edu>

This site from Colorado State University's Writing Center provides a brief overview of the writing process.

Information Designer's Toolkit: Preparing Descriptions

<http://SaulCarliner.home.att.net/id/>

This site presents a brief definition of descriptions as well as a guideline for structuring and writing them.

User-Friendly Manuals' Web Site

<http://www.prc.dk/user-friendly-manuals/ufm/home.htm>

This page by Peter Ring Consultants has plenty of useful information for technical writers, from information on software to use for preparing instruction manuals to tips on current trends in technical communication.

Instructions, Procedures, and Policies

A major component of technical communication is writing instructions and procedures that make it easy for people to do something they need to do. Writing that explains clearly and simply how to operate something, how to construct something—in essence how to *do* something—takes special skills. When instructions are well written, they work so smoothly that readers (often called "users" for this type of writing) can perform a task without even noticing the prose: it doesn't get in the way.

Policies are closely aligned with procedures and often appear with them in *policy and procedures manuals*. But unlike procedures, policies are not "how to" writing. Understanding the difference in these commonly used terms will allow you to write them more easily and effectively.

The Difference Between Instructions, Procedures, and Policies

Practitioners tend to use the terms **instructions** and **procedures** interchangeably. It may be most useful to think of instructions as a set of directions and procedures as the individual sequences of steps within the instructions. In the field of technical communication, instructions and procedures are usually termed **technical documentation** and appear in technical manuals, user guides, reference guides, tutorials, and other similar documents. Not surprisingly, the most common application for documentation these days is the computer industry, where end users and systems operators need help with both hardware and software installation, operation, and maintenance. Computer manuals come in all sizes and levels of complexity—from introductory word processing guides to sophisticated programming manuals used at a highly technical level by engineers and developers. For many products, users can purchase a whole family of documentation (known as a "documentation set") that takes them through installing,

operating, and maintaining the product. A quick reference guide is usually included for more experienced users.

But the computer industry is by no means the only place where technical communicators are responsible for writing instructions and procedures. Engineering firms, biotechnology companies, laboratories, and manufacturing companies are among the many other groups that require instructions for employees and for the people who ultimately purchase and use their products.

Policies are the agreed-upon rules that govern conduct or action. For example, most organizations have personnel policies governing treatment of employees, and universities have policies about student and faculty conduct. In technical environments there are policies on why and when—and often where—to take action. These policies are often accompanied by a set of procedures explaining how to take the action required.

Writing instructions, procedures, and policies requires careful planning and an understanding of the current "state of the art." This chapter discusses the standards and methods for writing these documents as efficiently as possible in today's world.

See Figure 10.1 for a list of components typically found in instructions and procedures documents; see Figure 10.2 for a list of components typically found in policy documents.

Planning and Researching

The first step, of course, in any communication process is to plan and research the document in advance. Whether the instructions will be a page or a complete "doc" set, you need to decide from the beginning what type of document is necessary for the intended audience, who the audience is and the level of expertise, and what contingencies and constraints may affect the writing task.

Determining Your Purpose

Different types of technical documentation work for different purposes. It's important for you to know the type of instructions you're writing at the outset because each kind focuses on specific goals and is organized and formatted accordingly. Instructions and procedures come in numerous types: hardware manuals, software manuals, installation guides, maintenance guides, and so forth. One of the major causes of poor documentation is the failure to differentiate among the separate types. When writers don't understand the differences, they often produce manuals that try to be everything to everyone—a conglomeration of instructions, policies, procedures, and reference material that can unnerve even the most determined user.

Types of Instructions and Procedures Although there are many specific types of procedural documents, technical professionals most often have to write documentation in the following broad categories:

Figure 10.1

Components of Instructions and Procedures

Sets of instructions and procedures can have many components. Here are some of the most common ones:

Title: Instructions and procedures need a clearly defined title so that users can see at a glance what the manual is about. The title can be on the cover of the document and then repeated on an inside title page, or it can just be prominently displayed at the top of the list of steps.

Legal information: Instructions often have preliminary required material on the page before the table of contents. The page may contain copyright information, revision or edition numbers, and any corporate trademarks, disclaimers, and so forth.

Table of contents: Shows the user how the manual is organized and gives chapter, section, and page numbers. The "TOC" (as it is often called) comes after the title page and the legal information.

List of tools, materials, or equipment: Usually placed at the beginning of the document, this list alerts the user to have on hand the necessary items for completing the task.

Explanations: Sometimes the audience may want to know why operations work or why certain procedures are appropriate. These explanations give the "nice to know" information that creates a context for the steps you ask the users to follow.

Hazard messages: Warnings, notes, and cautions should be placed prominently in the text so that users can see the potential for danger before they perform the tasks. These warnings are often standardized and accompanied by graphics. (See Chapter 8, pp. 179-180.)

Troubleshooting: In most guides for operating a machine or another type of product, there is a section at the end devoted to fixing problems that may occur.

Index: All good instructions and procedures should have an index at the back of the manual so that users can find information quickly. Even short manuals (over ten pages) should have an index.

- **User manual:** Step-by-step guide for how to operate something or perform a procedure; targets the novice user; task-oriented organization. (See sample on p. 243.)
- **Reference manual:** Similar to an encyclopedia in its function as a storehouse of information about a product; targets the more experienced user; usually organized alphabetically by product's parts, system commands, or user tasks.

Figure 10.2

Components of Policies

Purpose: What is this policy for? Often this information is expressed as a title or a heading. It should be clear to users what action the policy governs.

Guideline: Here is where you place the policy itself.

Rationale: Give a few sentences of explanation about why such a policy is necessary.

Approval: Indicate what authority has approved this policy.

Date: Policies are continuously revised in response to changing conditions, laws, and authorities. Always be clear about when this policy was updated so that users can determine if they are using the most current version.

> **Tip:** A common error in writing instructions is mixing step-by-step user manuals with reference manuals. Such mixing of different kinds of information creates serious difficulties for users. The writer's job is to separate user guide material from reference material. It's fine for manuals to incorporate different types of material, as long as they are clearly separated.

- **Tutorial:** Mini lessons on how to perform specific actions; interactive if online; targets the novice user; organized in a series of "lessons" that ask users to complete discrete tasks that build on each other to educate users about the product.
- **Quick reference guide:** Brief reminders of how to operate or use a product; targets experienced users; often printed on card stock or on overlays for the product; organized the same as a reference manual: alphabetically by parts, commands, or tasks.
- **Online documentation:** On-screen help; targets all users, but especially those familiar with computer menus, toolbars, and so on; organized hierarchically into tree structures, one topic branching into several topics. (See Chapter 15 for more information on writing online material.)
- **Procedures guide:** Set of company or laboratory standard procedures; targets all people who must perform these tasks; step-by-step task-oriented organization.
- * **Policies:** Policies are the overarching guidelines for conducting business; they differ from procedures guides in that they are about the principles behind the actions, not about step-by-step actions. *Policies should always be clearly separated from procedures.*

Unless you are writing an especially large book that you can divide into separate sections, you should identify the type of document you need to write and maintain its integrity as such. Resist the temptation to combine document types unless you have a good reason to do so.

Analyzing Your Audience

The next stage in planning a document is to determine who the audience is so your instructions can meet its needs. Analyzing the audience is not an easy step. Writers can't rely on simple definitions. If you're writing a user manual for novice users, that doesn't mean you can assume all novice users are the same; find out more about who these people are, what their education level is, how they need to use the product, where they will be reading the manual, and so forth. Understanding this specific information about your audience allows you to decide how best to organize the material and what level of sophistication you can use in the examples, the style, and the formatting. Never assume you already know this information. (See Steps to . . . Analyzing Your Audience.)

Steps
to . . .

ANALYZING YOUR AUDIENCE

1. Conduct a job study, formal or informal, to learn users' needs. Interview as many members of the audience as possible. Conduct surveys or use questionnaires. (See Chapter 2 for more on interviewing and designing questionnaires.)
2. Check with the customer training or customer support department. If anyone knows users' needs, fears, backgrounds, and experience, it is the support personnel who help them use the products.
3. Turn to previous documents your company has produced. Look at these manuals to see what kind of audience decisions other writers have made; then compare this information with what you have learned in your own research. You may find these documents extremely helpful or you may decide they are extremely dated in their approach.
4. Ask your supervisor or project leader about the audience. In small companies, the supervisors may be able to describe the users of the product in detail, whereas in larger companies—especially multinational ones—assessment of audiences may be more difficult.
5. If your company has a human factors department (whose business it is to understand the needs of various audiences), see what data they have available.
6. Use the marketing department. It is responsible for market analyses and surveys and is a storehouse of excellent information.

Once you have collected data about the audience, make a list of the most important discoveries you have made about your audience. Tape it on the wall next to your computer or even on the monitor itself. That way you'll always be reminded that you're writing for real people who have real needs and not wander off on tangents or otherwise fail to serve your audience well. For more information about audience analysis, see Chapter 1, pp. 13-16.

Document Specifications

In companies where technical communicators have been hired to write manuals about company products or for company employees, the planning stage should include preparing a formal document specification (see Chapter 1, pp. 21–23). This specification is an especially useful tool for writers who are collaborating with each other or with others in the company. It provides a plan and a schedule for getting the document "out the door." Even if you are the sole writer on a project, a doc spec can serve as a planning guide and as a way to make the importance of your project visible to co-workers. When time and money are too short to do a thorough spec, adjust your planning to do a shortened version. In every instance, the manual will be much better if you begin with a document specification.

Organizing

If instructions and procedures are to be usable, it is crucial for them to be well organized. As an experienced technical communicator once remarked, "People don't want to read the instructions; they want to get things done." Designing documentation that allows people to do what they need to do without getting lost in the instructions is hard work. The process requires you not only to understand the users' task thoroughly but also to anticipate their needs and organize instructions that meet the varied expectations those users may have.

The principles of writing effective instructions are essentially the same no matter what the application is or in what environment you are writing. How you organize and package the material differs with various types of instructions, but the writing must have three basic elements:

1. It must be *task-oriented*. Its organization follows the order of the discrete tasks the users need to perform.
2. It must be *clearly formatted*. The document's page design should enhance its usability.
3. It must be *transparent*. It should not be a barrier between the user and the job the user wants to get done.

When writing instructions and procedures, following a few simple rules will ensure that the document conveys the information you want it to convey clearly and uniformly. See the Guidelines: Organizing Instructions and Procedures for specific help.

GUIDELINES Organizing Instructions and Procedures

- Organize the information in sequential steps. Before you begin, make a list of all the tasks that users must complete. Put them in the order in which they should be completed. You may want to do the tasks as you organize, to make sure you don't skip any steps. You should, however, try to keep the total number of steps to ten or fewer, because research suggests that more than this can overwhelm users. If you have more than ten tasks or steps, try to group the tasks into coherent units.
- Hard copy vs. online: Organizing steps in print is fairly straightforward, because the steps are discrete and can simply be listed in order. Organizing online can present a more complex challenge, because software documentation often offers users many choices about how to reach various goals. You need to think carefully about what users' most common choices might be and organize the information accordingly.
- Provide clear signposts and goals. Users like to know what's coming next, and what the ultimate goal is. Always introduce a document or step by stating the objective.
 - At the document level include chapter or section overviews, introductions, and summaries.
 - At the step level begin each unit with a goal statement.

EXAMPLE

To move or copy files by using the right mouse button:

1. Select the file you want to move by putting the cursor on it and clicking on the right mouse button. This should highlight the file.
2. To **move** the file, click on CUT. To **copy** the file, click on COPY.
3. Open the folder into which you want to move or copy the file.
4. Click on PASTE to place the file into the new (older).

- Provide a list of all the tools or equipment needed to complete the task. If you have ever had to assemble something, you know how frustrating it is to begin the project and get to step #3 only to discover that you need a hexagonal wrench—which you don't have.
 - Hard copy vs. online: In a print document, put the list of tools at the very front. For online instructions, make sure that the list of tools is always available through a single click from any screen.
- Make sure instructions and explanations are separate. Most documentation includes both explanatory material and step-by-step instructions. Users need to be able to identify the actual steps quickly and refer to them frequently. If these steps are buried in explanation, the user will be frustrated. Provide instructions as numbered or bulleted lists, and provide explanations in a separate part of the document.
- Organize similar material consistently. If you begin one section with an overview, begin all sections with an overview. If one step is constructed as an imperative ("Now tighten the nut with the wrench..."), don't construct the next one differently ("The leg can next be attached to the tabletop by using the screwdriver").
- Separate user actions from system reactions. Make sure each instructional step is an action that the user must take, not something that the product or system will do in response to that action.

continued

Guidelines Organizing Instructions and Procedures, *continued*

EXAMPLE

To fold the bike, follow these steps:

1. Press the quick-release latch to remove the front wheel.
2. Remove the support member connecting the seat post to the forward frame.
3. Remove the handgrips from the handlebars.
4. Fold the handlebars backward toward the seat post.
5. The handlebars will fit almost parallel to the forward frame section.
6. Slide the forward frame section through the collar (located at the hinge) in the direction of the foot pedals.
7. The forward frame will slide approximately 7 inches and no farther.
8. Lift up the seat until the base of the seat pot frame is released from its supporting collars.
9. Fold the seat post and secure it.

Now look closely at steps #5 and #7. These are not user actions but descriptions of what will happen in response to user actions. How would you revise these instructions?

Designing

Effective document design for instructions and procedures makes prose easy to read and keeps users from getting lost as they turn from reading the instructions to performing the task and back again. Five major design techniques are particularly useful when you are drafting instructions and procedures; some are more obvious than others: (1) clearly labeled figures, (2) consistent formats, (3) decision tables, (4) modular design, and (5) information mapping.

Clearly Labeled Figures

If you are describing a procedure or giving a set of instructions involving special equipment, be sure to include precise line drawings of the equipment so users can *see* as well as read what to do. These visuals can be exploded diagrams, cutaway drawings, schematics, or any other precise graphic that the users will understand. (Chapter 4 discusses these specific types of visuals.)

When you choose graphics to illustrate procedures, make sure that they are uncluttered and that they target the level of your audience. Too often, one drawing serves as the single illustration for several steps, and the users can't see the discrete parts necessary for each step. Another problem arises from graphics that are overly technical or complex for the intended audience. For example, engineering schematics in a manual for businesspeople can confuse, not aid, the audience.

Consistent Formats

Design the pages of a document containing multiple procedures so that the format is the same everywhere. Repeated formats create a recognizable pattern that sets readers' expectations and keeps them oriented. Another benefit of formatting consistently is that doing so makes a document more "referenceable"—experienced users can flip through the pages and easily differentiate procedures from explanatory material.

Decision Tables

The **decision table** is a specialized type of table that is an efficient way to indicate the choices users have. There are several kinds of decision tables, but all indicate user choices, as in the "*If... then*" format shown in Figure 10.3. Other types of decision tables graphically list all the information in a chart, but allow users to determine the appropriate coordinates of their specific situations (see Figure 10.4). As these examples illustrate, by collecting all of the options and placing them in an easy-to-read table, you avoid lengthy prose explanations.

Modular Design

Many technical communicators take the idea of chunking information and apply it to the overall design of the document. For instance, a computer manual or a set of instructions is considered "modular" in design if it is divided into identically formatted short segments of approximately equal length. Usually one or two pages—no more than three—is standard for each module. Each of these segments is a task the user must perform, and the entire instruction set for that task is displayed in a single module. In manuals designed this way, users can readily see the step-by-step procedures they need to follow and can view each task completely without having to turn the page.

Figure 10.5 illustrates an example of modular documentation. Notice that the running header across the top of the page gives a clear sense of what the task is, and the complete set of instructions is visible at once. For most users, seeing the instructions in such a compact form is less intimidating than confronting long series of steps

Figure 10.3

//... Then Decision Table

<i>If...</i>	<i>Then...</i>
Mower engine fails to start	Engage blade control handle
Engine idles poorly	Replace spark plug
Engine skips at high speed	Adjust spark plug gap to .030 inches
Engine vibrates excessively	Tighten and balance blade
Mower will not mulch grass	Sharpen or replace blade

Figure 10.4

Decision Table Without If . . . Then Structure

Uni-Care Health Services, Inc.

Subject Administering I.V. Medication by I.V. Push

Department Nursing

Page 1 of 1

Policy IV2003

To provide guidelines for administering I. V. antibiotics via the I. V. push method.

The following guidelines have been approved for administering medications via the I.V. push method, *if* the appropriate venous access is in place and *if* the I.V. is administered by an RN. Note the infusion rate must be adhered to.

**Approved I.V. Bolus Medication
Infusion Rate Guidelines**

MEDICATION	CONCENTRATION	REFRIGERATION STABILITY	FROZEN STABILITY	ADMINISTRATION RATE	mOsm As
Ampicillin Omnipen Poly	1 gm in 20ml SWI 1 gm in 30ml NSS	4 hours 48 bo as	N/A N/A	>100mg / mill Adults Only	<602
Azlocillin Azlin	1 gm in 20ml SHI	24 hours		10 minutes	447
Aztreonam Azactam	1 gm in 20ml SWI	7 days	90 days	10 minutes	<4UH
Cefamandole Mandol	1 gm in 20ml SWI	7 days		10 minutes	<487 <466
Cefazolin Ancef Keflex	1 gm in 20ml SWI	10 days	30 days	10 minutes	(340)

Source: IV Policies and Procedures Manual ©1995 Uni-Care Health Services, Inc.

spilling over onto several pages. This design inspires confidence and it increases the manual's usability as a reference tool because the discrete procedures are easy to find and easy to read separately from the rest of the text. Furthermore, the manual is easier to update when certain modules need to be revised, but the entire manual is not out of date. In these instances, the self-contained sections can be replaced without disrupting the rest of the instructions.

➤ *Tip: Modular design is useful and works well in many instances. However, it increases the cost of the manual because it increases the length, and some material requires more explanation than modular design allows. You should take all of these factors into consideration before you decide to use this highly rigid design.*

information Mapping

Information mapping is a design technique that reduces the number of sentences in instruction material while increasing the number of tables. The rationale behind this technique is that users do not have time to read prose but will process visual information more quickly. To convey necessary material, writers using information-mapping

Figure 10.5

Mobile Computer Migration

5. Chapter 5: Restoring Files

Selective Restore

Selective Restore

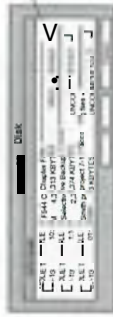
Many times a full restore of a hard drive is not necessary. Use Selective Restore when you just want to restore certain files or directories.

To perform a selective restore, you must first select the files or directories you want to restore.

To perform a selective restore, select the files or directories you want to restore. Then, from the Main menu, select Restore.

To perform a Selective Restore:

1. Insert the tape to be restored into the tape drive.
2. From the Main menu, select Restore.



Highlight a file or directory that you want to restore, then click on OK.

3. Select the tape volume to restore and click on OK. If the volume is not visible, you will need to enter the volume ID before the restore will continue. Passwords are required if the user typed an account on the backup, mini-computer, or Macintosh. Passwords are required if the user typed an account on the backup, mini-computer, or Macintosh.

4. The Selective Restore screen appears. Tap the files and directories you want to restore or specify them

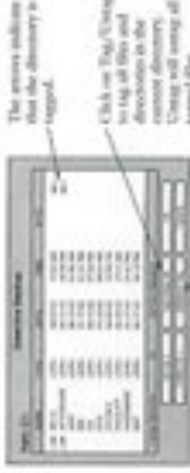
Source: Reproduced with permission of ©Alphatech, Inc.

using the wildcard option. When on a file or directory, click on Up File to restore the directory.

View the contents of a directory by clicking on Down File. Click on Up File to restore the directory.

To restore files or directories, click on Restore. A window appears with a list of files and directories. If a file or directory is selected, it will be tagged. If a file or directory is not selected, it will be untagged.

If you choose to Tag/Untag All, all files and directories will be tagged or untagged.



The arrows indicate that the directory is tagged.

Click on Tag/Untag to tag all files and directories in the current directory. Using will untag all tagged files.

To tag a directory or file, click on it with your right mouse button.

FILE RESTORE (RESTORATION) Read display: "Tagging File"

5. Enter the drive letter to which you want to restore your files and click on OK.

Once you have chosen your drive letter for the restore, you will see the name of the drive (e.g., C:). If any errors occur during the restore, you will see them in the error log.

Figure 1D6

Information Mapping (one of series of decision tables, "Solving Printer Operation Problems")

Symptom	Possible Cause	Solution
The Error light is blinking.	There was a memory error in your print job.	Press the front panel button to resume printing. (There may be some data loss.) Change your page to make it less complex, or add optional printer memory.
The Paper light is on steadily.	The paper cassette is empty.	Load more paper into the paper cassette.
The Paper light is blinking.	There is a paper jam.	See Chapter 8 for instructions on how to clear paper jams.
Both the Data light and the Ready light are on steadily.	There is unprinted data in the printer. (Your software did not send an "end of job" command.)	Briefly press the front panel button to print the rest of the data.
The Data light is blinking.	The printer is in Manual Feed mode and the manual feed slot is waiting for paper.	Insert a piece of paper into the manual feed slot
All the printer's lights are off.	The printer is in Intelligent Off mode.	Briefly press the front panel button to activate the Ready light. If the Ready light does not come on, check the power cord and your power source. If the printer still does not respond, contact your local authorized service representative (see Chapter 9).

methods design a series of decision tables like the one in Figure 10.6 to present a visual "map" of the procedure.

The benefits and liabilities of this technique are fairly clear. If information can be reduced to such lean formats, writers should probably do so, but that is not always possible. When the material requires more explanation, information mapping is not appropriate. And readers can easily tire of pages and pages of tables—it's hard to sustain concentration when there is no prose to break up so many visuals that look exactly the same. The best advice is to use information mapping techniques in combination with other types of document design. Your entire document does not have to be information mapped in order for you to use this technique where it is appropriate and useful to clarify and simplify complex material.

(See Chapter 4 for more about designing.)

Editing

Because instructions and procedures should be as transparent as possible to allow users access to the technology without stumbling over prose, the editing stage is vital. In most companies where writers are responsible for drafting documentation,

editing plays a major role. These days, *developmental editing* is standard practice and includes collaborating with an editor from the beginning of the documentation process to check the prose for organization, style, and grammar, and it also includes testing the document during the development cycle.

Collaborating

Editing instructions well is a complicated process that requires patience and openness on the writer's part to corrections that can make the documentation more useful. Get as much specific feedback as you can from as many people as you can while you develop the document. It's amazing how people read the same words differently. When you are writing instructions, it is especially important to have another pair of eyes look at what you've written because incorrect or misleading directions can cause users frustration and even injury, and can result in lawsuits for your company—or for you as the individual writer, (See Chapter 8 for more information on ethics and liability issues for technical communicators.) Many companies have hired specialized editors for this purpose—especially large computer companies with entire departments devoted to writing user guides and other manuals—while other companies allow writers to edit each other's work. Either way, having other people look at your work is essential.

Working together as a team from the beginning, the writer and editor make the writing process more dynamic, sparking ideas and collaborating on developing an effective document. Such developmental editing saves writers time because they make important revisions to smaller parts of the text during the composing process, rather than having to revise the entire document at the end. It also prevents writers from becoming overly protective of their work. Pride of authorship often makes writers reluctant to make changes in their prose; and, not surprisingly, the more words they've written, the less they want to change them. But it's a lot easier to take constructive criticism along the way than to present a product you thought was finished and have it come back to you for extensive revisions.

To establish a collaborative developmental editing process, take some time at the beginning of the writing project to work out a schedule with your editor. See Steps to ... Scheduling Your Project for more specific guidance. If you can put an effective developmental editing process in place, whether as a formal company policy or as an informal arrangement between two people, the final document will be finished more quickly, egos will be unbruised, and the document itself will be more effective.

Achieving the Right Tone and Style

Even before you give your work to an editor to review, you need to do some self-editing. Chapter 5 provides detailed strategies for editing for style. The Guidelines: Editing Instructions and Procedures summarize these strategies and tie them directly to the project at hand.

(See Chapter 5 for more on editing.)

Steps
to...

SCHEDULING YOUR PROJECT

1. Meet with other project team members at the project's start to make sure you are all in sync about the document's goals and the audience's needs.
2. Establish a style guide for the project including guidelines for page layout, style, and grammar. Check to see if your company already has a style guide; if so, be sure to use that as your model.
3. Develop a table of contents or an outline for the manual or instruction set, agreeing on organization and levels of headings.
4. Schedule interim review deadlines so other team members can see parts of the project at reasonable intervals.
5. Discuss the best procedure for seeking and receiving feedback. Do you want comments from others as online edits? As hardcopy edits? As separate memos?
6. Establish clear turnaround times for the editing process on the document sections. Decide how long other team members need to provide timely feedback, and let everyone know the schedule.

GUIDELINES **Editing Instructions and Procedures**

- Use the present tense. Users rarely read all the way through instructions before they begin following them. Instead, they read each step as they are actually doing the task it outlines—so the action is happening in the present.

NO When you finish, the icon for your printer will appear in the Printer folder.

YES When you finish, the icon for your printer appears in the Printer folder.

- Address readers as you. " The person reading the instructions is the person attempting the action; second-person address acknowledges that. Some instruction documents use third person ("the user") or even passive voice ("The wrench should then be tightened"), but these are generally less effective than speaking directly to the user in second person.
- Use imperative wherever appropriate. The imperative, which is the command form of the verb, is the most effective verb form to use when you are telling your user to undertake a specific action.

NO You should start the engine now.
The handlebars can now be slid into the open ends.
You can tighten the screw at the top as soon as the previous step is completed.

YES Start the engine now.
Slide the handlebars into the open ends.
Tighten the screw at the top.

- Use active voice as much as possible. Instructions written in the passive voice are often confusing. Passive voice is appropriate only when the doer of the action is unknown or unimportant, and using the active voice makes nothing clearer.

NO	The data dictionary should be called up. When the task of batch processing is complete, the next project should be begun.
YES	Call up the data dictionary. Complete the batch processing, then begin the next project.

- Use consistent style. Consistent patterns of grammar, style, and usage make instructions easier to follow, because they allow readers to fall into the rhythm of the steps and anticipate what's coming. Be consistent in grammatical structures, style, and formatting.

NO	<ol style="list-style-type: none"> 1. Clean the clave connector with an alcohol prep pad. 2. The syringe should then be attached to the clave connector. 3. Make sure you prime the tubing. 4. Then the tourniquet should be applied 49" to 69" above the insertion site.
YES	<ol style="list-style-type: none"> 1. Clean the clave connector with an alcohol prep pad. 2. Attach the syringe to the clave connector. 3. Prime the tubing. 4. Apply the tourniquet 49" to 69" above the selected insertion site.

- Use gender-neutral language. Pronouns that specify gender are offensive when used in situations that include both sexes. Use the plural; use second-person pronouns; or, as a last resort, include both genders: "She and he" or "S/he," and "his or her" or "his/her."

NO	The user can keep his documents on file. The facility nurse should assess the status of her patients by reviewing patient history.
YES	Users can keep their documents on file. You can keep your documents on file. Facilities nurses should assess the status of their patients by reviewing patient histories. The facilities nurse should assess the status of her/his patients by reviewing patient histories.

Testing for Usability

Before instructions are printed for use in actual situations, it's critical to test them with potential users to see if they work. Even though you may think your document is in its final form, letting users take a "test drive" before actually finalizing the copy will either surprise you with some unforeseen problems with the text, or confirm your beliefs that the instructions are ready to go. In either case, usability testing is worth the time and trouble. Imagine sending out finished instructions for medical equipment only to discover in the operating room that they don't work well. In that case, the writers, not the medical personnel, would have committed malpractice.

Types of Usability Tests

As in all stages of the documentation process, usability testing involves preplanning and careful implementation. The first step is to design an effective test. There are four main types of document tests: (1) the written test, (2) the task-oriented test, (3) the attitudinal questionnaire, and (4) the informal observation and interview. Each type measures something different.

Written Tests Test how well users understand the document, not their ability to complete procedural tasks. For instance, if you want to test users' understanding of the concepts after they have read the instructions, a written test is appropriate. You can use any of the traditional types of written examinations: multiple choice, matching, completion, or true-false.

Task-oriented Tests Determine how well users can follow the instructions to complete specific tasks. This type of test requires test subjects to follow the steps in an environment similar to the one where the instructions will actually be used. For example, some computer companies maintain usability testing laboratories where users are observed as they use the manuals, allowing the observers to see where the document needs improvement. (You can set up a similar test on a smaller scale.)

Attitudinal Questionnaires Determine how the users feel about the documentation. These questionnaires usually consist of three parts that allow users to rate various aspects of a manual or instruction set: (1) a series of statements about the usability of specific parts of the document, (2) a range of possible responses to each statement, and (3) a comment section for each statement.

Example

The headings used in the text made it easy to find information.
 _____(agree)_____ (neutral)_____ (disagree)_____ (unable
 to judge)

Comments:

Informal Observations and Interviews Yield more qualitative than quantitative results. By watching people use the documentation and then talking to them about it, you may gain perspectives not provided by other types of tests. However, because of its informality, this kind of test should be done in conjunction with one of the other types.

Before choosing the test type, be sure to decide exactly what you want to measure, what your testing resources are, and what kind of test you can afford. Many companies test their documentation several times: first, in-house in *alpha tests*, and then later at sites external to the company in *beta tests*.

Once you have completed the document testing, you should meet with your project team—anyone (developer, editor, manager, and so forth) who is involved in working with you on the project—and determine how to revise the instructions to meet the needs of the users. No matter whether you can afford single or multiple testing, remember that only after the instructions have been tested at least once and revised accordingly should they reach clients' or customers' hands.

Tips for International Communication

Instructions and procedures are the technical documents most likely to be translated into many languages or to be read in English by people from many cultures. It's especially important to be aware of the cultural aspects of your prose and to plan documents that are considerate of the target culture.

Considerations and Cautions

The key to writing effectively for international audiences is the same as it is for any audience: know your audience, and plan your document accordingly. The following strategies may help you plan better international manuals:

International English If you are writing a manual in English that will be read by international audiences without translation, use strategies to make your language easy to read by non-native speakers (see Chapter 5, pp. 133-134, for guidelines for simplified English):

- Choose words with limited meanings.
- Avoid verbs having two or more words ("examine" not "look at").
- Define all special terms in a glossary.
- Avoid idiomatic language ("run a risk," "lose ground," and so on).
- Avoid humor or sarcasm.
- Use simple sentences.
- Use bulleted lists or tables instead of paragraphs.
- Be formal but polite (no first names, contractions, and so on).

Fit Local Standards If you are writing a manual for a culture that is different from your own, do the necessary research to make the document fit the local standards. Often, translating a manual into another language is not sufficient. You need to consider how reader expectations differ from culture to culture and identify the expectations for your target audience. (See Chapter 1, pp. 13-17.)

Do a Usability Test Testing the manual with a group of users from the target country is extremely helpful in determining cultural features of the document that either work well or need to be changed. Be sure to select a test group that is similar to your intended audience and is large enough to give you trustworthy information. You may need to use several groups to represent the various types of

audiences your document may have. (See pp. 237-238 for information on how to design usability tests.)

Balance Theory and Practice Determine what the cultural preferences are for "how to" versus "why" information. For example, studies have shown that Dutch readers prefer their manuals to emphasize operation: How do I make it work? French readers, however, prefer an emphasis on the theory behind the practice as well as the operation: Why does it work that way?

Use Graphics and Icons Appropriately While the old saying "a picture is worth a thousand words" is true in many instances, the symbols used in one culture may not have the same meaning in others. For example, the picture of a pointing hand may be a benign icon in this country, but in others it may be offensive. Similarly, using animals in cartoons or drawings to portray people may work well in some cultures but may be offensive in cultures where animals are considered sacred or where confusing people with animals is a form of religious uncleanness. It's also difficult to be sure that an English word placed on an icon can be replaced with a direct translation of that word in another language and still fit within the perimeters of the icon. (See Chapter 4 for more on international issues with icons, symbols, and graphics.)

Use Color Thoughtfully Pay attention to the implications of color for the culture you are targeting. Yellow is considered a religious color in some Buddhist countries; red is a color of mourning in some cultures; and so forth. (Again, see Chapter 4 for more on using color in international documents.)

Understand Reading Patterns In the United States and Europe, we read from left to right, but in many Asian countries, the reading pattern is from right to left. Design the pages so that the information appears in a sequence appropriate for the target country.

Use Local Number Representations Presentations of dates, times, and orders of magnitude can vary greatly from country to country. For example, in the United States the numeral representing one thousand is 1,000; in Germany it is 1.000 and in Sweden 1 000. Be sure you adopt the presentation method standard in your target country, or your manual may cause confusion that could result in disaster.

For more about cross-cultural communication, see Chapter 7.

Quick Review

Writing and designing instructions, procedures, and policies is a challenge because you are essentially configuring white space, text, and graphics so that users will be

able to use the information without noticing the design. When done well, instructions reflect their excellence by their unobtrusiveness.

- Instructions are a set of directions; procedures are sequences of steps within instructions; policies are the rules that govern actions.
- Decide at the outset what type of instructions you are writing. There are several types of instructions: user manuals, reference manuals, tutorials, quick reference guides, online documentation, procedures guides, and policy manuals.
- Plan the documentation by getting information about the users and about the tasks they must perform.
- Write a document specification.
- Organize by following these guidelines:
 - Organize in task-oriented, sequential steps.
 - Construct deductive frameworks.
 - List tools or equipment necessary to complete the task.
 - Separate instructions from expository prose.
 - Organize similar types of information similarly.
 - Separate user actions from system reactions.
- Use a developmental editing process that includes both collaborating with others on style issues as well as document testing.
- Use document design elements that are especially applicable to instructions and procedures: clearly labeled figures, consistent formats, decision tables, modular design, and information mapping.
- Be especially careful about using culture-bound graphics, icons, color, or reading patterns in instructions that will be translated or used by readers whose native language is not English.

Exercises

1. Write instructions for a simple procedure, such as shuffling a deck of cards, tying your shoe, or making a paper airplane. In the first version, use only words and no graphics. Hand it to a colleague or a classmate and ask that person to follow the instructions exactly as you have written them—without your coaching. Note where the areas of difficulty are and discuss with your colleague what you might have done to clarify the instructions. In the next version, revise the instructions and add clearly labeled graphics. Ask a different colleague to follow these instructions and give you feedback about the difficulties. Continue revising and asking different colleagues to test your instructions until you are satisfied that they are easy to use.
2. Find a piece of software that runs on your computer but that doesn't have hardcopy documentation for users. (You may order some free "shareware" or download some software programs from the Internet if you don't have a

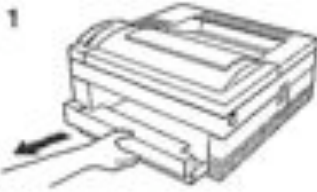
package readily available.) Write a brief manual either for all of the functions of the software or for a portion of them.



Community Action Project

For a team project, find an organization that needs a manual written for office procedures—you will find that most organizations have such a need! Begin with a document specification agreed upon by all team members, including representatives from the organization. You may want to divide the tasks among members of your group and plan periodic meetings to discuss progress and to edit each other's work. As you write and revise the manual, include everyone in the decision-making process, and keep everyone apprised of the changes in schedule and in the document specification. Be sure to conduct usability tests on portions of the manual along the way as well as on at least one draft of the whole document. The final version should have a consistent style and format, even though several writers have drafted it.

User Guide Instructions, Step by Step



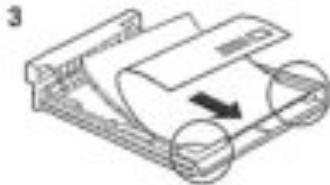
Adjusting and Loading the Paper Cassette

Follow these steps to adjust the paper cassette or the size paper you want to use, and to fill it with paper:

1. Pull out the paper cassette and remove the paper.



2. Push the paper size guide toward the center of the tray to free it from its notch. Slide it to the notch for the desired paper size.



3. Load letterhead face down, with the top edge forward the front of the paper cassette.



4. Secure the corner of the stack under the metal clip at the front of the cassette.



5. Rest the tray on the table or desk and slide it back into the printer. The green Ready light illuminates.

To Prevent Jams

- Make sure the corners of the stack are under the metal clips.
- Do NOT overload the paper cassette.
- Make sure the paper is pushed down to the bottom of the cassette.

Graphics are numbered to correspond to steps

Task clearly stated up front

1

User actions are steps

Note is set apart and easy to see

Note parallel structure using imperatives

This system reaction should be separated from the step

Sample Brief Instructions

Clear heading indicating purpose

Extra information separated from steps

Steps include user actions. Only one action per step

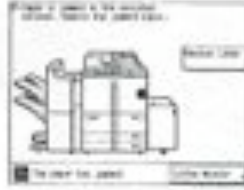
Visuals are self-explanatory and reinforce text

Hazard message includes caution and potential consequences

Fewer than 10 steps, each numbered

Removing Paper Jams in the Stack Bypass

If a paper jam occurs in the stack bypass, a display similar to the one on the right appears in the touch panel display. Check where the jam occurred, and follow the procedure below and the procedure that appears in the touch panel display to remove the jammed paper.



NOTE

• When the Paper Deck-G1 (option) is attached, move the paper deck away from the main unit. (See "Paper Deck-G1," on p. 9-3.)

- 1 Open the right cover (upper) of the main unit.



- 2 Remove all paper from the stack bypass.



- 3 Remove any jammed paper.



- 4 Close the right cover (upper).



CAUTION

• When closing the cover, be careful not to get your fingers caught, as this may result in personal injury.



- 5 Follow the instructions in the touch panel display. (See "Display Indicating How to Clear the Jam," on p. 8-2.)

Courtesy of Canon USA, Inc.

Sample Policy

Johns Hopkins Safety Manual	Policy Number	USE 504
Subject	Last Review Date	09/01/06
Registry of Biohazardous Agents and Materials	Page	1 of 2

Policy number

Review date

POLICY

It is the policy of Johns Hopkins to maintain an inventory of all hazardous and potentially hazardous biological agents or materials used in research at Johns Hopkins.

This inventory ensures that biological materials are handled within proper biosafety level containment; and provides locations of potentially biohazardous agents or materials in the event of an emergency.

Each Principal Investigator or Laboratory Supervisor shall register all potentially hazardous biological agents or materials in their possession by completing the Johns Hopkins "Human Tissue, Infectious Agents, Pathogens, Oncogenes or Toxins" Registration Form and submitting the form to the Biosafety Office in the Division of Health, Safety and Environment (HSE).

Prior to initiating research at Biosafety Level 3, a Standard Operating Procedures Manual shall be compiled by the Principal Investigator and approved by the Johns Hopkins Institutional Biosafety Committee or its designee.

It is the responsibility of Principal Investigators working at Biosafety Level 3 conditions to maintain and regularly update a Standard Operating Procedures Manual. Principal Investigators working at Biosafety Level 3 will also ensure that personnel receive annual updates or additional training as necessary for procedural changes in the Biosafety Level 3 laboratory.

The HSE Biosafety Officer shall be notified whenever a new potentially biohazardous agent or material is identified or introduced into use.

Purpose of policy

Procedure (not numbered)

REFERENCE

Biosafety in Microbiological and Biomedical Laboratories, U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and National Institutes of Health, HRS Publication No. 93-8395 Fourth edition, May 1999.

Clear designation of responsibility

RESPONSIBILITIES

Health, Safety and Environment

Compile and maintain the Registry of Biohazardous Agents and Materials.

Principal Investigator/Lab Manager

Register all potentially hazardous biological agents or materials by Submitting the enclosed form to HSR.

Institutional Biosafety Committee

Review and approve Standard Operating Procedures for research to be conducted under Biosafety Level 3 conditions.

REVIEW CYCLE

Annually

Notice of policy review schedule

Policy and Procedure on Same Page

Uni-Care Health Services, Inc.

Subject Disposing of Leftover I.V. Medications and Solutions

Department Nursing

Page 1 of 1

Policy IV1005

Purpose of both policy and procedure up front

Purpose

7b ensure proper handling and disposal of leftover I.V medications and solutions.

Policy is clearly separated from the procedure

Policies

Disposing of Leftover I.V. Medications and Solutions

- A. Unused or leftover I.V. medication or solution may NOT be returned to Uni-Care for credit. I.V. medications and solutions left over after a patient's treatment must be destroyed at the facility.
- B. Discard any unused premixed I.V. medication or solution. Do NOT save for future use.

Policy is not numbered

Icon indicates end of section

Procedure

Disposing of Leftover I.V. Medications and Solutions

Note the difference in format for the procedure

Responsible Person	Task
Facility Nurse	<ol style="list-style-type: none">1. Cut open bag of unused I.V. medication or solution and allow liquid to drain into the sink.2. Flush the sink with running water until all the medication or solution is rinsed down the drain.3. Thoroughly rinse the sink.4. Discard the empty I.V. bag in any waste receptacle.5. Wash your hands.

Procedure is numbered steps

Describing and Summarizing Technical Information

PROFILES **IN** PRACTICE**Summarizing Careers**

Every March on "Match Day," fourth-year medical students learn where they will serve residencies, periods of advanced hospital training after graduation.

At The Ohio State University, Susan K. D. Leonhart assembles massive amounts of information to write evaluation letters from the College of Medicine and Public Health about each student to residency directors at hospitals around the nation. "Each year, they get better," she says, a judgment confirmed by the Association of American Medical Colleges, which recognized OSU's letters for quality of content, one of only ten medical schools so honored.

The evaluations often cover highly specialized medical terminology. "After a while, you know the buzzwords, but you can't be lulled **into** complacency," Leonhart says. "I believe in using a twenty-five-cent word instead of a two-dollar one when appropriate." She is fiercely thorough and inquisitive. "I'm not afraid to question what comes to me, whatever the source." The difference, for example, between the word **inpatient** and *impatient* on a student's record can make all the difference.

Leonhart never loses her sense of ownership, even if she must await outside information. "I don't want to hear '**It's** not my **job,**'" she insists. "You have to make it your responsibility." As the November deadline for finalizing the letters approaches, she works every weekend, and acknowledges that "there are so many things you don't control." What does she do when stress rises? She takes two brief walks a day when weather permits. When it doesn't, "I close the door, turn on the music, and dance."

Susan K. D. Leonhart*Technical Editor**The Ohio State University,
College of Medicine and
Public Health*

GUIDELINES **Planning Descriptions and Summaries**

- Recognize that descriptions and summaries are persuasive devices. Whether you are summarizing actions or describing a technical object or procedure, the words you use paint a mental picture for readers.
- Determine reader preferences. Make sure you don't leave out important information for the multiple audiences who may read your document.
- Make a list of key points to include. Select only those points you think are pertinent to the summary or description.
- Decide on an appropriate **length**. Be as concise as possible without leaving out key material.

Internet Resources for Chapter 11

Online Technical Writing: Technical Description

<http://www.io.com/~hcexres/textbook/desc.htm>

This site discusses the importance of process discussion and provides examples and guidelines for writing your own descriptions.

<http://saulcarliner.home.att.net/id/summaries.htm>

This site provides a set of brief guidelines for writing technical summaries.

Technical Report Writing

<http://grcpublishing.grc.nasa.gov/editing/chp4.CFM>

This chapter in the technical writing guide at NASA's Scientific and Technical Information (STI) program Web Site discusses the format of experiment and analysis descriptions found in NASA's technical reports.

Describing and Summarizing Technical Information

People writing in technical professions—whether they are primarily technical communicators or engineers, scientists, or others—spend a lot of time describing technology, experiments, how things work, what a project entails, and so forth. Their jobs require that they have skills in writing these summaries and descriptions well.

Describing and summarizing may occur in many parts of a document: within the main body of the text and in formally labeled front matter (such as "executive summaries" and "abstracts"). Each of these instances requires specialized techniques, depending on the placement and the purpose of the descriptive prose. Chapter 12 discusses executive summaries and abstracts—the front matter—while this chapter focuses on descriptions and summaries within the text.

Planning and Researching

As in all writing, the planning techniques and research methods you choose depend on the purpose of the information and your readers' needs.

Determining Your Purpose

To determine the purpose of description or summary—and to know which techniques you should use—you first need to distinguish between the two types of writing. The key difference is that descriptions are about inanimate objects or processes, while summaries are about people's actions. In other words:

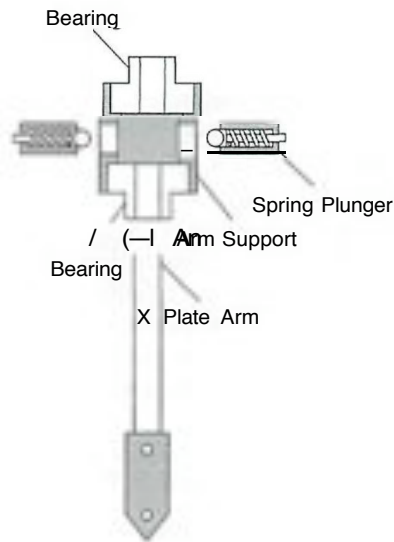
- Technical communicators *describe* how something looks (a product, a work site, or a mechanism), or how something works (a process).
- Technical communicators *summarize* what has been done or what will be done.

Describing a Mechanism When you describe a technical object or a mechanism, you provide details about the design and function of the whole object and its parts. For example, the first sample shown here is a mechanism description taken from a

technical report on designing a filament-winding machine. (It would likely be accompanied by a graphic that is carefully labeled, as it is here.)

EXAMPLE The *arm support assembly*, which is attached to the drive shaft, is the main turning mechanism of the filament-winding machine. This support assembly consists of three main components: the arm support itself, the bearings, and the spring plungers. The bearings and the spring plungers serve as a connection to the plate arm (see Figure 1).

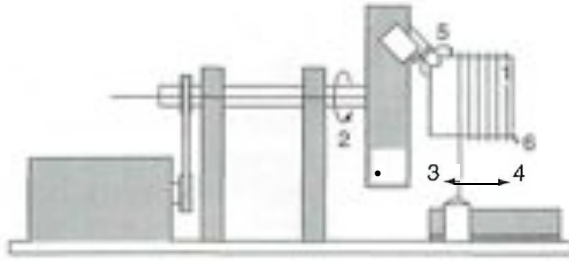
Figure 1



Describing a Process As you can see, the mechanism description focuses on how the mechanism looks. Later in that same report the writer describes how the mechanism works, as shown in the second sample. This description differs from the earlier example in that it describes the mechanism's actions, not its static parts. It also is accompanied by a graphic that shows the steps in the process and is usually labeled with arrows indicating how the parts move.

EXAMPLE As shown in Figure 2, the process begins when the filament attaches to the graphite plate with a drop of epoxy (1). Then the main shaft turns the plate and winds the filament (2), and the guide system guides the windings across the plate (3) and back to the filament's original position (4). Once the filament reaches that original position, the plate is flipped along its diagonal axis (5). As the plate is flipping, the filament catches onto the stop (6) built into the plate and the windings are reoriented 90°. At this point the plate is ready to begin its next layer.

Figure 2



Summarizing After studying the first two samples, look at a technical summary from this report. Note how it differs from the descriptions in that it narrates the actions of the *people* involved: the project team.

EXAMPLE After closer investigation of the prototype, Messac & Associates made some refinements to the retainer/plate interface, the drive shaft/arm support fastening, and the arm support machining:

Retainer/Plate Interface Changes

The actual area where the retainer attaches to the plate seemed too small. To relieve this condition, Messac & Associates increased the size of the corner knobs, thereby increasing the surface area of the interface and giving the retainer surer handling of the plate.

Drive Shaft/Arm Support Fastening Changes

The fastening between the drive shaft and the arm support originally was a press fit with a key. Unfortunately, when the machine was operating, the press fit was hard to remove without damaging the part. To correct that problem, the Messac team redesigned the fastening by tapping the end of the drive shaft and bolting the shaft to the arm support.

Arm Support Machining Changes

The sharp corners on the arm support made the machining process difficult. In addition, the corners were located where the bearings would be press fit and the thin walls could cause the bearings to slip out. The new design increases the arm's cross-sectional area, solving the machining problems.

These design refinements have allowed Messac & Associates to produce a better machine with minimal delays. A demonstrable prototype currently exists and is ready for further testing.

Sometimes these descriptions and summaries are special sections all to themselves, labeled with headings such as "Site Description," "Contamination Assessment Summary," and "System Design." Other times, writers describe or summarize material within other labeled sections of the document.

Analyzing Your Audience

When you are gathering information for a technical summary, be sure you research the needs of your audience and the context of the material you are summarizing. Novice audiences (nontechnical people or people who aren't familiar with the specific information you're summarizing) will probably need more explanation than those who are experts in the field. You need to be clear at the outset whether your readers do or do not have technical expertise.

Before you begin writing, then, you need to answer certain key questions: How much information do the readers need at any given juncture? In what order do they need it? How much detail is necessary when describing a technical object or procedure? Too much detail buries the main ideas, while too little leaves gaps in the information. To answer these questions, you need to be thoroughly familiar with your audience's knowledge of the subject and how they will use the information you provide. You can learn these things by personally interviewing your intended readers, by checking other descriptions and summaries that have been successful with this audience, and by talking to your colleagues who may have written similar documents before. In any situation where you are describing or summarizing technical information, you can count on some certainties: readers want the material to be logical, concise, and clear.

Remember that even experts appreciate your placing the summary in a clear context. Doing so means that you need to research not only the material you are summarizing but also any other information that affects or touches on the central ideas. For example, if you are summarizing the steps needed for a construction project, be sure to research all related building codes and legal issues. Explaining why actions are necessary helps your audience understand and remember your narrative. (See Guidelines: Planning Descriptions and Summaries.)

Organizing

Techniques for organizing descriptions and summaries easily follow standard deductive order: begin with the main point and then give details. Nonetheless, in the heat of composing, writers may forget these simple guidelines. As discussed in Chapter 3, organizing deductively means "frontloading" information by placing the main point and purpose of the material up front and following them with the more detailed explanations. This technique is especially vital for organizing descriptions and summaries, because the main point at the start gives readers a context for understanding and remembering what could otherwise seem an incoherent list of facts.

Organizing Technical Descriptions

There are two kinds of writing addressed here: (1) object descriptions and (2) process descriptions. In their daily work, engineers and scientists write these kinds of descriptions more than any other type.

GUIDELINES Planning Descriptions and Summaries

- Recognize that descriptions **and** summaries are persuasive devices. Whether you are summarizing actions or describing a technical object or procedure, the words you use paint a mental picture for readers. If the picture is sharp and clear, they will be more likely to find the material trustworthy. If it's sloppy, readers will be less trusting.
- Determine reader preference. Knowing who your readers are and what their expertise is can make your choices a lot easier. When your readers are experts, you can omit some explanatory details. But make sure you don't leave out important information for the multiple audiences who may read your document.
- Make a list of key points to include. Select only those points you think are pertinent to the summary or description. Remember that readers want the information to be concise but complete. Looking at the material in list form allows you to see more clearly what may be extraneous and what is essential.
- Decide on an appropriate **length**. Although you need to include all of the material your audience requires, pay attention to the length of your summary. People generally can't follow long narratives because there are too many facts and actions to remember. Be as concise as possible without leaving out key material.

(See Chapters 1 and 2 for more about planning and researching.)

Describing a Technical Object or Mechanism To describe a technical object, use deductive order. First, state what the object is and give the reason for your description (which might be a good time to describe the object's purpose). Second, to orient the reader, give a brief overview of the object's size and major components, and how these components relate to one another. Finally, describe the parts in detail, making sure to use specific terms and measurements and explaining carefully the location of each component. (See the sample technical object descriptions at the end of this chapter, pp. 261-263.) It always helps to have a drawing close to the description so that readers can comprehend the information both visually and verbally.

Look at this simple example of an effective description.

EXAMPLE

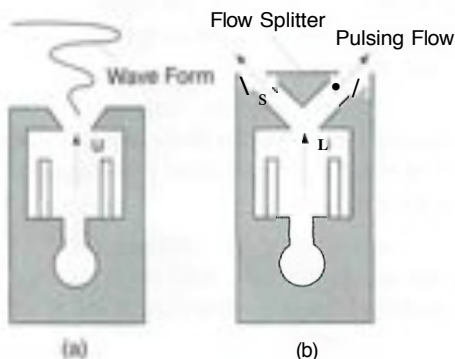
Flip-Flop Oscillator

The Hip-Hop oscillator is a device that varies fluid flow direction, rather than varying the pressure and flow rate. The oscillator can be of varying size and consists of a rectangular cavity whose width is less than its height. A 90° nozzle is located in the center of the top (see Figure 3). Our design group proposes to alter this basic mechanism to include a flow splitter, a triangular piece inserted into the nozzle to split the fluid's direct flow (see Figure 3b). Without the splitter, the

flow issued from the nozzle constantly changes direction, creating wave action. The splitter takes the flow and directs it to one of two ports, resulting in a strong pulsating flow from each of the ports. The direction of each pulsating flow is uniform.

Figure 3

Oscillator and Flip-Flop Modifications



Courtesy of the Capstone Design Course 1995-96, Northeastern University. Department of Mechanical, Industrial, and Manufacturing Engineering.

Describing a Technical Process To describe a technical process, again think in deductive terms. Explain what the process is and why it's important (What is its use? Its purpose?), then give an overview of the number of steps and, finally, list the steps in careful, logical order. Your preplanning research comes in handy here. A diagram is also helpful, especially if the process requires readers to visualize complex relationships or complicated steps. The next sample illustrates these points.

EXAMPLE

New Process for Measuring Fuel Consumption

Afron, Inc., has developed a new process that measures only the fuel consumed by the engine. In this method, the recirculating fuel is not directed through the Pelton wheel How meter as it is in the traditional method. Under traditional methods (see Figure 4), the fuel flows through the flow meter and into the recirculation loop around the injector pump. The fuel going through the meter and into the loop is equal to the fuel leaving the pump to be consumed by the engine. However, the problem with the system is the possibility that a vacuum leak might drain the fuel line, making it difficult to restart the engine. Our solution to this problem (see Figure 5) is to set up a series of solenoid valves connected to a switch on the dashboard. These valves enable a three-step process for more accurate fuel

measurement First, the valves allow the fuel to recirculate through the injector pump with the balance of the burned fuel flowing through the flow meter. Second, when the valves are powered, the fuel runs through the auxiliary lines, allowing the injector pump to pull the fuel up from the tank at a high rate to recreate the vacuum in the system. Third, once the fuel returns to the injector with the vacuum restored, the valves can be switched back to allow for recirculation and flow measurement.

Figure 4

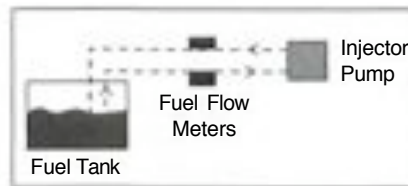
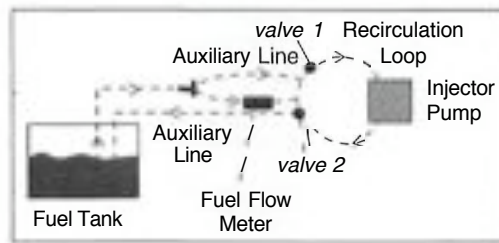


Figure 5



Courtesy of the Capstone Design Course 1995-96, Northeastern University.
Department of Mechanical, Industrial, and Manufacturing Engineering.

Note that in both descriptions an overview comes first and the details second. By establishing this framework up front, the writer sets readers' expectations and keeps them oriented throughout the material. Too many writers make the mistake of plunging right into a description without informing the readers about where they are going or why the material is important to know. With a few quick deductive explanations at the beginning, the descriptions become remarkably more readable and easy to follow. (See the sample technical process description at the end of this chapter, p. 264.)

Organizing Technical Summaries

Once again, deductive order is the key to writing effective summaries. The technique of frontloading your main point or purpose enables readers to follow the

information much more efficiently than if the facts appear in random—or even in chronological—order. Consider, for example, the following information:

Original

Water gas was produced at the Eighth Street site for a period of five years, from 1928 to 1932. Coal tar residues were collected in coal tar storage vessels located below ground at the site. Coal tar residues accumulated in the two gas holders. Residual coke and ash were spread over the site. Oxide wastes from the purifying operation may have been piled outside on the ground for regeneration (final disposal method is unknown). In recent years, there have been several observations that may be related to the former coal gasification plant: during demolition of the foundation of the small gas holder in the area of the influent building a concrete vault was found containing what appeared to be coal tar residue. Later excavation found what appeared to be coal tar residue mixed with the soil. On November 23, NYSEG obtained a sample from one of the coal tar storage vessels on the site. The sample consisted of water and gravel but had a strong odor. Analytical results from the tests performed on the sample indicated low concentrations of chemicals that could be related to coal tar. In January, the City dug test pits along the proposal route of yard piping for the expansion of the water treatment plant and uncovered soil that contained suspected coal tar residues. One water sample and three soil samples were collected during these construction activities. Three of the four samples collected and analyzed contained chemicals that could be related to coal tar.

What is the point here? The reader can see that it has something to do with a work site and with coal tar residues, but nothing about those matters stands out; the paragraph becomes a seemingly pointless list of observations. But the details become coherent and memorable when placed in the context of a main idea:

REVISED

We strongly recommend further investigations into possible environmental contamination problems at the Eighth Street site. Based on the following historical information and direct observations, Williams Corp. believes that coal gasification-related residues are likely present in the subsurface environment. From site reconnaissance, interviews, and file reviews, we learned several things:

Historical Information

Water gas was produced at the site for a period of five years, from 1928 to 1932. Coal tar residues were collected in coal tar storage vessels located below ground at the site, and coal tar residues accumulated in the two gas holders. Residual coke and ash were spread over the site. Oxide wastes from the purifying operation may have been piled outside on the ground for regeneration (final disposal method is unknown).

Recent Observations

In recent years, there have been several observations that may be related to the former coal gasification plant: during demolition of the foundation of the small gas holder in the area of the influent building, a concrete vault was found containing what appeared to be coal tar residue. Later excavation found what appeared to be coal tar residue mixed with the soil. On November 23, NYSEG obtained a sample from one of the coal tar storage vessels on the site. The sample consisted of water and gravel but had a strong odor. Analytical results from the tests performed on the sample indicated low concentrations of chemicals that could be related to coal tar. In January, the City dug test pits along the proposal route of yard piping for the expansion of the water treatment plant and uncovered soil that contained suspected coal tar residues. One water sample and three soil samples were collected during these construction activities. Three of the four samples collected and analyzed contained chemicals that could be related to coal tar.

This second version not only makes more sense because the recommendations and reasons for the list of facts create a framework for readers to understand the material, but it also arranges the facts into two groups: the historical information and the recent observations. With these changes, it packs more punch and is easier to remember.

In general, then, to organize deductively, observe the following guidelines:

- Begin the summary with a statement of purpose that creates a framework for readers to understand the importance of the information.
- Put conclusions and recommendations first if the audience will not be hostile to them.
- Follow the main purpose with details placed in logical and clearly discernible order.
- Group related information into categories marked with subheadings, and note how these categories relate to the main point.

These general principles work whenever you are summarizing information, and they will help you to organize your document so it's more efficient and understandable for readers.

(See Chapter 3 for more about organizing.)

Designing

As you write descriptions or summary information, remember that the way the material appears on the page goes a long way toward creating a positive or a negative impression on readers. When prose contains as many facts as descriptions and summaries do, it's a challenge to make the information look readable. Certainly the principles of "chunking" and using reader cues apply (see Chapter 3), as do the other techniques for effective page layout. The most fact-laden description or

GUIDELINES Designing **Descriptions** and Summaries

While all of the basic document design principles apply to in-text summaries and descriptions, some special design characteristics apply as well.

- **Use visuals.** Summaries of complex information frequently can be condensed into a table preceded by a brief introductory statement. Or you can follow the prose explanation with a visual that helps to clarify the material. (See Chapter 4 for more information on labeling visuals and integrating visuals with the text.)
- **Chunk text.** Use numbers, headings, and bullets to differentiate parts, steps, and other divisions of the information. This "chunking" technique (see Chapter 3, pp. 61-64) breaks up dense blocks of text and allows readers to better visualize and comprehend the information. Long summaries, dense with prose, are immediately annoying to most readers and make the document much harder to understand.
- **Differentiate content.** Consider setting off a summary or a description in a different type font, or indenting the material so it is visually differentiated from the rest of the document. Doing so allows readers who may not need or want to read that material to skip over that part of the text. Readers who want to read the material appreciate having it so clearly delineated as a unit.

(See Chapter 4 for more about designing.)

summary can benefit from even more specialized methods of designing the prose. (See Guidelines: Designing Descriptions and Summaries.)

Editing

As you edit descriptions and summaries, keep in mind three potential problems that might undermine their effectiveness:

- Too much information
- The "list syndrome"
- Inconsistent terminology

Too Much Information

One potential problem is the temptation to include too much information. In all descriptions and summaries, whether they are short or long, an overload of detail makes the information hard to comprehend. Think very carefully about what material is essential to include and what may be extraneous facts. Be brutal about paring your prose to its essentials—run a draft by another technical expert to make sure you've captured what needs to be said without overdoing the details. Otherwise, you may end up with prose like this:

Example

The primary objectives of these field investigations were to determine if the drummed materials were disposed of within the AC-1 landfill and to characterize the materials within or released from these drums and

to determine if these drums were the source of geophysical anomalies defined during the Step I Phase II program. The proposed seven trenches and 11 test pits were located to evaluate electromagnetic (EM), magnetic (M), and ground-penetrating radar anomalies (GPR) defined during the Phase I Step II program. These excavations resulted in approximately 1,285 linear feet of trenching. The placement of these trenches was not intended to test every anomaly present at the site, rather to provide a representative insight into the source of a number of different types of anomalies to support the determination of whether an expanded source characterization and interim corrective measures program were necessary. A scope-defining criterion was that every indication of buried drums was to be investigated, with the removal of any drums discovered. Following this criterion, it became necessary to add two additional trenches and 11 offset trenches totaling approximately 595 linear feet of excavation. The primary and offset benches combined with the projections of geophysical anomalies between the trenches, defined drum zones that were then excavated as part of a bulk drum removal phase of the program. In total, over 800 drums and fragments were recovered during excavation operations. The bulk drum removal phase removed approximately 450 of the drums, while adding the equivalent of 4,120 linear feet to the excavations. Trenching and test-pitting operations collected a total of 258 soil samples (including duplicates), which were submitted for environmental chemical analysis. Drum removal waste characterization required the collection of additional 285 samples from drums or directly associated wastes for waste characterization chemical analysis.

This summary would greatly benefit from some serious pruning and reorganization so that the facts cohere into a sensible and comprehensible narrative.

REVISED

AC-1 Landfill Field Investigations

The following summarizes the field investigation objectives, process, and results:

Objectives

- Determine if the drummed materials were buried in the AC-1 landfill.
- Characterize the materials within or released from the buried drums.
- Determine if the drums were the source of the geophysical anomalies identified during Phase II of the project.
- Determine if more extensive source characterization and corrective measures were necessary.

Process

- Investigated every indication of buried drums and removed those discovered.
- Dug 7 original trenches and 11 test pits to evaluate electromagnetic (EM), magnetic (M), and ground-penetrating radar (GPR) anomalies defined in Phase I (1,285 linear feet of trenching).
- As a result of findings in original trenches, dug two additional primary trenches and 11 offset trenches (additional 595 linear feet of trenching).

Results

- Discovered 800 drums and fragments.
- Removed 450 drums (adding 4,120 linear feet to the excavations).

The List Syndrome

Make sure that all facts are introduced with a clear context-setting statement that allows readers to understand them as a cohesive whole, not as a random brain dump. The list syndrome occurs when a writer tosses out a lot of loosely related facts that lack a clear organizing principle. Without an understanding of how facts and ideas relate, readers see just a jumble.

Inconsistent Terminology

When you describe or summarize technical information, use precisely the same terminology in all parts of the text. Writers who erratically switch terms confuse readers and sometimes generate serious problems for their companies. An example of a confusing switch in terminology occurs in the following paragraph describing vulcanization:

Vulcanization is defined as a process that increases the retractile force and reduces the amount of permanent deformation remaining after the removal of the deforming force. Generally, unvulcanized rubber is not strong, does not behave elastically, and is sticky. In short, unvulcanized rubber has about *the* same consistence as chewing gum. Heating rubber in a saturated sulfur atmosphere vulcanizes it. The vulcanized rubber takes the shape of its mold. This behavior gives it the properties we find in tires today. Devulcanized rubber is most useful for creating new products.

The writer uses the term "unvulcanized" and then switches to "devulcanized." Are they the same thing? Perhaps so; perhaps not.

In your writing, determine what are the key terms to communicate the technical information clearly, and then use them consistently. If you feel you are being redundant, try to use pronouns appropriately instead of repeating the term so of-

ten—but make sure your pronouns clearly refer to the term. If you can find no way around repeating the term, repeat it. Technical accuracy takes precedence over avoiding redundancy.

(See Chapter 5 for more on editing.)

Tips for International Communication

Most Americans are taught to write directly, concisely, and linearly; that is, they learn to connect paragraphs with clear topic sentences and omit extraneous material that doesn't contribute to this linear progression. In Germany, however, such simple style is not the norm and may be construed as simplistic rather than professionally concise. According to Arthur Bell, W. Tracy Dillon, and Harold Becker, who have researched German business prose style, "The German tradition promotes logical progression but imposes fewer restrictions on the inclusion of material. Germans may appear to digress from the main point at hand if they feel the additions contribute to their purpose. Thus lengthy German sentences and paragraphs typically signal a more varied and recapitulated content than American managers may be accustomed to in business prose."

The example of Germany is just one of many in the global marketplace. Although streamlined descriptions and summaries are the preferred form of communication in the United States, you must also be as thorough as you can be and balance the impression of concision with the thoroughness of detail. For some cultures, you will want to emphasize detail more than you would if you were writing to American audiences. It's a good idea to check the customs of the country you're targeting and to read some samples of the descriptions and summaries in their reports or proposals. Test both a streamlined version and a more detailed version of the same summary on a few readers from that culture. Which communicates most effectively?

For more about communicating across cultures, see Chapter 7.

Quick Review

Technical communicators spend most of their time writing technical descriptions and summaries—sections within documents that describe what has been done, what will be done, how something looks, or how something works. The key difference between them is that the description focuses on material external to people's actions, while the summary is a narrative of people's actions that have occurred or will occur.

*Arthur H. Ball, W. Tracy Dillon, and Harold Becker, "German Memo and Letter Style," *Journal of Business and Technical Communication* 9 (1995), p. 225.

To write effective descriptions and summaries:

- Recognize that descriptions and summaries are persuasive devices that convince readers of your competence as a technical expert and as a writer.
- Follow deductive order for descriptions and summaries and use page design elements to increase readability.
- Be as concise as possible in describing and summarizing information, but be careful to be thorough as well.
- Pay attention to three potential problems that can undermine the effectiveness of descriptions and summaries: too much information, the "list syndrome," and inconsistent terminology.
- Research the preferences of the cultures you are targeting with your prose; some cultures require more detail at the expense of concision.



Exercises

Write a one-page description of a common technical object—a digital clock, a power drill, a pair of scissors, for example—without naming the object, giving its function, or including any graphic illustrations. Be as precise as possible. Exchange the description with a classmate or colleague and ask that person to draw a picture of the object and figure out what the object is. (Let the prose stand on its own—don't give any hints.) After each group has finished this process, discuss the reasons for any difficulties encountered in drawing or naming objects.



Community Action Project

Develop a short workshop or clinic on writing technical descriptions and summaries. Be sure to feature tips for effective describing and summarizing and also include time for group editing of works in progress. You may want to hold this clinic at your workplace or school—or you may want to broaden participation by offering it through an adult education evening at your church or community center. Your audience will be people who are preparing reports or proposals for their organizations or individual projects.

Object/Product Description

The X-ray Micro-radiography (XRM) is a high-resolution imaging technique that shows internal structural information at magnifications of 1X to 25X.

Overview

SOME XRM APPLICATIONS

Specific applications

1. Materials Evaluation
 - location of voids and cracks
 - location of gross contaminants
2. Failure Analysis
 - detection of lifted lead bonds
 - location of leaks in seals
 - imaging of voids in plating
 - determination of intermittent relay problems
 - micro-crack detection
3. Quality Control Screening
 - die attach verification
 - parts placement and position verification
 - imaging of sealed switches during operation
 - inspection of plated through holes

Parallel structure using nouns

PRINCIPLE OF OPERATION

The sample is placed in front of a focused, 10–60 keV X-ray beam and an X-ray sensitive video camera detects the X-rays that pass through the sample and displays the output on a video monitor. While viewed, the sample can be rotated and moved in all directions to focus on features of interest. Varying the sample's position between the X-ray source and the video or photographic camera changes the image modification. The output of the camera is displayed on a video monitor. The sample can be rotated and moved in all directions while being viewed to locate features of interest. The image magnification, changed by varying the sample's position between the X-ray source and the video or photographic camera, changes the image modification.

Subheadings "chunk" information

DATA OUTPUT

The X-ray image may be viewed in real time on a video monitor or it may be stored on a video tape recorder for later review or comparison of a "good" sample to a "bad" sample. The image may also be recorded on high-resolution film (either positive or negative). Film recording of the image provides for higher magnification and greater material penetration than video recording.

SAMPLE CONSTRAINTS

The XRM sample size can be from 1 mm x 1 mm x 0.1 mm to 25 cm x 5 cm x 1 cm. Any material that is not X-ray sensitive may be radiographed without damage.

Specific dimensions given

Technical Object and Process Description

Purpose of process

We measured gear stresses with the photoelastic method, using a lull model. For this experiment, we used gears cast out of transparent (polymer) material where the model gears are stressed in a polariscope to reveal stress fringes.

POLARISCOPE

Overview of equipment and purpose

The optical instrument of photoelasticity is a polariscope, an instrument that uses the properties of polarized light in its operation. For experimental stress analysis work, two types of polarizers are frequently employed: the plane polariscope and the circular polariscope. The names follow from the type of polarized light used in their operation.

Specific components described

A plane polarizer (Figure 4-1) is the simplest type of polariscope. It consists of two devices for plane polarizing light, placed one behind the other, and a light source. The polarizing device placed nearest the light source is termed the polarizer; the second device, which receives the light that has passed through the polarizer, is termed the analyzer.

Visual aid



Fig. 4-1. Illustration of Plane Polariscope

Process described

Ordinary light consists of wave motions in which the vibrations are normal to the direction of propagation. Special filters (polaroid filters) are able to select only those rays vibrating in a particular plane, thereby producing "polarized light-

After leaving the first filter (the polarizer), the polarized light enters the transparent gear model and can only vibrate along two perpendicular planes coinciding with the planes of principal stress. The speed of propagation of each component light ray depends on the stress acting on the plane. Consequently, the two rays emerge from the model out of phase. The difference in phase depends on the differing stresses, the length of the light wave, and the thickness of the model. The two rays emerging from the model are received by the analyzer, which transmits only components of these two rays in its plane of polarization. Because the two emerging components are directly additive, they cause extinction with monochromatic light if one component is a half a wavelength behind the other. Alternatively, if one component is an integral number of wavelengths behind the other, a maximum light intensity is produced.



Fig. 4-2. Diagram of Photoelastic Fringes

This variation in magnitude of principal stresses at points in the model causes the entire surface of the model to be covered with a number of "fringes" (Figure 4-2). From these fringes we can measure the maximum shear stress and stress direction.

*Summary of
polariscope
use*

Technical Object Description

Number of components predicted

List of components with specific detailed descriptions of their functions

Parallel structure used

Visual aid (an exploded diagram shows components clearly)

The final hinge design (Figure 4-3) consists of six components:

1. One forward collar assembly comprising 3 separate collars and 2 braces. A square collar, used to hold the forward frame member, will be secured to the 2 rotating round collars via the 2 braces.
2. Three independent collar and bracket assemblies that will be welded to the rear triangle section of the bicycle.
3. One central core around which the 2 round collars from component #1 and the 3 collar/bracket assemblies from component #2 will be free to rotate.
4. One Teflon sleeve that will surround the central core and allow the collars to rotate more freely.
5. Two end plugs used to secure the collars and central core in place. The end plugs will each consist of a round steel tube capable of snugly fitting inside the central core and a plate welded to the end of the tube. The end plate will have a diameter larger than the collars and will therefore be able to keep the core aligned inside the five collars.
6. One bolt that will pass through the hole in one end of the plug end plates, through the central core, and through the second end plug end plate. The bolt will be held in place with a wing nut and washer and will in turn secure the end plugs and, accordingly, the entire main hinge assembly.

Figure 4-3 International User Analysis Grid

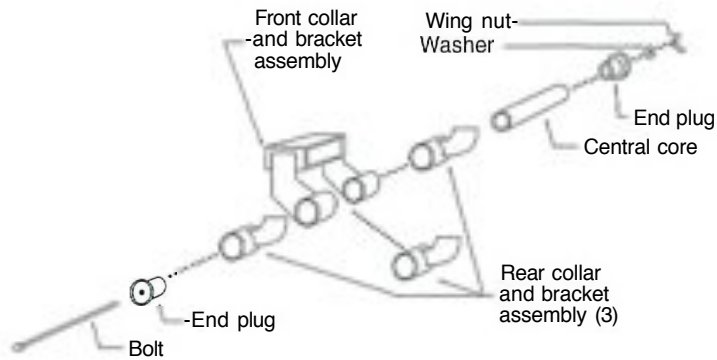


Table 1 gives the dimensions of the main tubes used in the hinge design:

Table 1 - Tube Diameter Dimensions

Round collars (5)	Outside diameter	2.000 in.
	Inside diameter	1.625 in.
Central core (1)	Outside diameter	1.500 in.
	Inside diameter	1.232 in.
End plugs (2)	Outside diameter	1.1875 in.
	Inside diameter	0.947 in.
Square collar (1)	Outside Height/width	1.750 in.
	Inside Height/width	1.510 in.

*Dimensions
presented in
an easy-to-
read table*

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PROFILES IN PRACTICE

Abstracting and Indexing

Barbara Zahm

*Senior Scientific Information
Analyst*

Chemical Abstracts Service

Recording information about science, like science itself, has changed dramatically with advancing technology, according to Barbara Zahm, Senior Scientific Information Analyst at Chemical Abstracts Service. A division of the American Chemical Society, CAS produces the world's largest, most comprehensive databases of chemical information. "We provide very sophisticated online and print services" beyond abstracts, according to Zahm, including access to a variety of databases with information about more than 29 million chemical compounds. "We try to add value not only in abstracting, but in indexing as well," Zahm says, "by providing carefully selected multiple access points to the abstract and ultimately the original article."

Although CAS products and processes have changed, they still begin with human beings evaluating scientific journal articles and patents. "What is novel about this paper?" Zahm asks of each document she considers for inclusion in databases. She carefully reviews both abstract and the article itself. "We are findings oriented," she says, thinking about the scientists who are her audience. "They want to identify the novelty of what was done and decide whether they want to go back to the original article."

The keys to a good abstract remain unchanged. "Clarity of expression" is everything, according to Zahm. "In the scientific world, **it's** a good abstract if you can tell what the scientist did and what was **found**." To that end, the classic order of *purpose*, *methodology*, *results*, and *conclusion* works well. "You must understand [**from** the abstract] what was done," she says.

Zahm enjoys her work. "When you are an analyst, you are on the leading edge of science. You continually learn" by seeing the field's latest information, she notes. As for the challenges posed by change and technology, Zahm says, "People who like to learn always find a better way to do things."

GUIDELINES Planning Abstracts and Executive Summaries

- Recognize that abstracts and executive summaries are persuasive devices. In many cases, executive decisions are made based on a reading of only the front matter.
- Determine the nature of the communication. If the document is a lengthy report, it may require both an abstract and an executive summary. If the document is short, perhaps an informative abstract is the best choice.
- Determine reader preference. Ask yourself what your readers are going to want from the abstract or executive summary: Conclusions? Recommendations? Details? An overview?
- Make a list of key points to include. Focus only on the material you think absolutely needs to be included in the abstract or executive summary.
- Decide on an appropriate length. A good rule of thumb is to make abstracts short and executive summaries a bit longer, though both should be as concise as possible.

Internet Resources for Chapter 12

Engineering Writing Center Handbook

<http://www.ecf.toronto.edu/~writing/handbook.html>

Both general writing principles and specific kinds of engineering writing including short reports, proposals, and progress reports. A very helpful walk-through tutorial on writing abstracts, and the section on proposals discusses writing an executive summary.

Writing Report Abstracts

http://owl.english.purdue.edu/handouts/pw/p_abstract.html

From Purdue University's Online Writing Lab, summarizes the qualities of a good abstract, and lists the steps for writing effective report abstracts.

Writing Abstracts

<http://leo.stcloudstate.edu/bizwrite/abstracts.html>

Explains the purpose and uses of an abstract and provides useful guidelines for creating one; contains links to other sections of the site that can help with wordiness, passive voice, and other grammatical errors.

Abstracts and Executive Summaries

This chapter focuses on how to write the preliminary parts or front matter in technical proposals and reports—specifically, the abstract and the executive summary. Often left until the last minute to write, this section is the first thing readers see, and it sets the tone for the rest of the document, (Chapter 13, pp. 291-292, contains a full discussion of all the components included in the front matter.)

Planning and Researching

How you plan the front matter depends on whether you write it before or after you write the rest of the document. Obviously, if you have written the rest of the document first, the research has already been completed and you have little of that to do. But if your strategy is to write the abstract or executive summary first as a means of focusing your document, then you need to finish much of the research before you write. Nonetheless, no matter which strategy you choose, you may notice that writing the front matter so sharply focuses the central ideas in your text that you see areas needing further research. Even though it's tempting to think you're finished with your work when you only need to add an abstract or an executive summary, the document is not finished until all parts are carefully considered and completed. Planning the abstract or executive summary may help you see what else the document needs.

Determining Your Purpose

Although many technical professionals use the two terms interchangeably, an abstract is essentially different from an executive summary in purpose, length, and placement in the text.

Abstracts Abstracts appear at the *beginning* of technical reports (and sometimes proposals, if a request for proposal requires it)—either on the title page or right after it—and briefly summarize what the document contains. Most abstracts

contain four elements: (1) the *purpose*, (2) the *methodology*, (3) the *results*, and (4) the *conclusions*. Which of these you include depends on the type of document you are writing, the requirements given to you (from your company, your teacher, or a professional board such as the *Journal of the American Medical Association* guidelines for abstracts), and the needs of your readers. Usually, writers draft the abstract after they have written the report, so that it accurately reflects the material in the document. There is a school of thought that suggests you should write the abstract first as a means of focusing what you want a document to say, but most technical communicators choose to wrestle with the report first and then write the abstract afterward.

Whether you decide to write your abstract before or after you draft the document, you should think carefully about which kind of abstract best serves your purpose and meets the needs of your readers. In general, there are two types of abstracts:

1. The **descriptive abstract** acts as a prose table of contents, indicating the main topics that are covered within the body of the document. It is a general-purpose device that doesn't contain a lot of details or quantitative information. Readers who prefer this type of abstract want to know what the general coverage of the document is, what the subdivisions are, and how the material is developed.

EXAMPLE
DESCRIPTIVE
ABSTRACT

Organizational Communication and Culture: A Study of Ten Italian High-Technology Companies

An important contribution of this research is the testing in international environments of communication and culture models previously developed within U.S. high-technology organizations. Specifically, this research demonstrates that relationships among organizational culture themes, employee values, organizational **communication** activities, and perceptions of a variety of organizational outcomes are similar but not identical for U.S. and European high-technology **organizations**. Second, the research extends previous work by identifying cultural dimensions that are related to a variety of communication processes.

2. The **informative abstract** acts as the document in miniature, a capsule version of the overall report or proposal, highlighting the primary ideas. It is often longer than the descriptive abstract and is preferred by readers who want to get the main points without reading the entire document or who need to take action on these important points immediately but will read the entire document later.

EXAMPLE
INFORMATIVE
ABSTRACT

Design for a Twin-Bar Rotary System

The objective of the electro-mechanical project was to design and build an experimental **testbed** for nonlinear control research. The final design is a Twin-Bar **Rotary** (TBR) System that consists of two easily reconfigured flywheels with a flexible shaft. Masses are

attached to each bar on a pulley connected by a wire to a single compression spring. A DC motor rotates the testbed at a maximum of 100 rpm to accommodate safety constraints. When the shaft on the testbed rotates, the masses move out radially, allowing the entire system to achieve a 90% **inertial** change.

Our data acquisition group has also provided the means to **control** and analyze the system with a computer program and optical encoders. This TBR System can be used to demonstrate physical **programming—a** highly effective system optimization **approach—in** the context of control research.

Most abstracts are no more than one page in **length—most** often they are no more than 150 words, although such absolute "rules" can **straitjacket** writers. (See the sample descriptive and informative abstracts at the end of this chapter, pp. 283-284.)

Executive Summaries The purpose of an executive summary is to introduce the document, give a synopsis of its contents, and convince readers of the **document's** validity. It is primarily a persuasive component of the report or proposal, designed not only to introduce and summarize the information contained in the complete document but also to persuade readers of the quality of the material it introduces. In technical reports, the executive summary is less of a marketing tool than it is in technical proposals, but in both instances it is a persuasive device. It is usually longer than the **abstract—frequently** one to two pages (or more) in formal reports and several pages in formal **proposals—and** appears after the table of contents. (See the example of a traditional executive summary on p. 282.)

The title "executive" summary gives a clue as to its function: it is aimed primarily at supervisory personnel who must make decisions based on the material, although they may lack technical expertise or may not have time enough to read the entire document. In proposals, the executive summary is chiefly a marketing device used to highlight the benefits of the bidder's product or service. In reports, the executive summary serves a persuasive function as well, focusing reader attention on main points, conclusions, and recommendations as well as setting the audience's expectations about the quality and thoroughness of the material to follow. In every instance, it presents succinctly the "case" the writer wants to put before the audience, and it is the lens through which readers who continue on to the main body of the document will see the information. For those who do not continue reading, it is the only view of the material that they will have.

Some companies require abstracts and executive summaries; others require one or the other. When there are no requirements, you need to decide whether two summarizing devices are appropriate. If the audience comprises many different types of readers, and if you need to **"sell"** the validity of the document, including an abstract and an executive summary might be a good idea. (See the sample descriptive abstracts and executive summaries on pp. 280-284.)

Steps
to...

CREATING AN ABSTRACT AND EXECUTIVE SUMMARY

1. Recognize that abstracts and executive summaries are persuasive devices. Whether you are giving a brief synopsis of a report in abstract form or are writing a longer executive summary, the words you use paint a mental picture for readers. If the picture is sharp and clear, they will be more likely to find the material trustworthy. If it's sloppy, readers will be less trusting. When evaluating preliminary material, readers quickly form opinions about the competence, validity, and quality of the work. In many cases, executive decisions are made based on a reading of only the front matter.
2. Determine the nature of the communication. If the document is a lengthy report that contains extensive quantitative information, it may require both an abstract (usually a descriptive abstract for such long, specific reports) and an executive summary to aid nonexpert audiences. If the document is short, gives specific recommendations and conclusions, and focuses more on theory than on technical details, perhaps an informative abstract is the best choice. Adding an executive summary in this instance may overpower the report, making it too heavy with front matter.
3. Determine reader preference. Knowing who your readers are and what their expertise is can make your choices a lot easier. When your readers are experts, you can omit some explanatory details. But make sure you don't leave out important information for the multiple audiences who may read your document. One of the uses of abstracts and executive summaries is to simplify key information for nonexperts, allowing the more technically oriented readers to deal with the actual report. Ask yourself what your readers are going to want from the abstract or executive summary: Conclusions? Recommendations? Details? An overview? Once you determine reader preferences, you can design the abstract or executive summary accordingly.
4. Make a list of key points to include. Focus only on the material you think absolutely needs to be included in the abstract or executive summary. Remember that readers want the information to be concise but complete. Looking at the material in list form allows you to see more clearly what may be extraneous and what is essential.
5. Decide on an appropriate length. Some authorities suggest that all abstracts be restricted to one paragraph and executive summaries to one page. Increasingly, however, writers are beginning to realize that abstracts and executive summaries, as powerful persuaders, may need to be longer to get the job done. A good rule of thumb is to make abstracts short and executive summaries a bit longer, though both should be as concise as possible. You don't want to overcrowd information just to stay within space limitations, nor do you want the material to lose its "punch" by making it too long. Think about the impact that the length of your prose may have on readers and use that as your guide. Have you said enough to attract and sustain readers' interests? Or have you said so much that they may become bored or inattentive while reading? It's also a good idea to check for required formats. Many companies have set guidelines about length.

Analyzing Your Audience

Planning the front matter requires you to think about the readers' needs and your goals. Remember that the preliminary material serves as an information tool as well as a marketing tool to "sell" your ideas to the audience. With that in mind, deciding between an informative and a descriptive abstract means that you need to know whether the audience wants specific quantitative information up front, or whether they simply need to know the main points of the document. Does the format of the report or proposal you're writing require an executive summary? If so, you may want to omit the abstract—or include it if you think it will add impact and make the technical material easier for a variety of audiences to understand. See Steps to . . . Creating an Abstract and Executive Summary for a clear schedule of tasks.

(See Chapters 1 and 2 for more about planning and researching.)

Organizing

As in most technical writing, the best method for organizing is to use deductive order. Begin with your main points and then give the details. In highly focused abstracts and executive summaries, this order emphasizes the relationship of the ideas within the text and gives readers a clear overview of your document's contents. Keep in mind, too, that in this concise front matter you have to decide which details are absolutely necessary and which can be omitted, and you need to make sure the order of the material sets in high relief the basic knowledge you want to convey. (See Guidelines: Organizing Abstracts.)

Methods of Organizing Executive Summaries

Remember that executive summaries should be able to stand alone for readers who do not intend to read the full report immediately (or ever). An executive summary is titled ("Executive Summary") and can be organized in one of two ways: (1) it can follow the same order as the body of the document, or (2) it can be organized into sections that meet the needs of nonexpert readers.

No matter which organizational technique you choose, the first step in organizing well is to identify which topics are essential to synopsis by checking the document's major headings and subheadings. Begin with the main purpose of the document and its primary point, conclusions, and recommendations. Do not add information or opinions not in the document itself, and do not refer to tables or specific sections of the document.

Method 1: Following the Same Order as the Body of the Document With this method, you break out the major headings from the document and use them in the summary. Under each heading, take longer material from the main report and condense each section into shorter form, but ensure that the headings exactly match the main headings from the document. For example, the headings for an

GUIDELINES Organizing Abstracts

- Make sure the abstract is connected logically to the title of your document. Make sure the abstract, in combination with the document's title, conveys the essence of the material you want to communicate since many readers never move beyond these redundancies.

ORIGINAL

Design of a Filament-winding **Machine**

Abstract

This report discusses the design of a filament-winding machine.

REVISED

Design of a **Filament-winding Machine**

Abstract

The Mechanical Engineering Group has built a bidirectional filament-winding machine that will be useful in expanding research into bidirectional composites.

- Highlight information contained in the document, and use key technical terms found in the document itself. Never include information in the abstract that is not in the document. And make sure to include the main findings, major points, and recommendations, if any.
- Make sure the abstract has smooth transitions between sentences. When you are taking information from the full document and recasting it for the abstract, you have to condense large ideas into short statements. Be careful to ensure that your sentences connect well. When you condense so much information, your sentences may lack clear transitions.

J

executive summary organized in this fashion might read as shown below. (Only the first few sections are fleshed out as they would appear in the executive summary; the rest of the sections are incomplete.)

Example

A Cost-Effective Process **for Pulverizing Waste Automobile Tires**

Executive Summary

Introduction

Massachusetts alone disposes of 6 million tires per year, posing serious health and fire hazards. A practical solution to this environmental problem is to investigate methods for converting scrap piles of tires into thermal energy for use in producing fuel. Scientists studying tire combustion report that rubber burns most efficiently and cleanly when pulverized into powder form, but the cost of pulverizing tires may be prohibitive, depending on the methods used. To produce tire-derived fuel (TDF) at a cost competitive with coal fuel, Alternative Energy Corporation recommends a three-stage process that combines the best of the general methods for pulverizing tires.

Current Methods for Pulverizing Tires

Cutting, Grinding

The current general methods for converting tires into powder include cutting with blades or water jets, or grinding with wheels or belt sanders. Although these methods have both positive and negative aspects, the primary problem is that the process is too slow to produce enough material for creating fuel.

Cryogenics

Cryogenics is a method using temperatures below -150°C . Exposed to these temperatures, rubber approaches its glass transition and becomes brittle and is easily pulverized. However, the expensive materials required for the process make cost a major concern.

Devulcanization

Devulcanization is the process of cleaving totally or partially the poly, di, and **monosulfide** crosslinks that are formed during the initial vulcanization of rubber. This chemical reaction can be used to alter the composition of the tires to make them easier to pulverize, but the process requires the preliminary step of breaking down the tires into small rubber particles.

Design Options Considered

- Water-jet Cutting
- Shredding
- Cryogenics

Cost Analysis of Options

Conclusions and Recommendations

Method 2: Organizing for the Needs of Nonexpert Readers This method works best when you have a nonexpert management audience who may need to be convinced of your project's value, who may need to know just the highlights of your report in order to approve funding, who may need to present an overview of the project at a board meeting, or who may have to choose your proposal from among several other bidders. Take a few minutes to determine what the nonexpert audience really wants to know and in what order. Look at the headings in the main document, but translate them into more general categories that any reader would understand. For example, the executive summary shown in the previous section might be reorganized this way. (As in the previous example, not all of the sections have been completed.)

EXAMPLE

A Cost-Effective Process for Pulverizing Waste Automobile Tires**Executive Summary****The Need for the Project**

Scrap tire piles pose a serious environmental hazard. Such piles provide an ideal breeding ground for disease-carrying rats and mosquitoes; fires at tire dumps burn for months, emitting health-threatening amounts of toxic smoke. While these fires are detrimental to the environment, they also suggest that tires are an outstanding fuel. Research has shown that pulverized tire powder burns as fast, as hot, and as cleanly as coal. Alternative Energy Corporation believes that tire-derived fuel (TDF) can be blended with coal and burned in existing coal-fired power plants to produce electricity. TDF has the potential to provide a safe, clean, and effective use for scrap tires while reducing environmental hazards of tire dumps.

Project Objectives and Requirements**Design Concepts Considered****Cost Analysis****Recommended Design**

Notice that these headings are not as technical as those in the previous version, but the main points are nonetheless included. For readers who think in these general terms rather than in terms of technical specifics, this organizational method is the better choice.

As you write, keep in mind that you are creating first impressions and that you want them to be positive. In proposals, the executive summary is a genuine sales device in which writers try hard to sell the product or service they can provide. In formal reports, the summary indicates the quality of the material that follows: its scope, its thoroughness, its organization, its professionalism.

(See Chapter 3 for more about organizing.)

Designing

The design of the front matter in any document has a major effect on readers' perceptions of the whole text. Once again, it's important to realize that this material creates the first impression your audience has of your document, and negative first impressions often are hard to shake. Pay special attention to designing this preliminary material so that it creates a professional and powerful image.

Specific Strategies for Abstracts

Abstracts are always centered on the page and appear either on the title page (if the abstract is short) or immediately after it. The centered title, "Abstract," appears two spaces above the abstract itself.

► **Tip:** *The general practice is to use lowercase roman numerals (ii, iii, iv, and so on) for the page numbers on all of the preliminary material in the front of the report or proposal. Regular page numbers (1, 2, 3, and so on) begin with the first page of the actual document.*

The belief that abstracts must be one paragraph long and that they can contain no subheadings or other reader cues (bullets, numbers, and so forth) no longer holds. As long as you are concise and restrict the information to less than one page, feel free to use any design elements necessary to increase readability. Keep in mind, though, that the abstract is the first thing readers see, so you should make it appear professional and efficient. Wordiness or garish designs for their own sake do not create good impressions.

Specific Strategies for Executive Summaries

The role of executive summaries is changing as companies begin to realize how these summaries function as marketing tools. With this change comes more latitude in design and length. As mentioned earlier in this chapter, an executive summary can be several pages long and still be a concise synopsis of the document. Its job is not only to summarize the material but also to highlight the important elements and convince readers of the document's validity.

Traditionally, these summaries have been written in full-page format, but technical communicators are increasingly taking advantage of computer technology to create three-column page formats for executive summaries (see Chapter 4, pp. 81-83). This page design allows the text to look professional and concise in the right two-thirds of the page, while leaving the left-hand column for callouts that highlight the important points. Such a design gives readers another level of readability, as they can skim the callouts and get an overview of the whole summary or use these callouts as pointers to the part of the text they want to read more thoroughly. For writers, this design provides an opportunity to pull the essentials from the text and feature them in abbreviated and highly visible form:

EXAMPLE

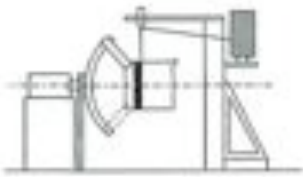
Easily carried and stowed by the urban commuter

A collapsible bicycle would be a great tool for the urban commuter. Many people take the train or other form of public transportation daily to a central location. Often, this location may not be near the desired destination and the commuter is forced to walk or take a taxi. Our bicycle folds to the size of a standard suitcase (6" x 16" x 20"), can easily be carried and stowed on a train, and can be ridden from the train to home or work.

If you prefer to use the more traditional full-page format for your executive summary, you can still use the standard design elements—bullets, headings, italics, numbers, and so forth—to increase readability and focus readers' attention. You

may also want to include graphics. Remember not to refer to a graphic that occurs within the main document. You might thus consider including some visuals directly in the summary, but the number and placement of the visual aids in the executive summary depend on the type of document you're summarizing. If it's a proposal, you may want to be more creative with the visuals and include more of them. If it's a formal report, keep the overall number of graphics in the executive summary to a minimum, but feel free to use a few. Any graphic included in an executive summary should have a brief caption explaining what it is, but do not label graphics with figure numbers—think of the graphics in this part of the document almost as marketing tools to capture your reader's attention, not to significantly explain technical concepts. If you decide to use the two-column format, the left column is an ideal place to include small diagrams or other visual aids, as long as you don't clutter the space so that nothing stands out.

EXAMPLE



Rotating Plate

Rotating Plate

The second concept to develop reverses this configuration. Now the arm remains stationary while the plate rotates. The plate is still mounted on a curved track, but in this case the curved track itself rotates in order to turn the plate. The plate still slides along the track in order to change the angle of winding.



Robotic Arms

Robotic Arms

The third concept is the most elaborate. It involves two robotic arms mounted at 90° to each other. The guide system is mounted on a slide track at a short distance from the plate. One arm turns the plate along an axis. To change the direction of winding, the guide slides along the track 90°. Meanwhile, the free arm grabs the plate. With the plate held by this arm, the first arm releases the plate. The second arm then begins rotating the plate.

(See Chapter 4 for more about designing.)

Editing

As in summarizing or describing information within the text, three problems might undermine the effectiveness of your abstract or executive summary: too much information, the "list syndrome," and inconsistent terminology (see Chapter 11, pp. 000-000). However, when you are writing abstracts and executive summaries, you need to be aware of two additional pitfalls:

- Cut and paste style
- Overly technical language

Avoiding Cut and Paste Style

The "cut and paste" problem occurs when writers attempt to create abstracts and executive summaries by cutting complete sentences from the body of the document and pasting them together into a hybrid short form. Such sutured prose is always obvious and awkward, resembling a composite photograph where one person's ears are placed on another's head. Here's an example of a weak abstract that has been written in a cut and paste style:

ORIGINAL

The purpose of the project is to design, construct, and test a self-propelled merry-go-round to be used by children between the ages of three and eight. The materials for the merry-go-round include pressure-treated wood, aluminum, and steel; these materials provide excellent strength, durability, and corrosion resistance and are reasonably priced and readily available. There is a bearing in the center of the design to allow the merry-go-round to move smoothly and free of any obstructions. The design submitted by the group meets all design criteria and provides optimal performance for use by small children. This design was created with safety and simplicity in mind. In addition, the designers believe that this invention is an excellent piece of playground equipment children will enjoy using; in other words, simplicity and safety make the self-propelled merry-go-round an innovative design.

In this example, the sentences don't connect well, the information seems scattered, and the logic is hard to follow. A revised version handles the abstract as a unit unto itself—not as a collection of sentences lifted from the document and thrown together into a paragraph. Like this:

Revised

Messac & Associates has designed, constructed, and tested a self-propelled merry-go-round that meets all required design standards and is safe and simple for use by children between the ages of three and eight. Messac has designed this piece of playground equipment to be exceptionally durable and reasonably priced. Constructed of cost-effective and readily available materials (pressure-treated wood, aluminum, and steel) and rotating around a simple center bearing that allows freedom of movement, the merry-go-round is corrosion resistant, safe, and easy to operate.

In this version, the ideas connect much more clearly and the sentences are in a definite, progressive order, creating a seamless account of the equipment's design. The sense of randomness apparent in the first version has been corrected.

> **Tip:** *No matter how tired you are of your material or how pressed you are by deadlines, always allow enough time to edit your executive summaries and abstracts. They are the first impression readers have of your document, and as such they are highly persuasive and powerful pieces. Don't wait until the very last minute to write them and then dash the documents out the door without at least one thorough edit, preferably more.*

Avoiding Overly Technical Language

While it is extremely important to be consistent in the use of key ideas and terms, remember that the front matter at the beginning of the document often targets less technical readers. By all means use the key language necessary for the document's professional audience, but add definitions and explanations where necessary for nonexpert readers. Abbreviations, acronyms, and highly technical language may not be appropriate for this audience.

In general, when you have technical terms or acronyms in an abstract or executive summary, include an explanation of what they mean unless they are so standard that most people would understand them. For example, MMR (Massachusetts Military Reservation) is not a term many people would know, while EPA (Environmental Protection Agency) is common enough for most

technical audiences not to need a definition.

(See Chapter 5 for more on editing.)

Tips for International Communication

Remember that abstracts and executive summaries may be translated into other languages or may be read by people whose native language is not English. It's challenging to reduce the full discussion of your document to a shortened form, and you may be tempted to take shortcuts that readers in the United States will understand but may confuse an international audience. Be sure to avoid using unexplained abbreviations or acronyms in your attempt to save space and be concise. Don't assume that your readers will understand analogies or idiomatic expressions—"as easy as pie," "like greased lightning," "go to bat for," and so forth.

For more about communicating across cultures see Chapter 7.

Quick Review

When writing abstracts and executive summaries, you will follow many of the same techniques used when writing in-text descriptions and summaries. The key distinctions about these preliminary sections are that they are often meant for audiences less technically expert than the readers of your main text and that they are marketing tools.

- Abstracts come in two types (descriptive and informative) and often contain four elements (purpose, methodology, results, and conclusions). They are the

first section that readers see and, as such, should be especially concise, professional, and clear. They are usually no longer than one page and are often as short as half a page or even one paragraph.

- Executive summaries differ from abstracts in purpose, length, and placement in the text. They are aimed at readers who may be nonexperts but who must make decisions based on the material in the document. These readers may read the executive summary but not the rest of the document. Increasingly, executive summaries are recognized as a key marketing tool and are being designed with that function in mind.



Exercises

Find an executive summary from your own company or from a company in your local area. (You may be able to find these summaries at your library if you don't have access to a company.) Note the design of the summary and determine if you think it's appropriate for its purpose. Try redesigning it to make it more persuasive. If it's a one-column design, consider making it two-column. Perhaps add sidebars. Change the graphics and the typefaces to reach the audience more dynamically.



Community Action Project

Find four or five published articles that are especially useful to an issue important to your community, your coworkers, or your classmates. As a service, write informative abstracts of each of the articles and circulate them (through your local library or community center?), encouraging people to read the full text of any that are directly applicable to their projects or interests.

Portions of a Contemporary Executive Summary

Headings meet readers' needs

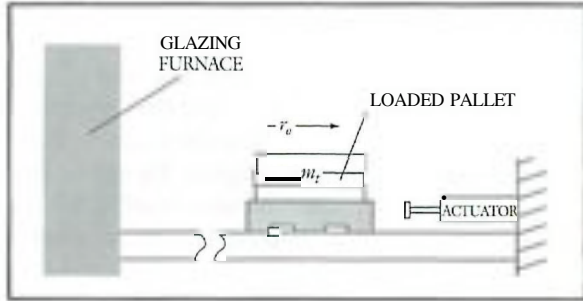
Callouts allow readers to skim highlights

Need for the Decelerating System

Due to the highly competitive supplier market of ceramic tiles, a company needs to increase its production rate of ceramic tiles or lose a major client. The production rate is to be raised by increasing the load and the speed of each pallet, which is carrying the ceramic tiles. The increased speed and load of the pallets creates an automation design problem. The design problem is to decelerate and halt the loaded pallet without causing a large shock to the ceramic tiles (excessive shock will break the fragile tiles). If the tiles can be stopped smoothly and the system re-set within twenty seconds for the next loaded pallet, then the ceramic tile factory will retain a major customer.

An automation design problem impacts the business viability of a tile company.

The 1996 ASME Design Problem: Decelerate a pallet of unknown mass and variable initial velocity to a stop.



Design Objectives and Requirements

Design Objectives

The NU team's idealized force profile used for preliminary analysis.



The increased production of the ceramic tiles is accomplished by increasing the velocity at which the loaded pallet travels and the amount carried by each pallet as it proceeds through the production process. These two ways of increasing production must be handled by a robust actuation system. The actuation system must control a pallet with initial velocities between 3 to 6 m/s and masses ranging from 90 to 475 kgs. With an applied force and within given constraints, the system will decelerate the pallet by following a constrained motion time-history.

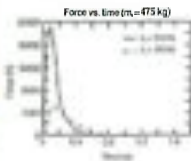
Design Requirements

The design must meet the previously mentioned objectives for all initial velocities between 3 to 6 m/s and for pallet masses ranging from 90 to 475 kgs. The design must have a controller that is robust enough to accomplish the deceleration with only the initial velocity as input.

Other constraining requirements are as follows:

- Stopping distance is 0.65 m
- Three cycles per minute
- Shock (jerk) cannot exceed $2,283 \text{ m/s}^5$

LQR force profile used for preliminary analysis.



The NU team further determined that this system must have a response time much smaller than 0.11 seconds (Section VI.6.2). From the LQR analysis, the hardware must be capable of a force of approximately 2(kN (Section VI.3) and achieve a speed of 6 m/s.

Small graphics in callout column work to add interest and impact

Note the marketing language used throughout

Note the use of bullets

Design Concepts Considered

Specific details included throughout

To determine an appropriate system, the NU team considered many potential solutions to the design problem. Solving the design problem involved gathering information on the components of all considered system options. Potential actuation systems are electro-hydraulic, electro-mechanical, electro-magnetic and electro-pneumatic actuators. Some options involve supplementing these actuators with other components, such as shock absorbers, dampers and springs.

Electro-hydraulic actuators are able to provide high force at reasonable speeds.

Electro-hydraulic Actuators in Series

A high-end electro-hydraulic actuator has a response time of 0.005 second (Supplemental Reference Book), provides a large force, greater than 24 kN, and attains moderate speeds, up to 1.52 m/s (Supplemental Reference Book). Thus, four electro-hydraulic actuators in series can achieve a relative speed of 6.08 m/s and provide a force of 24 kN. At an approximate cost of \$4,500 per unit (Supplemental Reference Book), the NU team deemed this option a viable deceleration system.

	14-P	30-S
Max Force (kN)	174	660
Max Mo-Load Velocity (m/s)	10.0	0.21
Actuators Needed to Solve Design Problem P-Parallel S-Series	14-P	30-S

Electro-mechanical actuators do not satisfy the NU team's design preferences.

Electro-mechanical Actuators in Parallel or Series

Electro-mechanical actuators are available in two basic types; belt and screw (ball and acme) driven. Electro-mechanical actuators provide first responses to command signals. The major drawbacks of electro-mechanical actuators are the maximum attainable speeds and/or the force an individual actuator can deliver. A high-end single belt driven actuator can attain the necessary speed of 6 m/s, but the maximum force provided is approximately 1.7 kN (Section VI.6.1). A single screw type actuator can deliver a force of 66 kN; however, the speed (0.212 m/s) at that force level is too slow (Section VI.6.1). The deceleration system would require fourteen belt type actuators in parallel or thirty screw type actuators in series. Accurate control of these actuators was deemed impractical, and therefore the NU Team discarded the electro-mechanical system.

At a cost of \$30,000 per unit, the electro-magnetic actuator system is costly.

Electro-magnetic Actuators in Series

Like the electro-mechanical actuators, the electro-magnetic actuators have a fast response to command signals. The force output is directly proportional to the electrical current and can provide a force of 7 kN. Three electro-magnetic actuators in parallel can provide 21 kN of force and accurate position control. This option meets the design objectives stated earlier; however, the cost of each electro-magnetic actuator is \$30,000. With the high cost of each electro-magnetic actuator, the NU team deemed this option costly (Section V.1.4).

Electro-pneumatic actuators do not react quickly enough to control the deceleration of the pallet.

Electro-pneumatic Actuators in Series

Electro-pneumatic actuators were considered, however, the gas inside the electro-pneumatic actuator is highly compressible. The NU team determined that an electro-pneumatic actuator capable of applying the required force would have a time constant of approximately 0.67 seconds (Section VI.4.1). Essentially, the air in the cylinder would act as a large spring making it very difficult for the system to control the deceleration of the pallet.

Traditional Executive Summary

Note that this sample resembles a long descriptive abstract: specific details and conclusions are omitted

Legal requirements

Overview of project

Note effective use of bullets

This section is informative but not specific in giving details

Note the persuasive technique of including all steps- Creates the impression of thoroughness

Promise of future action and document

EXECUTIVE SUMMARY

This engineering report, prepared by Allen & Jarvis Corporation, discusses the Best Management Practices (BMPs) currently in use at United Illuminating Company's New Haven Harbor Station and presents recommendations for any improvements necessary to meet the new criteria of BMP Program under the provisions of the Clean Water Act. Allen & Jarvis is making this submittal in accordance with the terms and conditions specific in the State of Connecticut, Department of Environmental Protection NPDES Permit No. CT0003760, granted September 16, 1996.

The objective of the BMP Program is to prevent or minimize the potential for the release of toxic or hazardous pollutants from these support activities into United States waters. The BMP Program for the New Haven Harbor Station (NHHS) will be prepared and implemented at a later date, as required by the above NPDES license. Implementation details of new and modified BMPs will be included in a comprehensive program, which will integrate corporate environmental assurance policies with applicable state and federal regulations.

Coverage

This report details necessary BMPs for support of electric power production operations at the NHHS, including the following:

- materials storage areas
- in-plant transfer, process, and material handling areas
- loading and unloading operations
- plant site runoff
- sludge and waste disposal areas

The report also addresses physical and operational aspects of chemical and oil storage, transfer, and use.

Methodology

In developing this report, Allen & Jarvis examined each facility component or system at NHHS for its potential to cause a release of significant amounts of toxic or hazardous pollutants because of equipment failure, improper operations, or natural phenomena. Where the potential existed, A & J made an assessment of the direction, rate of flow, and total quantity of toxic or hazardous pollutants that could be discharged from the facility. Also assessed are potential risks to human health or to the environment possibly occurring with an accidental release or improper disposal of chemicals and/or oil.

For each of the production support activities at NHHS, the report addresses aspects such as material inventory; material compatibility; employee training; reporting and notification procedures; visual inspections; preventative maintenance; spill control; housekeeping; and security. In addition, A & J examined existing BMP Programs for Spill Prevention Control and Countermeasure (SPCC) plans and proper management of solid hazardous waste in accordance with the Solid Waste Disposal Act, as amended by Resource Conservation and Recovery Act (RCRA).

Organization

Section 1.0 presents discussions and tabulations of BMPs currently in practice at the NHHS which are judged to be adequate. Recommended BMP improvements are included in Section 2.0 for those areas where additional or modified BMPs are deemed necessary to meet the BMP Program objectives.

Exclusions

Other specific regulations, such as those pertaining to radioactive materials under the policies of the Nuclear Regulatory Commission (NRC) or hazardous wastes under the regulations of the Resource Conservation and Recovery Act (RCRA) are not the subject of this report, although the impact of these regulations will be reviewed later in a separate document.

Informative Abstract

UNDERSTANDING AND PREVENTING OUTDOOR LIGHT POLLUTION

ABSTRACT

Large and small communities alike are expressing serious concerns about the adverse effects of artificial outdoor light sources and the advancing rate of light pollution. An increasing body of research links human-made light pollution to substantial impacts on the health, safety, economy, and ecology of an area. In order to address these issues, light pollution prevention advocates are promoting

- education
- legislation
- and design strategies

to reclaim and manage nighttime darkness. Local and state governments that have initiated light pollution prevention campaigns are experiencing both short- and long-term benefits. Leading authorities on light pollution suggest that developing rural areas proactively address this issue before it becomes a serious threat. An abundance of resources and exemplary prevention initiatives are available to help communities adopt solutions appropriate to their region.

Issues defined

Specific methods for addressing issues

Bulleted list emphasizes these central points

Results

Recommendations

Resources

Informative Abstract for Funding Proposal

*Purpose of
funding
request*

Request for an Ultra-low 800° C Upright Freezer

This application requests matching funds to purchase an ultra-low 800° C upright freezer for investigators in the College of Pharmacy. This freezer is needed to replace the 17-year-old freezer that has stopped functioning. The lack of a freezer prevents expanding research and attracting additional funding for research projects such as in vitro and clinical pharmacology of anticancer agents in patients with solid tumors and the clinical pharmacology of approved and investigational agents in critically ill patients. A large, ultra-low freezer is critical for maintaining stable laboratory samples from these research projects. Furthermore, with the recent hiring of two new faculty members, the freezer space currently available in the department is inadequate. As space permits, the new freezer will be available to additional faculty members within the College of Pharmacy.

*Rationale for
request*

*Note the
clarity of the
4 reasons:*

- old equipment broken
- research funding halted
- necessary for stable lab samples
- inadequate space for new faculty

Descriptive Abstract

*The title is
not repeated
in the
abstract*

GETTING THE BRAIN'S ATTENTION: THE CAUSES AND EFFECTS OF DRUG ADDICTION

*Reading:
"Abstract"
clearly
displayed*

Abstract

While drug abuse continues to blight society, science is getting a clearer view of causes and effects of drug addiction. This report describes a new view of how the neurotransmitter dopamine may contribute to addiction and how fetal cocaine exposure may affect brain development.

*Purpose of
report—
main topics
covered in
report*

PROFILES IN PRACTICE

Thomas P. Meissner*Director of Engineering**Unitil Service Corporation***Reporting for Results**

Not every person writing technical communications is a writer by nature. Writing effectively is essential, though, whatever your background, according to Thomas P. Meissner, Director of Engineering at Unitil Service Corporation. "If you can't ultimately publish your work in a form that gains you recognition and respect," he says, "your effort is lost." Meissner supervises engineering professionals for a public utility holding company that distributes services and provides energy consulting and e-commerce solutions. He points out that in the real world, "work product is often judged less on content and technical merit than on presentation and polish."

For those who don't value those skills, Meissner offers a wake-up call. "I have found that many technical professionals overemphasize the analytical aspects of their jobs and place little emphasis on the quality of their communication. It appears that 95 percent of their time and effort is devoted to analytical work, and only 5 percent to the communication of results." Meissner recommends a proportion near fifty/fifty, because reports and studies often communicate to senior management and are part of budget-approval processes—with a direct impact on careers. "Highly intelligent professionals whose writing skills are less developed than their analytical skills often face a lack of support and recognition for their ideas. They become frustrated underachievers."

Meissner emphasizes the importance of grammar and spelling in making an impression. Poor performance here undermines credibility. Beyond mechanics, he looks for well-organized work that flows and articulates ideas clearly. Not only does writing well help on the job, it may affect whether there is a job. Meissner considers the ability to write reports and studies well when he chooses people. "I request copies of written work," he says of prospective employees. "What's critical is that they can translate their ideas into something for other people."

GUIDELINES Writing a Consistent Report

- Put headings at each level in parallel grammatical structure within that level.
- Make sure your system of numbering figures and subsections is consistent throughout the report.
- Use abbreviations and acronyms sparingly, but be consistent in their use throughout the **text**.
- Decide in advance which words will be capitalized and stick to the decision.
- Use a company style guide or other reference work to find conventions for punctuation. Be correct and consistent throughout the document.
- If you use the pronouns *me* or *you*, then you can use them throughout the text. But if you have begun with the more formal *the Company* and *the user*, don't switch suddenly to either pronouns in mid-document.
- When you are writing a long document, you may make an assertion in one section that is contradicted in another. Read the whole report in sequence to eliminate all contradictions.

Internet Resources for Chapter 13

A Short Course on Writing Technical Reports

<http://www.technical-writing-course.com>

This site provides a fairly comprehensive, although somewhat idiosyncratic, guide to report writing.

Writing Technical Reports

<http://www.monash.edu.au/lis/lonline/writing/engineering/technical-report/index.xml>

This page offers guidelines specific to engineering.

Online Technical Writing: Technical Reports

<http://www.io.com/~hcexres/textbook/techreps.html>

This site reviews various types of technical reports and also provides guidelines for addressing specific audiences.

Technical reports are documents whose primary purpose is to convey information or the results of a study. But that wording may be misleading. Technical reports do much more than simply convey information: they convince, reassure, nudge, equip, and sometimes even alarm at the same time that they provide readers with essential facts. Although the material presented in reports and studies *is* objective, these documents are nevertheless powerful tools for persuasion. When written well, they grease the wheels for getting things done and enhance the position of writers. When written poorly, they can slow activity to a crawl and cause confusion, frustration, and often substantial losses to companies, institutions, and writers.

Communicating Factual Information

When people think of technical writing, they often think of technical reports. In fact, most people use the terms *report* and *study* interchangeably—the same document may be called a report in one company and a study in another. No matter which label is used, these documents are commonplace in the work world because they communicate necessary information about technical activities, ideas, and research.

Business and industry produce countless types of reports and studies—from formal reports, progress reports, preliminary reports, trip reports, and laboratory reports to feasibility studies, management studies, environmental impact studies, sales reports, periodic reports, annual reports, and personnel reports. Fortunately, the basic principles for writing all reports are the same. Once you know these, you can customize reports and studies for specific circumstances and audiences.

Technical reports convey factual information about a problem or a situation. Although these documents are not overtly marketing documents like proposals, the way you structure the information in a report strongly influences the way readers

perceive it. For instance, here's the introduction to an engineering report from a project engineer to a supervisor:

ORIGINAL The overhead door installation has caused delays and cost overruns for the HOTCELL chamber operation. The door motor terminal strip was not labeled, and the terminals were not consistent. This required significant time for the electrical contractor to troubleshoot and complete accurate terminations. The overhead door installer was not able to provide assistance, since he had no way of knowing how they were factory wired. In addition, at least one motor was factory wired incorrectly, which was corrected by the electrical contractor. The door limit switch and safety edges have had to be periodically reset on frequent failures of operation. The door seals have also been a problem. In addition, the wall panels have had to be returned because of a lack of fit at the joints.

Which of these problems is the main issue? What can be done to address this situation and solve the problems? A supervisor reading that report would realize that a problem exists, but the mishmash of facts creates a confusing picture of the situation, not to mention a dim view of the writer, who has missed an opportunity to convince the audience of the problem's scope and importance. Consider the different perception the writer could have created:

REVISED Three problems with the overhead door installation have prolonged the HOTCELL chamber start-up period, resulting in exaggerated cost overruns:

- The wall panels did not fit together at the joints.
- The overhead door seals supplied by CoreTek leaked.
- The door motor wiring diagrams were incorrect.

These delays are the direct result of CoreTek's faulty specifications, inadequate seal design, and slow response to our requests for assistance.

This version creates a clear picture of a three-pronged problem with a definite cause, and it gives the impression that the writer is a professional who has control of the facts and can be trusted. This introductory paragraph also encourages the audience to continue reading to find out more about the circumstances and the writer's view of the situation. Although the facts in both versions are the same, the second version demonstrates that reporting technical information is more than simply listing facts—that *the way the facts are presented is the key to getting the point across persuasively*.

Planning and Researching

Well-written reports reflect thorough research, clear logic, and thoughtful targeting of the audience's needs. The preliminary step in writing any kind of report is to gather the necessary information and/or complete any needed research. If you are

completing a trip report, collect all your receipts and expense vouchers. If you are writing a report recommending a plan of action, research the situation so you can demonstrate in the report that your plan is grounded in sufficient knowledge. And all report writers need to remember that an essential phase of the research process is analyzing the audience's needs and expectations. The thoroughness of the report you produce depends on the thoroughness of your preliminary research, of both topic and audience.

To effectively plan the report, follow these four steps:

- Determine the purpose.
- Analyze the audience.
- Define the problem.
- Develop a schedule.

Determining Your Purpose

As is true in drafting any form of technical communication, the first thing you need to do is to determine the report's purpose (see Chapter 1, pp. 9–11). You may think you have already completed this step once you've identified the type of report you've been asked to write. To some extent that's true, because there are common categories of reports, as shown in Figure 13.1 (p. 288).

These categories identify your report's type but not its real purpose. Look beyond general categories and carefully analyze your particular situation. Do your homework and know exactly where your document is going and, further, *why it's going there*.

Most reports are written for one of two general purposes:

- To document work or activities
- To guide decisions

Although every report is persuasive to some degree and is thus a decision-making tool, some documents are more obviously designed to influence decisions than are others. As you plan your report, think carefully about whether your main goal is to influence a decision or to document that you (or your company, group, or team) have met necessary requirements and have done a job well. The way you present the information may change depending on the report's purpose.

The following list categorizes types of reports by their general purpose. Remember that such general categorizing serves only as a spark to ignite your own ideas, not as a formula for automatically identifying what you intend to do in your report:

Reports That Document Work or Activities

- annual reports
- final reports
- financial reports
- laboratory reports
- medical reports
- periodic reports
- progress reports
- sales reports
- trip reports

Figure 13.1

Types of Reports Compared

Type of Report	Information	Audience
Annual report	Summary and evaluation of finances and activities during a 12-month period	Stockholders, management
Environmental impact study	A proposed action's consequences to the environment	Executives, government, citizens
Feasibility study	Consequences of possible actions	Project decision makers
Final report	Results of completed work	Client, sponsor of work
Financial report	Assets and liabilities, gains and losses	Investors, bankers
Justification report	Explanation for actions taken	Managers, clients
Laboratory report	Results of experiments, procedures	Principal investigators, faculty members
Maintenance report	Product repair and service record for a given period	Customers
Management study	Efficiency of current management practices	Executives
Medical report	Symptoms, treatment, response	Physicians, nurses, other medical personnel
Periodic report	Summaries of accounts done at set intervals during the year	Investors, bank account holders
Personnel report	Evaluation of employees' work	Managers
Preliminary report	Task analysis	Project leader, client
Progress report	Work accomplished to date	Project leader, client
Research report	Summary of research completed	Principal investigators, professional community
Sales report	Sales figures for a given period	Managers, stockholders
Trip report	Expenses and activities	Supervisor, accounting department

Reports That Guide Decisions

- feasibility studies
- justification reports
- management studies
- personnel reports
- preliminary task analysis reports
- research reports

When you look at this list, consider how some entries might fit into either category. For instance, is a financial report merely a tabulation of the figures or is it a document that guides decisions? The same question applies to an annual report. Stockholders make many decisions based on the annual report and the sales figures. When confronted with gray areas like this, you should decide which is your primary purpose in writing and which is secondary because the primary purpose governs the report's organization and style.

Analyzing Your Audience

Although there are the common audiences for the various reports (as noted in Figure 13.1), it's still a good idea to make sure that your audience is one of these "usual suspects." If it is, understanding that audience's needs still requires more in-depth analysis than simply identifying the reader's job title. You need to take the time to thoroughly define the reader's needs, biases, expectations, and other perceptions that might influence the effect your document might have. (For specific guidelines on conducting an audience analysis, see Chapter 1, pp. 13-16.) Remember, too, that some reports target readers other than the ones listed in the general categories—or they target multiple audiences. Be sure to consider all the possible readers and plan for their needs.

Defining the Central Problem

The second step in planning effectively is to make sure you frame the report in terms of a problem you are being asked to address. All reports are based on a problem or unresolved situation of some sort; it's essential for you to understand that problem at the outset and use it to guide the document's development. Chapter 1 gives detailed advice on how to define the problem or issue underpinning a document, but here are two quick tips for finding the real issue behind your report during the planning process:

1. **Think of the document in terms of an issue your text will solve.** It can be as simple an issue as this one: "My manager needs to justify the amount of money she can authorize for reimbursement of my trip expenses." Or it can be more complex: "The company is losing time and money because the computer systems cannot communicate with each other."
2. **State the problem in question form.** You might ask: "How much money did I spend and how is it specifically related to business?" Or: "How can we increase the exchange of information among the three major departments of the company in a cost-effective way?"

Stating the problem in this interrogative fashion gives you a definite question that the report must answer. It's a good idea to jot down that problem question and to keep it

in front of you when you are developing the report. As you write sections, keep checking back to make sure each section is to the point—does it specifically address the question? If it does, keep writing; if it doesn't, scrap it and start over with a new focus.

Developing a Schedule and Document Specification

When you are confident that you know your report's purpose and have framed your thinking in terms of a problem to be solved, you're ready to plan the schedule and specifications for completing the document. The writing process runs more smoothly if you take the time to write a document specification. Whether you are writing a large report as part of a team or drafting a document by yourself, managing the writing project becomes much easier if you have a clear specification for what you plan to do, including a schedule for completion and a division of labor (see Chapters 1 and 6).

If you're working in a team, have a team meeting and decide who is going to be responsible for various sections of the report and set deadlines for writing and editing. If you're working alone, set a realistic schedule for yourself—one you can stick to—that takes into consideration research and production time as well as writing time. One of the first things to do in this phase of the planning process is to develop a tentative table of contents, if you can, and divide tasks based on the TOC divisions. (Some reports have preformatted TOCs, so this part is easy.) If you're not ready to plan a TOC at this stage, divide the material into broad categories and schedule tasks that way.

Make sure the doc spec with the attached schedule is distributed to all key players: managers, writers, editors, technical reviewers, production people, and so forth. Indicating your plans in writing puts everyone on notice about what you're doing and what you need to get the job done. Doing so also firmly establishes in your colleagues' minds the scope of your undertaking and the significant expertise it takes to complete it.

When the research and planning phase is completed, you're ready to sit down and write. (See Chapters 1 and 2 for more about planning and researching.)

Organizing

A professor at a major technical university used to give his students this general outline for a report. It was exact and absolute in its requirements:

	The Title
<i>The Briefing</i> (2 pages)	{ I. Introduction
	{ A. Problem
	{ B. Criteria for evaluating solutions
<i>The Evidence</i> (18 pages)	II. Body
<i>The Evaluation</i> (2 pages)	{ III. General evaluation
	{ IV. Recommended areas for further study

While this formulaic outline might have seemed like a boon to the students wanting exact criteria, such stiff rules usually work only in the classroom. Such exact specifications will not work in every instance—you need to know how to meet various real-world situations. Nonetheless, this outline does feature the essential elements of a report and shows how the parts fit together. The professor's terms "the briefing," "the evidence," and "the evaluation" put the parts of a report in a problem-solving context that most people understand. Notice, too, how the subsections listed under the Introduction ("problem," "criteria for evaluating solutions") establish a context for the third part of the report's evaluation so the readers (and the writers) know the ground rules right away.

Keep in mind this view of the report as a problem-solving document organized by evidence and evaluation and then consider how to flesh out this model by incorporating the standard elements found in formal reports.

Components of a Formal Report

Not all reports are structured as precisely (down to the page count!) as the professor's academic exercise, but there are general components that appear in most reports. This section describes in detail the parts of a report, although the order of these parts has some flexibility. Figure 13.2 summarizes the standard components.

Front Matter Although these materials appear first in the report, you may want to write them after you are finished with the main text. The letter of transmittal, the abstract, and the list of figures and tables, for example, are easier to write after the report is complete because they directly reflect its final contents. The table of contents and the executive summary might be appropriate to draft first (keeping in mind that these are drafts and can be revised) so you can better focus your ideas. The sample report at the end of this chapter (pp. 328-345) shows how the front matter sets reader expectations for the rest of the report.

- **Cover Title.** Think carefully about the title you put on the cover. Give readers all the information they need in a concise manner. Remember that this title

Figure 13.2

Standard Components of a Formal Report

1. Front Matter	2. Text	3. Back Matter
Cover	Introduction (The Briefing)	Appendixes
Title page/abstract	Body (The Evidence)	Glossary
Letter of transmittal	Conclusions (The Evaluation)	Bibliography
Table of contents	Recommendations	Index
List of figures and tables	Notes	
Executive summary		

will be the first thing readers see, so it creates the initial impression. For example:

WEAK Preliminary Site Investigation
BETTER Investigation of Former Coal Gasification Sites
 First Street, Chalmers, New York
 Task 1 Report: Preliminary Site Investigation

- **Title Page.** The title page includes the basic "hardware" of a report—what it's called, who wrote it and where they can be contacted, and the date it was submitted. The title page sometimes also includes the abstract. Figure 13.3 shows a sample title page.
- **Abstract.** The abstract that appears either on the title page or right after it, depending on the required format of the company or institution, briefly summarizes what the document contains. (See Chapter 12 for advice on how to write abstracts.)

Figure 13.3

Sample Title Page

INVESTIGATION OF FORMER COAL GASIFICATION SITES

FIRST STREET

CHALMERS, NEW YORK

Task 1 Report

Preliminary Site Investigation

New York State Electric & Gas Corporation

Binghamton, New York

Envirotech, Incorporated

February 2007

GUIDELINES Writing an **Effective** Transmittal Letter

- Identify the topic of the report at the beginning of the letter and indicate that the report is attached.
- Establish the purpose of the report. Explain why, when, and by whom the report was authorized.
- Give a brief summary of the report and stress any significant information especially relevant to readers.
- Provide a brief wrap-up that states any conclusions or recommendations, depending on the audience's willingness to hear them.
- Include thank-yous to those who provided valuable assistance.
- Conclude gracefully with an expression of appreciation for the opportunity to prepare the report or proposal, and offer to answer questions the readers may have or to provide additional information.

(See the sample letters of transmittal on pp. 314 and 327.)

- *Letter of Transmittal.* A letter of transmittal is a specialized cover letter that conveys a report (or a proposal) to your audience by stating its purpose. It is either attached to the front of the document or bound into the text right after the title page, depending on company custom. The letter is usually brief—one page, preferably—and serves several functions: to introduce the document, to summarize its contents, to persuade readers of the document's value, to make sure the document gets to the right person and the right place, and to give writers a place to add comments that don't fit easily into the report or proposal itself. When done well, the letter of transmittal functions much the same as a preface to a book. (See Guidelines: Writing an Effective Transmittal Letter.)
- *Table of Contents.* List all the sections of the report (including any front matter and back matter) and give page numbers for each section. (Page numbers for the front matter are lowercase roman numerals.) Depending on the length and complexity of the report, the TOC may list only first- and second-level headings so it doesn't overwhelm readers. *Headings must be worded exactly as they appear in the text.*
- *List of Figures and Tables.* List each figure and table, including numbers and captions, and the page numbers where they can be found. Place this list on a separate page or, if there is room, on the TOC page.
- *Executive Summary.* An executive summary, or synopsis of the report, may or may not be necessary, depending on the conventions required by your instructor, your supervisor, or your audience. Keep in mind that it

may be distributed separately from the report, so it needs to be complete. It can also be in a different format from the rest of the report: a two-column or a three-column format with a sidebar column to highlight special features, if so desired. (See Chapter 12, p. 269 for more information on executive summaries.)

Text of the Report This is where you introduce, explain, and resolve the problem on which the report is based. Readers who are "with you" in this part of the document are reading carefully to comprehend and use the information you convey. At this stage, you can either lose readers or impress them, depending on how well you organize the material. Make sure you divide the major sections into digestible "chunks" with subheadings to increase readability. The main features of the text are as follows:

► **Tip:** *You may want to use the subheadings shown in Figure 13.1 or create your own—or omit subheadings altogether if the introduction is short and the report's parts are self-explanatory.*

• **Introduction.** The introduction states the problem in context, explains the report's purpose, gives an overview of the report's organization (a road map), and establishes the tone of the report. Figure 13.4 shows a sample introduction.

• **Body.** The body of the report presents, analyzes, and interprets the information you have gathered. These sections contain the proof or evidence for the conclusions and recommendations you offer. Make sure to use subheadings

and illustrations to help readers understand your points easily. Your organization should provide clear sign posts within each section (stating the main point first and then giving supportive details), and the order of sections should follow a logical progression.

• **Conclusions.** This section tells readers what the report means. It gives an answer to the problem question you developed during the planning stages.

EXAMPLE From the site reconnaissance, interviews, and file reviews, Envirotech learned the following:

- Water gas was produced at the site for a period of five years, from 1927 until 1932.
- Coal tar residues were collected in coal tar storage vessels located belowground at the site.
- Residual coke and ash were spread over the site.
- Oxide wastes from the purifying operation may have been piled outside on the ground for regeneration (final disposal method unknown).

Figure 13.4

Sample Introduction

Problem Statement: Envirotech is currently investigating the First Street former coal gasification site under contract to the New York State Electric & Gas Corporation. The investigation is divided into four tasks: (1) preliminary site investigation, (2) sample analysis, (3) risk assessment, and (4) conceptual design. Task One Phase will allow us to develop an understanding of the site's history, environmental setting, and current condition based on available information and direct observation. We will use material gathered in Task One to better define the nature and scope of Task Two activities.

Scope: The scope of work completed for Task One included the following:

1. A historical review of the site to develop an understanding of the former gasification plant layout, operations, and surrounding land uses.
2. A preliminary assessment of air quality including potential airborne contaminant concentrations before and during the site investigation.
3. A detailed site reconnaissance to become familiar with the area and identify locations for explorations, access requirements, and potential conflicts with above- and below-ground utilities.
4. A geophysical investigation using ground-penetrating radar and terrain conductivity to define the underground structures and utilities, changes in shallow geology, and any subsurface coal tar deposits.
5. Preparation of a report presenting the findings of Task One, including a plan showing significant natural and artificial features at the site and recommendations to proceed with Task Two.

Background: The Chalmers-First Street site is located in Tompkins County, New York. The coal gasification plant occupied approximately three acres of a 12.74-acre plot currently owned by the City of Chalmers. The site was located at the end of First Street bounded by Case Creek on the north, the Lehigh Valley Railroad on the south and east, and Third Street to the west. The gas works have been replaced by the City of Chalmers Wastewater Treatment Plant, which is undergoing expansion.

Methodology: The geophysical survey used two separate exploration techniques: ground-penetrating radar (GPR) and terrain conductivity profiling, sometimes referred to as electromagnetic profiling (EM). Envirotech evaluated other techniques but selected these two as being the most appropriate, given the geologic setting and field conditions.

continued

Figure 13.4

Sample Introduction (continued)*Definitions:*

Table 1 <i>Chemicals Contained in Coal Tar</i>	
Light oil	Benzene, toluene, ethylbenzene, xylenes, phenols, cresols, pyridene
Middle oil	Naphthalene, phenols, cresols
Heavy oil	Phenols, cresols, creosote

Limitations:

At the time of the survey, the First Street site was an active construction site. Portions of the area were being excavated and contained piles of excavated soils, stockpiles of construction materials, and several buildings and storage tanks in various stages of completion. Access to most of the area of investigation was limited to narrow, unpaved roadways. The presence of these materials produced much unwanted electrical "noise" or interference and affected the results of the terrain conductivity survey.

Report organization:

This report summarizes the findings of Task One of the investigation and provides recommendations for activities to be undertaken during Task Two.

- **Recommendations.** If you are writing a report that guides decisions, this section is where you give opinions about what to do next. Recommendations should be based on clear logic and should seem to be the inevitable outcome of the information you have included in the body of the text. Sometimes the recommendations are included with the conclusions, and sometimes they are kept separate. For example, the following paragraph combines conclusions and recommendations. (See also the conclusions and recommendations section in the sample report on p. 344.)

Excerpt

The results of our reconnaissance suggest that coal gasification related residues are likely to be present in the subsurface **environment** at the site. Further investigations into possible environmental contamination problems at the First Street site should be conducted.

Back Matter Usually, materials that are secondary to the report itself go in this back section. This extra information helps readers who choose to refer to it.

- **Notes.** If you have worked from sources in preparing your material, some documentation styles (APA and CSE name-year style, for example) require you to put your source **acknowledgments—the** author's name, year, and page number—in parentheses directly in the text. However, other styles (the *Chicago* style, for example) require you to collect the sources for quotations or ideas and place them in this separate back section. Make sure that the end-note number for each note corresponds directly to a note number in the text. Follow the format for notes appropriate in your field. (See Chapter 2, pp. 49-51, for information on documentation styles and citation forms.)
- **Appendixes.** An appendix either supplements the main text with information that is too long for inclusion in the central text, or complements the text with information that lacks direct relevance to it. You may want to include sample questionnaires or forms, lists of names or equipment, maps, and so on. Some organizations specify that all visuals be placed in an **appendix—a** practice that is not the most convenient format for readers but is less costly to produce. Make sure that you separate each type of material into its own clearly labeled appendix. For example, "Appendix A: Sample Questionnaires," "Appendix B: Topographical Maps."
- **Glossary.** If your readers may not understand terms in your document, add an alphabetized list of words and their definitions. Take time to determine which words the audience really needs to have defined, because you likely won't have enough space to add an extensive glossary. Keep in mind, too, that readers might feel patronized if you define words they already know.
- **References/Bibliography.** The references (or bibliography) section is an alphabetized list of sources that should be included if you have consulted outside material when preparing a report, and if the documentation style you are using requires you to do so. It differs from the "Notes" section in that these entries are not correlated to a numbered note in the text and the format of the citation also changes. Follow the citation style appropriate to your field. (See Chapter 2, pp. 49-51, for examples of documentation styles and citation forms.)
- **Index.** An index is an alphabetical list of names, places, and topics mentioned in a report and the pages on which they occur. It serves as a tool (along with the table of contents) for readers to find information in your text and should be keyed to the terms readers are likely to search for. If your audience is not highly technical, cross-reference more general terms with technical language so readers can more easily find the information. (For instance, the technical term "terrain conductivity" might be cross-referenced with "methods for defining underground structures.") Indexes are included in published reports, but rarely in unpublished ones.

While these are standard parts for formal reports, requirements may differ from situation to situation. Before you write any report, always check for any required formats you must follow. If none exist, then you can use the above list as a guide.

Components of a Progress Report

Technical professionals working on long projects (more than a month in duration) often have to submit progress reports. This type of report uses many of the same techniques as the longer, formal reports, but its basic components differ enough that it is worth briefly discussing here.

Progress reports serve many purposes, but the major one is to reassure people that the project is on schedule and the work is getting done. Usually, these reports are required at regularly scheduled intervals and they include the following parts:

Front Matter

- Project title
- Project objectives and brief background
- Overview of methods
- Project participants

Body

- Summary of work accomplished
- Summary of current work
- Summary of future work planned
- Problems encountered
- Changes in schedule, budget, and so on

Conclusion

- Appraisal of overall project status

These reports can be as short as a memo, a letter, or they can be several pages. Whichever length your situation requires, remember that the real purpose is to reassure those who have authorized the work. Be sure your report contains the necessary information to achieve that goal. (See the sample progress report at the end of this chapter, pp. 317-318.)

Using Direct and Indirect Approaches

Even when you are working with specified report components, the organization you choose depends on the purpose and audience of your report. If you are primarily documenting work or activities, you may be required to order your material in a standardized format such as an expense form or a medical chart. However, if your main purpose is to guide decisions, then you have to be especially attuned to audience attitude.

A direct approach may be most effective for receptive audiences or busy ones whose members may not read the entire report. Frontloading material for such audiences allows them to grasp your report's essential message quickly. An indirect approach, traditional in full-length reports, allows a writer to build his or her case to its conclusions. (See Chapter 3 for more information about approaches to organization.)

Figure 13.5

Direct and Indirect Report Structures Compared

Indirect Approach (Traditional)	Direct Approach (Frontloading)
Executive summary	Executive summary
Introduction	Introduction
Problem statement	Problem statement
Background	Background
Methods	Methods
Plan of development	Plan of development
Body	Conclusions
Conclusions	Recommendations
Recommendations	Body
Appendixes	Appendixes

The structure of a report may reflect the choice between a direct or an indirect approach. Figure 13.5 shows how the body of a report displays information differently according to whether the approach is direct or indirect. Choose the one that best meets the needs of your audience.

Creating an Argument

Regardless of whether you choose a direct approach or indirect approach to your document, you still have to choose a structure for developing the ideas within the subsections. Generally, writers organize their ideas based on a clear pattern: chronological order, spatial relationships, order of importance, major categories, or logical sequence. If you choose one of the first four patterns, organizing is easier because it will follow an obvious order. The pattern of the fifth—logical sequence—requires that you impose a logic on the material and guide readers through your chain of reasoning. Even the apparently preset organizational patterns require that you make some choices, however.

As you think about organizing, ask yourself the following questions to help you select which pattern might be appropriate for your material:

- « *Chronological order*. Should you arrange your ideas from past to present or from present to past? *Example application*: a sales report, a progress report
- *Spatial relationships*. Should you proceed from right to left, left to right, top to bottom, or bottom to top? From inside to outside, or vice versa? *Example application*: a site investigation

- *Order of importance.* What is most important to the audience? Is that order the same as yours? Should you start with the most important and end with the least or work in ascending order from least important to most important? *Example application:* a feasibility study, a management study
- *Major categories.* What determines the major categories? Are they correct? With which category should you begin? *Example application:* a financial report, a medical report

If you decide to arrange your material using the logical sequence, think about the lines of argument to which your readers **will** be most attuned. Every field has its own specialized methodologies, reasoning, terminology, and authoritative evidence that are especially convincing to its professionals. For example, ask yourself if your audience will prefer to move empirically from evidence to hypothesis, or whether they **will** more readily begin with the hypothesis and then look for support. What is the more convincing authority to use for them, statistics or human factors? Is the audience expecting technical terms (such as "assay," "protocols," or "electromagnetic profiling") or do you want to use lay terms (such as "test," "procedures," or "geological exploration technique")?

In addition to these specialized lines of argument and terminologies, there are the more general common rhetorical modes that you might want to consider. These structures can help you develop any subject:

- *Definition.* Clarify the nature of something by placing it in the context of a class or by listing its parts.
- *Comparison/Contrast.* Explain something by showing how it is similar to or different from something the audience understands.
- *Cause and effect.* Illustrate and prove the causal links between things.
- *Circumstance.* Argue that the situation makes something possible or impossible.
- *Authority.* Provide evidence via examples, testimonies, precedents, statistics, and so forth.

The Classical Model of Argument Once you have decided the lines of argument that are best suited to your subject and your audience, you may find it useful to consider a system of persuasion that has stood the test of time. The classical model, first put forward in Aristotle's *Rhetoric* in the third century B.C.E., explained how speakers and writers could organize an argument most effectively to convince audiences of its validity. The model consisted of five parts:

1. Introduction
2. Statement of fact
3. Proof
4. Refutation
5. Conclusion

This arrangement has survived many centuries, and it is still used today as the basis for many contemporary persuasive documents. In the following example, a technical

communicator at Nuclear Metals Inc. used classical argument to convince management that installing a local area network was the solution to the electronic communication problems within the company. The excerpts from his feasibility study give a clear sense of how the classical model can be used as a persuasive tool.

- **Introduction** (introduces the point to be made):

Example

A basic problem facing all departments at Nuclear Metals Inc. (NMI) is one of communication—too many computer systems that cannot communicate with each other. In an effort to resolve the problem for three NMI departments, the vice president of **Engineering and Programs** asked me to examine the feasibility of creating a Local Area Network (LAN) to link the three departments that he supervises.

- **Statement of fact** (explains what the current situation or problem is):

Example

The manufacturing process at NMI requires an ongoing daily, if not hourly, interchange of information between members of the engineering, production control and quality control departments, the three departments on which this report focuses. The current computer system is inefficient, not configured to the needs of NMI users, and is therefore not being used. An engineering-based Local Area Network (LAN) linking the three departments is feasible with a minimum expenditure of **funds**.

- **Proof** (gives the evidence for an evaluation of the situation). The writer included all of the evidence he had gathered, including the results of a user survey (with tables and charts illustrating the text). He then summarized his findings as follows:

EXAMPLE

Virtually every member of the three departments involved in this report wants to be on a network of some type. Each staffer also wants to keep the computer system with which he or she is familiar and on which the staffer may have hundreds, if not thousands, of files. The department members' reasons for wanting to network vary, but the major needs are e-mail capability, access to a common database, and real-time conversion.

He then listed the equipment and training necessary to switch to a LAN system, and finally gave a cost analysis:

EXAMPLE

The actual cost of setting up a LAN linking engineering, production control, and quality control is dependent upon the following factors:

- Immediate implementation of the LAN solution versus a **phased-in** approach.

- Use of existing in-house computer equipment versus the purchase of new equipment.
- Actual **market** prices for computer components (price continues to fall) at point of purchase.

Table 4, Cost Estimates, provides a working and planning tool for establishing an engineering-based LAN.

- *Refutation* (explains the opposing points of view; a strategic move to show consideration of all sides of the problem). Included here are alternative solutions with illustrations of why they are not feasible:

EXAMPLE In order to limit costs and expedite setting up a network, NMI may argue that using a VAX-based system instead of a PC-based LAN is a better option. However, as currently configured, the VAX is not compatible with Macintosh software, thereby excluding one-third of the personnel in engineering, production control, and quality control.

- *Conclusion* (presents a solution to the problem or suggests a plan for resolving the situation):

EXAMPLE Because of these factors, the best solution is to establish a PC-based network. Such a LAN will provide the means for easy interchange of data among the three departments and will also allow for future expandability to link with other networks in the company. Further, the cost is minimal and, once the equipment is purchased, the LAN could be operational within two weeks.

Although this model is highly structured, it provides a balanced approach for persuading readers. The structure makes it much harder to slant ideas or omit steps in the argument—either of which might seriously undermine its effect on the audience. If you decide to arrange your report using the logical sequence method, this model may come in handy as a guide for establishing quality reasoning.

The Toulmin Model of Argument Another strategy for structuring prose persuasively is the **Toulmin model of argument**, named after its major proponent, twentieth-century philosopher Stephen Toulmin. Basically, this model differs from the classical one in that it emphasizes the assumptions that a writer or audience may have that lead to certain conclusions, and it also tests the validity of these assumptions. The Toulmin model includes four basic components:

1. The *claim* (the basic point the author is trying to prove);
2. The *qualifier* (a word or words that modify the certainty of the claim);
3. The *support* (the evidence and any appeal made to the audience—such as an appeal to their sense of justice or fairness, and so forth); and
4. The *warrant* (the unstated assumption underlying the entire structure).

This type of argument requires that you know what your audience's assumptions are so that you can tailor your argument to match those assumptions.

EXAMPLE

Claim: Installing a local area network in the office will improve productivity.

Qualifier: Installing a local area network in the office should improve productivity.

[The word "should" makes the recommendation less an absolute truth and allows the writer and the reader to entertain claims that are less certain. It is less threatening than a "must" or a "will."]

Support: A local area network will enable all the departments to communicate electronically.

Warrant: Communication is essential for improved productivity.

Claim: Cigarette smoking must be prohibited in all public places.

Qualifier: Cigarette smoking should be prohibited in all public places.

Support: Secondary smoke is harmful.

Warrant: The public's health is more important than an individual's right to smoke.

This strategy for structuring an argument works especially well in situations where you have researched your audience thoroughly and have discovered their basic motivations. When you know what their underlying assumptions are, you can present your ideas in a context most favorable to them. You can also use the Toulmin model to discover and test the validity of your own assumptions and reasoning. If you want to propose upgraded computer software for all computers in your work environment, for instance, what is the unstated warrant underlying your claim? Once you bring that warrant to light, examine it to determine if it's valid.

(See Chapter 3 for more on organizing.)

Designing

Another tool for making technical reports and studies persuasive is the design of the information—its page layout and use of graphics. If you are not familiar with basic text design principles, read the detailed discussion in Chapter 4. But there are several cautions about document design that apply especially to technical reports. This section focuses on these possible trouble spots.

Formatting

Numbered Headings Many standard formats for technical reports, especially engineering reports, require writers to number each section: the first-level heading is 1.0, the second is 1.1, the third is 1.1.1, and so forth. The next main topic is 2.0 and continues the same pattern. Documents using this system allow readers to find specific parts more quickly, especially in large reports that can include 300-plus pages.

A caution applies here. Don't get so carried away with numbering that you number each paragraph. Doing so causes the decimals to string out so far that they overwhelm the text on the page: "2.3.1.8.2.2 Technical Developments."

If you get carried away with decimals, the table of contents (which must include all of the numbers) will resemble a data stream and be harder to read, not easier. A good rule of thumb is to use only three levels of decimals in the table of contents, even though you may include more numbered levels in the text. But let that three-level rule serve as a reminder to you as you write the text: Include more levels only if absolutely necessary.

Pagination When numbering pages, you have two options. You can number the pages sequentially from the beginning of the report through to the end. Or you can begin each chapter or major section with page one. For example, pages for Chapter 1 would include the chapter number first and the page number second, like this: 1-1, 1-2, 1-3, and so on. In Chapter 2, the page count would begin at 1 again: 2-1, 2-2, 2-3, and so on. Paginating reports by section is preferable because it makes the documents easier to update—you don't have to renumber all of the pages if you add or delete material from just one chapter.

> **Tip:** *Never use bullets to indicate subcategories under already-bulleted items. Try hyphens under bullets or use another symbol.*

Bullets Using bullets to highlight important elements and to serve as reader cues works well—unless you overuse them. Text with too many bullets looks like a grocery list. If you have more than seven or eight bullets in a row, you may want to find ways to combine them. And if every one of your subsections contains bullets, they are no longer doing their job of highlighting information—everything is highlighted, giving no emphasis to what's really important. As with any good technique, use bullets in moderation.

Figures and Tables

Technical reports often employ graphical information to clarify or enhance the information presented. However, poor graphics can actually detract from the text if figures are overcrowded, poorly presented, or inappropriate to the information. See Checklist: Using Graphics in Reports for additional guidance.

Some technical report standards require writers to place all graphics (sometimes known as "exhibits") in an appendix. Although you must follow the requirements, this practice is counterproductive to the connections between the visuals and the text. If you can integrate the graphics into the body of the report, by all means do so.

Mathematical Equations

Many technical documents incorporate mathematical equations within the text. As with visuals, long strings of equations make the document difficult to read and are

CHECKLIST Using Graphics in Reports

- D Are all graphics large enough to be easily visible? If you have a complicated visual squeezed into a small space, readers have trouble deciphering the information. If a visual is so large that it does not fit comfortably on a single page, consider turning it on its side and presenting it vertically instead of horizontally. This technique gives you more space for the graphic, though readers have to turn the document sideways to read it. Another (more expensive) solution is to use a "foldout"—a larger page that is folded into the text; readers can pull it out to its full length as they need it.
- Does each graphic have a definite function and an informative caption? A graphic is useful to the audience only if they know what it is and why it's there. A caption such as "The Pelton Meter System" tells readers very little, while "Measuring the Fuel Flow in Test Automobiles with a Pelton Meter System" tells readers why the visual is important and gives them a perspective from which to understand it.
 - Have I strung together too many figures in a row? Technical reports that have four or five (or more) graphics following each other with no intervening text make the document seem more like a hardware installation manual than a professional report. Figures used effectively correspond to and enhance text, they don't replace it.

rarely useful. When you integrate mathematical formulas or equations into your text, always introduce the purpose for the calculations, include textual explanations where possible, and separate series of calculations with distinct prose commentary. (See Figure 13.6.)

Figure 13G

Integration of Mathematical Equations into Text

The threaded rod can be modeled as a column fixed at two ends. The effective length for a column fixed at two ends is half the length. The area moment of inertia can be calculated as follows:

$$I = \frac{\pi r_e^4}{4}$$

(Eq. 17)

where

r_e = Effective Radius (calculated from effective area)

The critical buckling load of the threaded rod is 2001bf, which is about 600% of the effective load on the threaded rod. Therefore, if the pressure in the cavity is limited to 5 PSIG, the threaded rod will not be a hazard to system integrity.

Presenting Statistics and Visual Information Ethically

Readers comprehend complex information much more easily and are often more strongly convinced of its validity when a document presents the information both graphically and verbally. As a writer, you have a responsibility to present information accurately, allowing the overall structure of the document and the lines of argument you have chosen to do the persuading, not misleading numbers or graphics. When presenting visual information, be sure to give the entire context for it and design it so that it emphasizes the idea accurately.

(See Chapter 4 for more on designing.)

Editing

Editing the style of a technical report requires that you pay attention to the principles of effective editing (see Chapter 5). But a few specialized elements are worth mentioning here because they are especially pertinent to report writing.

Tone

Because reports are not advertisements, the tone you create should seem even and well reasoned—professional technical documents should not seem like sales pitches or emotional pleas. Edit your work carefully for any marketing language or subjective prose that might have slipped in. Here is an example:

DBS is at a crossroads. The company's stated effort to make this a place where "winners love to work" means that we have to satisfy the people who have the high level of skill needed to build our products. Unless we allow our employees to work from home, we may be faced with hundreds of disgruntled workers who no longer care about the quality of work they do. We must give our people more time with their families, more time to rebuild their emotional health, so they can build our products better. Clearly, we need to begin telecommuting.

The melodrama of that passage makes it sound more like a political speech than a technical report. In this instance, the writer got carried away with making a point and veered into a dramatic harangue. Such slips are easy to make when you are firmly convinced of your solutions. It's also easy to include some of the marketing language from the brochures and other sales literature you collect during your research. Phrases such as "exciting online service" or "front-runner in the industry" or "120% error free!" give the impression that you are looking at the facts from a biased perspective.

Analogies, metaphors, and other figures of speech can work well to help you explain unfamiliar technical concepts to nontechnical audiences, but these techniques can backfire if you use them to create pictures inappropriate for the situation. Consider this example:

The dense, tar-like fluid will tend to creep downward under the influence of gravity and slowly sink like slime through the saturated zone until it encounters

an undeniable barrier to its downward migration. Relatively impermeable fine sand, silty or clayey soil strata that is laterally extensive will provide such an undeniable barrier and will severely impede the downwardly oozing coal tars due to their high viscosity and surface tension effects.

This description sounds as if it were written by Stephen King, not a geologist. Be sure to edit your prose for any stylistic oversteps into unnecessary drama.

Consistency

Your report should be consistent in the style of the prose, the structure of the headings, and the way similar information is presented. If you are part of a report-writing team, you have the added task of seeing to it that the sections written by various people seem as if they have been written by a single author. Corporate style guides help in this process because they give standards for abbreviations, grammar, numbering, captioning, and so forth. (See Checklist: Style Consistency on p. 308.)

Completeness

It's common sense to think you wouldn't send an incomplete report to your supervisor. However, even though you may not omit entire sections, you may submit a document that makes promises it doesn't keep. For example, if you write a section on Monday and edit it on Tuesday, you may cut and paste so that its integrity is lost. The chart promised on page 22 is no longer there, and the paragraph defining the technical approach suddenly makes no sense because you deleted an adjoining paragraph. Always give a document a final check for integrity. Do page numbers correspond to the table of contents? Are figures numbered correctly? Have you included all necessary material in the right order? Make a checklist for both integrity of ideas and mechanical details. Use it.

Passive Voice

It is best to avoid unnecessary use of passive voice, which tends to make sentences more abstract and longer than necessary. The classic argument for using passive voice is that in certain cases, the agent performing the action is less important than the action itself. An engineer might write "The PACSAT protocol was built on top of the AX.25 protocol," instead of "The engineers built the PACSAT protocol on top of the AX.25 protocol." In this instance, the passive voice emphasizes the action and the object of that action, not the person performing it. But note what happens when passives become the "default mode" of a report:

ORIGINAL

A McMillan Company flow sensor, model no. 121-3, to be used by the team in the new system, was purchased from the Cole-Parmer catalogue. Two solenoid valves, donated by Harvard, were used in the system. The valves and the flow sensor were attached to a metal plate and installed in the test vehicle. Technical difficulties were encountered but were solved easily.

CHECKLIST: Style Consistency

- Have I made sure that all headings are parallel in format?

NON-PARALLEL HEADINGS IV PROPOSED LAN SOLUTION
 VAX vs. PC
 Creating a New Network
 Linking Computers
 Equipment Needs
 Network Security

PARALLEL HEADINGS IV. PROPOSED LAN SOLUTION
 Comparing VAX and PC
 Creating a New Network
 Computer Links
 Equipment Needs
 Network Security

- Have I numbered all the figures consistently and sequentially?
- Do I always refer to figures consistently (as Figure 3 or Fig. 3, but not both)?
- Have I used abbreviations and acronyms sparingly and consistently?
- Have I capitalized words consistently?
- D Have I followed the company style guide or another reference in making punctuation choices? Am I sure that I've used punctuation correctly?
- Have I used second- or third-person address consistently throughout—either "you" or "the user," but not both?
- Have I double-checked the whole document to make sure I have not contradicted myself anywhere—that my arguments are consistent throughout?

J

In this version, the passive occurs in every sentence, distancing readers from the agents to such an extent that the material becomes harder to grasp and loses power. A version with more impact mixes active and passive voice appropriately:

Revised: The team purchased a McMillan Company flow sensor, model no. 121-3, from the Cole-Parmer catalogue to use in the new system and also used two solenoid valves, donated by Harvard. The valves and the flow sensor were attached to a metal plate and installed in the test vehicle. This procedure resulted in technical difficulties, but the team solved these problems easily.

As discussed in Chapter 5 (pp. 118–119), passive voice has proper uses, but overdoing it adds another layer of difficulty for readers of technical material. In general, prefer the active voice and use passive constructions only when necessary. Remember that your job is to explain the material more clearly, not to further complicate it.

Sentence Variety

At the other end of the spectrum is technical information presented in an overly simplistic and repetitive manner. Writers trying to explain their material clearly sometimes lapse into redundant patterns of sentences all beginning with subject followed by verb.

ORIGINAL

4.3.3 Feedback Mechanism

The feedback mechanism is a direct result of the two mechanisms interacting with each oilier. The vortex rings produced by the jet instability mechanism hit the exit wall and produce pressure pulses. The pulses are then selectively amplified by the Helmholtz mechanism because they occur at the frequency of the resonant chamber cavity. These amplified pressure fluctuations make the upstream flow fluctuate. Larger vortex rings can be made from the jet instability mechanism when the incoming flow is subjected to a forcing frequency. These sequential vortex rings are highly ordered. The vortex rings occur at distinct frequencies because of the pulsing flow. These vortex rings are then amplified by the jet instability mechanism.

The repeating pattern of subject plus verb makes the prose seem to march down the page in little staccato steps. It sounds elementary. But writers trying to explain a process usually don't notice this simplistic pattern as they are struggling to make the ideas clear for readers. Only at the editing stage do most people catch this problem. If you find that you are unconsciously writing similar redundant patterns, try varying your sentence beginnings and sentence lengths. These two easy techniques make your prose seem more professional and pleasurable to read without upgrading its complexity.

REVISED

4.3.3 Feedback Mechanism

The feedback mechanism is a direct result of the two mechanisms interacting with each other. When the vortex rings produced by the jet instability mechanism hit the exit wall, the impact creates pressure pulses. Because they occur at the frequency of the resonant chamber cavity, these pulses are selectively amplified by the Helmholtz mechanism, producing large pressure pulses throughout the entire JDHO cylinder. Such pressure fluctuations make the upstream flow fluctuate

as well. When the flow coming into the jet instability" mechanism is subjected to forcing frequency, larger vortex rings are created. The sequential vortex rings become highly ordered, occurring at distinct frequencies because of the pulsing flow, and they are amplified by the jet instability mechanism.

Acronyms and Abbreviations

Acronyms are words formed by combining initial letters or syllables of a word or series of words into a new word (for example, NATO for North Atlantic Treaty Organization). Abbreviations are a sort of shorthand for longer words (for example, NBC for National Broadcasting Company). Even though your audience may be familiar with the acronyms and abbreviations you use, try to use them sparingly. Text easily starts to look like alphabet soup when acronyms get out of hand:

PFHs received by ground stations can be grouped together to form a directory of files. Radio receivers for the PACSAT broadcast protocol can be any FM receiver compatible with the TNC data standard and the AFC for the doppler shift compensation. For receive-only ground stations, any TNC with a modem compatible with the G3RUH standard can work. Since the broadcast system can work with any-kind of file, the system offers great flexibility for software application such as DOS or MS-Windows or any message in ASCII format, as well as HTML documents for the WWW.

Remember, too, that almost all reports have multiple audiences—some not necessarily familiar with the acronyms—who may find the abbreviations a foreign language. Keep abbreviations and acronyms to a minimum and never include them in the text without first defining them.

Editing a professional-quality document is a painstaking process that requires time, attention to detail, and the patience to proofread your work over and over until you're positive it's correct. Once is never enough.

(See Chapter 5 for more on editing.)



Tips for International Communication

Writing for international audiences requires writers to explore the cultural expectations of the target country before drafting technical documents. Writing reports and studies for different cultures means that you must learn about the ideologies, the social customs, and the preferred forms of communication in the cultures you address. Some cultures, called high-context cultures, prefer that communications establish a relationship before getting down to business. Reports in these countries are much more inductive than Western documents and tend to begin with what Americans and Europeans may view as extraneous detail about the company or

personal detail about the writers. Once a stage is set, the report moves to its recommendations and discussion.

By contrast, low-context cultures value directness more highly than establishing preliminary relationships—at least in the form of writing. Reports in these countries are utilitarian, organized deductively to give main points first and then details.

Another way of looking at these differences is to think of the two cultural approaches to organizing reports as *bottom-up* or *top-down* structures. High-context countries prefer bottom-up organization that begins with the relational details, explores options, and ultimately comes to the point, while low-context countries prefer top-down organization that begins with a clear statement that places all the ensuing details in context.

Some low-context cultures can be so direct that they seem harsh and unfeeling in their efficient transmission of information. On the other hand, high-context cultures can produce reports that consist of nothing but details because writers are reluctant to state a point that might cause controversy. Construct documents to respect the culture of both writers and audience. A middle ground is often the best foundation for effective communication.

As global communication increases, these differences in approaches to writing are becoming less pronounced. On occasion, Germans, Americans, Scandinavians, and other low-context cultures choose to use a bottom-up approach, and Chinese, Japanese, Arabs, and other high-context cultures choose a top-down structure. As you plan your reports, take the time to learn about the cultural expectations of your specific target audience. Be sensitive to their needs, but avoid generalizations that cause you to stereotype. Remember that each reader is an individual who deserves respect for individual characteristics that may not fit stereotypes. Always deal with the person first and the culture second.

For more on cross-cultural communication, see Chapter 7.

Quick Review

Although technical reports and studies are apparent conveyers of objective fact, if written effectively they are also persuasive documents. Most reports present facts to document work activities or guide decisions—sometimes both. When information is presented well, it is naturally persuasive. When information is presented poorly, even the most compelling facts can confuse readers or have little impact at all. The key is to structure a report to create an effective context for facts.

- To plan the report, determine the purpose and audience, define the problem, and develop a schedule.
- Use general guidelines for understanding your report's type and audience, but realize that each report is situational and requires in-depth analysis of specific circumstances.

- Remember that reports usually include three major parts: the briefing of the problem, the evidence, and the evaluation.
- Decide whether to use the direct or indirect approach, depending on the audience's needs and attitudes.
The direct (“frontloading”) approach puts the evaluation component first. The indirect (traditional) approach puts evidence first.
- When editing technical reports, focus on tone, consistency, completeness, unnecessary passive voice, sentence variety, and overuse of acronyms.
- When designing technical reports, focus on the numbering systems (headings and page numbers), use of bullets, figures and tables, mathematical equations, and statistics.



Exercises

1. Decide whether to use a direct or an indirect approach in the following report situations:
 - a. You have researched types of computers your organization might purchase in the near future and are recommending a switch from one brand to another. The head of the organization is the person who made the decision to purchase the current computers. Your audience is the Purchasing Committee.
 - b. You are writing a case report on a patient who has a serious medical condition. Your goal is to be sure that the new physician assigned to the patient understands the patient's treatment history and can treat the patient effectively. Copies of the report will go to the insurance company and possibly the patient.
 - c. You are writing a performance review for one of your employees who needs to improve her productivity and her attitude. The report will be sent to her and a copy will be placed in her company file. You will meet with her when the evaluation is complete to discuss its content.
 - d. You are writing a report for your supervisor on the scope of an upcoming project your company may undertake. The supervisor must make decisions about whether to accept the project, how many people to assign to it, how much time to allow for its completion, and how large a budget to develop for it.
2. In a maximum of one page, define your report's central question and list subissues that stem from that question. Be as thorough and as concise as you can, clearly indicating the relationship of the subissues to the central idea.



Community Action Project

Find a group in your area that is working on a special project. For example, you might look for a citizens group working to turn a local vacant lot into a playground or a group of dog owners interested in establishing an off-leash area in the neigh-

borhood. Most likely, the people already working on the project have gathered some information but have not put it together in a cohesive, persuasive package. Offer to take the data already collected, gather more if necessary, and put it all together in a report on their project. You may write a series of progress reports to send to all project members as they proceed, or a feasibility report about the potential for their success, or yet another type of report (see the list in Figure 13.1 on p. 288). The project group will be grateful for your efforts and have an organized document (or documents) that will make their work go much more smoothly.

Letter of Transmittal

LORENA L. HILNER

2 Cardinal Drive, Milton, PA 17847

April 1,2007

Edward Henninger, Dean of Business & Computer Technology
Pennsylvania College of Technology
One College Avenue, AHS-E257
Williamsport, PA 17701-5799

Dear Professor Henninger,

*Topic
identified*

Attached is a report on findings about the Networking and Technical Support (NT) Associate Degree program. These are conclusions based on my completion of the program as well as on interviews with other students in the program.

*Brief
summary*

The report responds to a student's complaint letter and outlines the problem with the NT program. As noted in the report, students feel there is not enough hands-on networking experience offered in the curriculum and that more programming classes are offered than networking classes. A change in the curriculum would address this complaint, and I hope you will consider implementing it. Specifically, the three courses in C++ programming could be condensed so that more time slots for hands-on networking lab courses could be available. Students entering the job market with an associate degree are ready to work and need more practical experience to offer an employer.

*Recommen-
dations*

*Acknowledg-
ments*

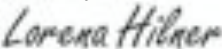
I would like to thank fellow students in the NT program for providing input and help with this report and the Research Department at Pennsylvania College of Technology for providing statistical data.

*Expression
of appre-
ciation*

Thank you, Professor Henninger, for the opportunity to present this information to you. If you have any questions, I can be reached at the above address, at 570-742-3900, or at hillor93@email.pct.edu. I would be happy to discuss this matter with you.

*Contact
information
and offer to
answer
questions*

Sincerely,



Lorena Hilner

Sample Brief Report

Recommendations for Changing the NT Curriculum

Introduction

This report outlines the results of a survey prompted by a complaint letter. The complaint from a fourth-semester student enrolled in the NT (Networking and Technical Support) Program at Penn College states that the number of programming courses far exceeds the number of networking classes where students gain hands-on experience in networking applications and techniques.

The following report discusses the methods used to gather information to support this complaint, gives the results of the student survey, and provides information from an interview with the Curriculum Coordinator in the Computer Science Department. Also included are the implications of these findings.

Methodology

Information was obtained from a random survey of students in the NT program. The researcher searched the Student Information System (S.I.S.) to access the list of the 157 students enrolled in the program and selected a cross-section of third- and fourth-semester men and women, local and nonlocal addresses. These students received an e-mail explaining the project and requesting them to complete the attached survey and return it via e-mail. Approximately 25 surveys were sent and 7 were returned.

Additionally, the research included a request for an interview with the Dean of Business and Computer Technology. A visit to the school's office determined that a more appropriate person to interview was the Curriculum Coordinator in the Computer Science department, Mrs. Denise Leete. Mrs. Leete responded to an e-mail requesting an interview and a follow-up message confirming the scheduled time. The interview questions were attached to the follow-up e-mail.

Results

The interview with Mrs. Leete was quite informative and helpful. She is a new Department Head in the Computer Science department and was genuinely concerned about the complaint letter and agreed that changes need to be made. In fact, she had already forwarded the letter to her colleagues in the department and reported that there have been many similar complaints. The faculty have begun looking at the data and are "trying to improve and change" the curriculum. Already this semester third-year students have designed another opinion survey given to students in the two-year program to complete.

*Report's
purpose and
context*

*Conclusions
stated up
front—
direct
approach*

Road map

*Steps used
to gather
information*

*Summary of
data
gathered*

Usually the curriculum is revamped every three years and presently, according to Mrs. Leete, the department is "heavy into curriculum revision and major revamping is planned." Changes can be expected beginning in the fall 2004 semester. These changes probably will include a cluster of classes with opportunities for certification in A Plus, CISCO, or Help Desk.

The student surveys showed that all students did agree that more hands-on networking experience was necessary with fewer programming classes offered. Most students believed that some programming knowledge is appropriate even though they do not plan to seek employment in a job that would require actual programming. Some students indicated they are leaving Penn College because they did not feel there was enough networking experience offered; another switched from the two-year to the four-year degree for the same reason. Three-quarters of the students said the class on Web Page Design is especially relevant.

Discussion

The initial complaint letter that prompted the survey was certainly valid. This validity is evidenced by the fact that revisions are already under way, suggesting that the faculty is concerned about student dissatisfaction with the curriculum. Presently, the NT program offers three classes in C+++ programming and one class each in AS400 Systems programming and Web Page Design for a total of five programming classes. The classes that offer hands-on experience in networking are EET105-Microcomputer Maintenance and EET204-Network Maintenance Lab. CSC110-Introduction to Information Technology also offers such experience but is a basic class mostly focused on the Microsoft Suite of products. It is a required class for all students enrolled at the College. Some hands-on experience is provided with EET271-Network Administration, but it involves working with a variety of software installations—no network connectivity is taught.

Conclusion

Curriculum revisions are needed to decrease student dissatisfaction and to increase future enrollment. The faculty and administration need to listen to, and indeed are considering, the input from students. More hands-on networking classes and fewer programming classes are the most popular options. The fact that revisions are already under way is encouraging.

*Perspectives
on the
results*

*Recom-
mended
action (note
the positive
tone at the
end)*

Sample Progress Report

Plant Survey with Data Synthesis, Part 2 - Survey of Current Vegetation

January 2004

1. Samuel Smith, Principal Investigator
2. Karen Johannes, Graduate Research Assistant

January 1, 2006; Expected completion date: June 30, 2007

Goals and objectives:

Activities performed in the past year are part of an ongoing effort to study plant diversity within the designated study area. The main thrust of this research is to examine how habitat fragmentation, resulting from human-caused alteration of the landscape through urbanization, of a formerly continuous expanse of natural plant communities responds to these processes.

Questions being asked:

We wish to discover how various parameters affect the species richness and composition of communities within these natural habitat patches. These parameters include area and shape characteristics of patches, degree of isolation from other patches, time since patch formation, and disturbance characteristics.

Overview of approach and methods:

We have gathered data on the frequency and abundance of terrestrial vascular plant species using quadrants arrayed along transects placed in a variety of habitats. Through the use of 1-m² (herbaceous species) and 10-m² (all species) quadrants, we can construct species area curves and analyze ordination, classification, and species richness estimators.

Summary of completed and current work:

Since the last progress report (Summer 2005), we have sampled four more patches, and three of the four original patches more extensively. Woody species have now been surveyed in a total of eight patches, using 100-m² quadrants arrayed along transects. Summer herbs have now been sampled in a total of six patches; the other two patches had no significant summer herb growth. A lingering spring drought, resulting from La Niña, has made it impossible to further sample spring herbs since spring 2005.

Project title

Report date

Participants

*Start date
and status*

*Background
and project
context*

*Problems
encountered*

We have analyzed the data by estimating species-area curves for spring and summer herbs and the woody species. We had expected the logistic model to provide the best fit. However, the power and exponential curves were more appropriate in most cases. These results indicate that the scale of environmental heterogeneity is very small in these habitats. This contrasts sharply with results from other biomes.

Future work:

Future analyses will include spatially explicit data on woody species within subsets of each study area. Maps of woody individuals will be used to generate species-area curves under a variety of sampling situations. Other analyses will include nonmetric scaling ordination, nestedness analysis, and indicator species analysis.

In the coming year, we will survey more patches and collect more spring and summer herbaceous data (rains permitting). We will develop a GIS database to record how disturbance dynamics affect a patch's plant communities. Using aerial photography, we will examine how disturbance has affected each patch through time. Assuming sufficient resolution, disturbance events should show up as reductions in plant cover for a particular year.

This project is on track to provide one of the first large-scale studies of urbanization and habitat fragmentation on plant community structure, especially in a desert biome. This project will test various theories of landscape ecology concerning the effects of landscape fragmentation. The project will provide information needed for planning urban growth, especially in sensitive ecosystems.

Sample Medical Report

Diagnosis: Osteopetrosis

Full history:

52 year old male with a history of osteopetrosis. The patient suffers from anemia (hemoglobin = 4.5), thrombocytopenia (platelets = 29,000), and splenomegaly. Bone marrow imaging was requested to evaluate the degree of intramedullary and extramedullary hematopoiesis. The patient is being considered for splenectomy to counter platelet sequestration. Also, this study will serve as a baseline prior to potential Epopo therapy to help treat the patient's anemia.

Radiopharmaceutical:

Tc99m Sulfur Colloid (filtered through 0.22 um millipore filter)

Findings:

Initial whole body Tc99m-sulfurcolloid images as well as 4 hour delayed images of the abdomen and pelvis were obtained. The most striking abnormality is the lack of any significant bone marrow uptake. Only when the images are greatly intensified does one note minimal bone marrow activity at the L5-S1 level.

There is massive splenomegaly-likely representing the principal site of extramedullary hematopoiesis. Slightly less activity is present in the spleen as compared with the liver.

Plain film of the pelvis reveals diffuse dense bony sclerosis consistent with the patient's known osteopetrosis.

Dual energy x-ray absorptiometry of the lumbar spine revealed an average bone mineral density of 3.19 g/cm² in this patient. This bone density is 19.5 standard deviations higher than the normal value in a male patient of the same age!

Discussion:

Osteopetrosis is characterized by the replacement of trabecular bone with compact bone. This results in diffuse increased bone density, decreased hematopoiesis, and resultant anemia.

Bone marrow scintigraphy is seldom used today but can be helpful in certain clinical situations, such as with this patient. The procedure involves the intravenous injection of small (pre-filtered) colloid particles (0.1-0.22 um) which are taken up by the

This report documents activities and also guides diagnostic decisions

Clear, short subheadings

Short paragraphs list results efficiently

reticuloendothelial system (RES). Normally, Tc99m sulfur colloid (which has not been filtered and thus includes particles as large as 0.5 μm) localizes predominately in the Kupffer cells of the liver (85%), macrophages of the spleen (10%), and bone marrow (5%).

Factors which influence to distribution include extraction efficiency, blood flow, disease states, and particle size. Larger particles localize within the liver, while smaller particles collect in the bone marrow.

In most normal subjects, red marrow is seen in the axial skeleton and proximal appendicular skeleton (proximal thirds of the femur and humeri). In osteopetrosis one often sees decreased central marrow uptake with peripheral expansion (increased marrow in the distal extremities) and/or extramedullary hematopoiesis (ie. hepatosplenomegaly).

This patient does not demonstrate peripheral marrow expansion, but does have an enlarged functioning spleen showing increased uptake due to increased number and activity of splenic macrophages.

This study provided useful information in this case. We determined that this patient's situation is tenuous because the spleen has become the primary site of hemopoiesis, while the enlargement of the organ has led to platelet sequestration and subsequent thrombocytopenia. The tentatively scheduled splenectomy was thus cancelled.

Differential Diagnosis List

Bone marrow replacement processes such as myelofibrosis, diffuse metastatic disease, leukemia, and multiple myeloma. Also consider chronic renal disease (advanced renal osteodystrophy) and aplastic anemia.

*Conclusions
leading to
decisions on
diagnosis
and
treatment*

Sample Final Summary Report

Veterinary Report on the Equestrian Events at the Athens Olympics

Leo Jeffcott,
President of Veterinary Commission,
& Nigel Nichols
Foreign Veterinary Delegate.

Introduction

There is no doubt that the equestrian events at the Olympic Games were an organizational success. From the veterinary point of view we have never been provided with such good facilities at the world's premiere equestrian event to ensure the welfare of the horses. This situation actually created something of a national veterinary problem as this is not only the best clinic in Greece, but for the month of August most equine vets in the country were working there – making it difficult to provide surgical cover to Greek racing and equestrian horses elsewhere. In fact two Greek national horses were admitted into isolation on the venue so that surgery could be undertaken in the Olympic clinic.

General matters

The equestrian venue was created on about 2000 hectares as a new facility at Markopoulo for racing and equestrian sport in 2003. It has the capability of accommodating some 2000 racehorses with a huge racetrack stand, ample parking for spectators and the veterinary clinic adjacent to the stable compound. There is also an impressive equestrian park with cross country course, extensive training facilities, a separate stable compound, show jumping and dressage arenas, a large indoor arena and administrative building. During the Olympics the two operations were kept strictly apart and no racing took place at all in August or September.

No expense was spared to provide comfort and safety for the 200 odd Olympic horses from 38 different nations. During the Olympic sojourn 219 horses were accommodated of which 205 competed in the three Olympic disciplines (i.e. 75 in Eventing; 53 in Dressage & 77 in Jumping). The stable compounds were designed and built to the highest standard providing tall ceilings, good airflow, large boxes (4x4 metres), wide aisles, insect protection, automatic watering, ample electricity and easy to clean. There were 20 boxes in each block and the blocks were arranged in groups of four with a central exercise and lunging rings. Each block had ample space for tack and equipment with lockable rooms and toilets at one end. There was also a separate building for each block with four rooms for the teams and their riders. Washing facilities for the horses were provided in the compound and three electronic weigh bridges. In addition a 10 x 10 metre shade tent was provided with banks of misting fans (like those used in Atlanta'96) to cool the horses after training and competition. In our opinion the horses wanted for nothing more.

The stable compound was completely secure and stewarded at all times. It contained a fully equipped farrier station and a large feed and bedding store organised by Kentucky Equine Research which did the same job in Atlanta and Sydney.

Generally the weather was as predicted - hot and dry with temperatures reaching the high 30's Centigrade and relative humidity of 30-40%. A dedicated weather station positioned on the cross country course provided the WBGT index which is the most accurate prediction of expected heat load experienced by the horses. The WBGT did reach around 30 on occasion, but excessive heat loads during competitions or training sessions were not experienced. Some of the hottest times were chosen for the Horse Inspections - probably to test the endurance of the Veterinary Commission to work under pressure!!

The veterinary team at this Olympics consisted of around 60 dedicated individuals including 16 senior veterinary students from the Vet School in Thessaloniki (see Table 1). The large number of vets was required to ensure the safety of the horses on cross-country day of the

Main point

Introduction sets context for report

Description of facilities and environment

This section could benefit from more subheadings

Eventing competition. For the rest of the time there were about 20 vets manning the clinic, competition and training areas. A horse ambulance with an experienced vet on board was present at all competitions and training sessions.

In addition to the official vets there were some 35 veterinarians that came with the 219 horses as Team or Individual vets.

Veterinary Commission	4
Athens 2004 Veterinary Services staff	13
Veterinary volunteers:	
Overseas	14
Greek	4
Veterinary students	16
Medication Control Testing Vets	2
Ministry & Border Inspection Vets	7
Total	60
Team Veterinarians	35

Table consolidates and focuses information

Table 1 - The complete Veterinary Team at the Athens Olympics

Medication (i.e. doping) control is a crucial part of any major equestrian event nowadays and, of course, it has a very high priority at the Olympics. Samples of urine and blood were taken from horses competing in all three competitions by specially trained staff. There were two official FEI Testing Vets (one from Switzerland and one from Greece) who collected a total of 40 samples. The facilities provided for collection were excellent and included four large boxes in an isolated part of the vet clinic compound. After collection the samples are sealed and sent by courier to the central FEI laboratory in Paris for analysis. The results are sent direct to the FEI headquarters in Lausanne.

Despite the strict rules against doping there is some medication permitted during competition. This includes gastric ulcer medication, drugs to suppress excessive estrus behaviour in mares, rehydration fluids, vitamins and some herbal/homeopathic remedies. Nothing that contains drugs on the Prohibited Substance List is permitted unless there are special circumstances (for example some eye drops and anti-spasmodic drugs for colic). However, this requires the approval of the Veterinary Commission and the President of the Ground Jury. The samples collected from each discipline are shown in Table 2. These include samples taken at random, a few spot tests requested by the Ground Jury and mandatory samples from the medal winners.

	Random	Spot	Medals	Total
Eventing	9	1	3	13
Dressage	9	0	3	13
Jumping	11	1	2	14
Total	29	2	8	40

Table 2 - Medication control samples taken throughout the Olympic Games

Eventing

The Eventing competition management was a great success and a tribute to the cross country-course designer, Albino Garbari, and his team and the Technical Delegate, Mike Etherington-Smith and his very experienced team of overseas and Greek officials. From the veterinary perspective there were two main worries - the potential heat load on the horses during the cross country and the new shortened format of the CCI without the Steeplechase. The course was beautifully designed at 5.57 km. 34 fences and 45 jumping efforts in a time allowance of just under 10 minutes.

At the first Veterinary Examination it was clear that the horses all looked fit and well and acclimatized quickly to their surroundings at the equestrian venue. Only one horse unfortunately injured itself in training and had to be substituted with a reserve. It was a very experienced Ground Jury and Foreign Veterinary Delegate and both Horse Inspections were performed fairly and efficiently (see Table 3). For the first inspection only two horses were held and after examination in the Holding Box both were accepted to compete. The Holding Box was nicely presented a short distance from the main trotting track and the Holding Box vet did an excellent job examining the horses and advising the Inspection Panel. For the first time ever both tracks had exactly the same surface of tarmac (asphalt) with a light dusting of sand. The horses performed well on this surface. At the second Horse Inspection 4 of the 70 horses presented were examined in the hold, but all were subsequently accepted - a tribute to the overall fitness of the horses. After cross-country day only two horses were not presented at the inspection because of lameness incurred the previous day.

	1 st Horse Inspection	2 nd Horse Inspection
No. of horses presented	75	70
No. of horses sent to Holding Box	2	4
No. of horses accepted	75	70

Table 4 - Results of Eventing Horse Inspections

The competition got off to an excellent start with some very high quality dressage. The cross country was also extremely successful and the weather was unbelievably kind. The temperature only reached about 25° Centigrade with the relative humidity of ~45% and the WBGT index between 24 and 27 (i.e. quite low). The horses warmed up well and then jumped the cross-country course impressively. The completion rate was >90% with only 3 horses failing to finish and 2 more withdrawing before the jumping phase. Only 10 falls (i.e. rider & horse falls) were recorded from all 75 horses competing and only one at the 26th fence turned out to be serious. This horse unfortunately sustained a fracture of the medial condyle of the distal femur. Despite valiant efforts to repair this at the Vet Clinic the animal had to be humanely destroyed as it recovered from general anaesthesia. The only other orthopaedic problem was a horse that also sustained a stifle injury, albeit much less serious than the first one and this horse completed the cross-country and was still apparently sound.



Figure 1 - Plan of the D-Box used for recovering the horses after cross-country

The horses finished the cross-country in good shape when being presented to the Second Veterinary Examination in the D-Box (see Figure 1). With the horses starting at 3-minute intervals a substantial number of horses were present in the box at any one time. It was necessary to have an organised system of recovering the horses that went as follows:

- a) brief clinical examination (including TPR) on entering the box. Rectal temperatures were taken with 10-second digital thermometers;
- b) aggressive cooling with plenty of water and ice while keeping the horses in one of two shade tents with misting fans;
- c) the vet checks were repeated every 10 minutes and horses were not permitted to return to the stable until a member of the Vet Commission was satisfied they had cooled sufficiently to walk the 20 minutes back to the stables.

The mean rectal temperature on entry to the box was 41.2 °C and with the cooling carried out by the teams this progressively reduced over the ensuing 30 minutes (see Figure 2). The horses were examined twice (28%), three times (60%) or four times (8.5%). The horses were hot on entering the box, but not excessively so. After only 10 minutes the mean rectal temperature had decreased by just over 0.5 °C and by 20 minutes this was down by a further 1.5 °C. The pulse and respiratory rates also decreased progressively over the 30 minute monitoring period. By this time the horses looked good clinically with normal colour mucous membranes and capillary refill time and were acceptable to walk back to the stables.

Temperature, Pulse and Respiration Rate Monitoring D-Box

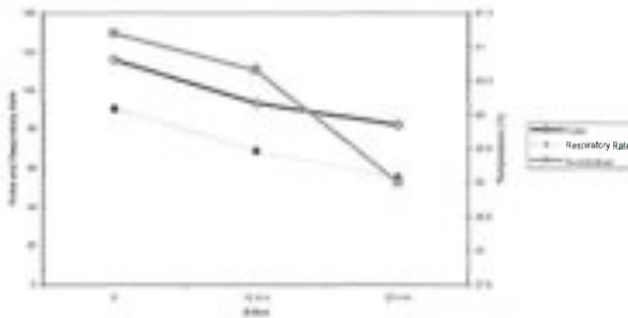


Figure 2 - Mean results of D-Box monitoring in 73 horses after the cross-country

After the cross country a number of horses were given from 10 to 30 litres of rehydration fluids by intravenous infusion to replace the fluid lost by sweating on the course. By the evening this had all been completed and the horses were left to have a quiet night.

Dressage

The Dressage competitions were of an exceptionally high standard with the Germans, Spanish and Americans taking the Team medals. The horses were all beautifully turned out for the Horse Inspection. This is the first time that only one Horse Inspection took place at an Olympics in the Dressage discipline and, of course it was held on the same hack as the ones for Eventing and Jumping. The inspection went well with 53 horses presented and only 4 being sent to the Holding Box for examination. Of these 3 were accepted and only one horse was considered unfit to compete because of a right forelimb lameness.

There were few veterinary problems apart from a transient colic soon after arrival that quickly resolved. One horse had a recurrent urticarial (i.e. allergic) skin reaction that responded to antihistamine treatment. Another horse had a nasty laceration in the mouth that unfortunately required withdrawal from the competition. In the Individual Grand Prix Freestyle Anky van Grunsven put on a dazzling display to win gold from Rusty (GER) and Beauvalais (ESP).

Jumping

All the Jumping horses arrived in good time at the venue with the exception of a Colombian horse and he was substituted by a Danish horse and arrived too late to present with the other horses at the 1st Horse Inspection. He was examined on his own on the evening before the warm-up competition. The other 76 horses were inspected and 4 were sent to the Holding Box. One horse was not accepted, but passed the re-inspection the next day.

All the jumping competitions were of a very high standard, but there were some veterinary incidents. One horse developed progressive signs of colic the day before the Horse Inspection. This was diagnosed as a colon displacement that was rectified by manipulation without resort to any medication. The horse went on to compete extremely well and even won a medal!

Another horse had an alarming and extremely acute urticarial response that concerned us for a while. However, it responded rapidly to antihistamine medication and aggressive cooling. It went on to compete in the Individual 2nd Qualifier only to land badly after the 3rd fence and sustain a strain of the superficial digital flexor tendon. In the same round another horse had a very similar injury on the opposite forelimb. Both cases were taken immediately from the arena by horse ambulance to the clinic and treated with ice, limb support and NSATDs. In the ensuing rounds of the competition there were no further problems at this fence. Examination of the footing afterwards did not reveal any abnormalities that might have predisposed the horses to injure themselves.

The Team competition under lights ended in a most exciting jump off for the silver medal between USA and Sweden. This included 3 clear rounds apiece before Sweden conceded defeat because it was impossible to make up nearly 8 seconds by their final rider.

The 2nd Horse Inspection went off very well, in fact, the horses seemed to be moving even better than at the first inspection. No horses were held and all were accepted. Another important veterinary and stewarding component of the Jumping competitions is the bandage/boot checks as the horses leave the arena. At this event random checks were made by the Veterinary Commission after the Individual 1st Qualifier, the Team Jumping Final and the Individual Jumping Final so that all horses were done at least once. The riders seemed happy to comply with the procedure and no suspicion of any hypersensitization or other abuse was found.

The Individual Jumping Final was another brilliant and exciting competition with the best 29 horses going for a final round. There was a jump-off for the silver medal between Rodrigo Pessoa on Baloubet du Rouet and Chris Kappler on Royal Kaliber. The Brazilian set a scorching pace with 49.42 seconds and 4 faults. Then Royal Kaliber was flying round and going clear, but at the large oxer, Fence 15, he seemed to put a foot wrong and landed badly, then look another step awkwardly and pulled up lame on the left forelimb. The horse was immediately splinted taken to the vet clinic for radiographic and ultrasound evaluation. It was not difficult to diagnose an acute strain of the superficial digital flexor tendon and then horse was treated accordingly. By the next morning he was bright, alert and pretty comfortable. Arrangements were being made to delay his departure for 3-4 days to ensure a safe journey home.

Final Comments

All in all this was a great Olympics – full of excitement, plenty of controversy and best of all magnificent competition. All three disciplines produced the very best performances possible. We believe that the Veterinary Team also did a terrific job and greatly assisted the smooth running of the Games.

For all the vets involved the incident in the Individual Jumping Final was a most disappointing end to the equestrian Olympics, particularly tragic for the US leant who had done so well in Athens. Questions were asked at the Press Conference after the medal ceremony, but without a full investigation into the fooling in the arena it was not possible to apportion any blame at this stage. This is a matter the FEI will need to look into with great care.

Finally it was very sad to see the loss of one really good eventer and three cases of serious lameness in the jumpers, but the other 202 horses looked great and gave of their best - well done to all concerned.

Note the authors inject emotion into the text- Such subjectivity is not appropriate in all reports, but it adds Interest here.

Letter of Transmittal

Carney Associates
18 Washington St.
Brighton, MA 02135

November 29, 2007

Ms. Jane Brennan
Director, Office of Water
Massachusetts Water Resources Authority
Charlestown Navy Yard—Building 39
100 First Ave.
Boston, MA 02129

Dear Ms. Brennan:

I am pleased to present the attached report to the MWRA Office of Water regarding the proposal that was accepted in October. As requested, this report examines the problem of urban nonpoint pollution and the associated impacts to coastal waters and determines the best pollution management program based on this information.

Because the sources of nonpoint pollution are spread out over an entire watershed, as opposed to a direct source, the need is for a program that integrates the control of pollution from each source into one comprehensive program. Through my research I have found that the control of nonpoint pollution can be best achieved through a broad-based approach called the Watershed Management Approach. The Watershed Management Approach brings together all the people involved in the problem, from homeowners to business leaders to environmental planners, who develop best management practices (BMPs) such as public education, permit programs, and water quality monitoring that tackle a community's specific watershed protection problem.

I recommend that you use the information I am presenting on the Watershed Management Approach for your handbook to be used by municipalities in Massachusetts looking to control nonpoint pollution. If desired, I will follow this report with a specific management program for any cities that show interest in my findings. Also, I received a great deal of technical support from Bill Pisano and Jim Barsanti at Montgomery Watson in Boston, a consulting environmental engineering firm that will provide any of these cities with a proposal for services related to this or any other program they are soliciting.

I thank you for the opportunity to examine this problem for your office. If there is anything you need in the future, or any questions related to the attached report, please feel free to contact me at (617) 555-1234 or via e-mail at jmcarney@aol.com.

Very truly yours,

John M. Carney

John M. Carney, P.E.
Consulting Engineer

Sample Report

Controlling Urban Nonpoint Source Pollution Using a Watershed Management Approach

by
John M. Carney

Abstract

This report examines the problem of urban nonpoint pollution and recommends a control strategy—the Watershed Management Approach—as the most effective approach for a wide variety of cities with pollution concerns. Adaptable for any community, the Watershed Management Approach requires input from all members of the community, from homeowners to business leaders and environmental planners. The program is specific to each community's situation and incorporates Best Management Practices (BMPs), which can include public education, permit programs, and water quality monitoring. This report can be used as a handbook for Massachusetts communities wishing to implement pollution control programs.

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1. Introduction to Urban Water Pollution

The nation's clean water program is at a crossroads. For about 30 years, the United States has put endless time and money into the protection of our environment, with a focus on the cleanliness of our nation's waterways. This effort included the formation of agencies at the national and regional level that developed policies and regulations to monitor discharges to waterbodies. Agencies such as the United States Environmental Protection Agency (EPA), and each state's Department of Environmental Protection (DEP) have made significant, measurable improvements to water quality since the early 1970s by controlling the discharges of municipal and industrial (point source) pollution. These discharges, which include sewage and the chemical wastes from industrial processing—for instance paper production—were very visible, and if untreated caused obnoxious kinds of pollution—odorously anaerobic (dead) water, fish kills, and aesthetic impairment of the receiving waters.

Today the challenge is controlling the other significant contributor to urban water pollution—namely, nonpoint source (NPS) pollution that results from storm runoff and is affected by nearly every kind of land use. Runoff, which is also called "excess rainfall," is the portion of rainwater or snowmelt that flows above ground surface, as opposed to groundwater, or "infiltrated rainfall," which is the portion of this water that is absorbed into the ground. Nonpoint pollution occurs when runoff sweeps over land used for agriculture, construction, forestry, urbanization, and other activities. The runoff picks up pollutants and deposits them in rivers, lakes, and coastal waters or introduces them into groundwater. Some of the pollutants are toxic to humans, but the vast majority are nontoxic or conventional (such as mineral nutrients and sediment).

This section defines the different sources of pollution, the challenges associated with controlling NPS pollution, and the development of a comprehensive solution in the form of watershed protection. Also, Section 1.2 presents an overview of the current water quality legislation in the United States.

What Is a Watershed?

The term watershed, as used in the United States, refers to a geographic area in which water, sediments, and dissolved materials drain to a common outlet, or point of discharge—a point on a larger stream, a lake, an underlying aquifer, an estuary, or an ocean. This area is also called the drainage basin of the receiving water body.

1.1 Pollution Source

Sources of pollution can be divided basically into two groups: natural and cultural (those caused by man). The sources can be further classified as either point or diffuse (nonpoint) sources of pollution.

- Point sources enter the pollution transport routes at discrete, identifiable locations and usually can be measured directly or otherwise quantified. Because they are easily quantified, their impact to the environment can be evaluated directly. Major point sources include effluent, or waste discharge, from industrial and sewage treatment plants, and effluent from farm buildings or solid-waste disposal sites.
- Pollution from nonpoint sources can be related to weathering of minerals, erosion of virgin lands and forest including residues of natural vegetation, or artificial or semi-artificial sources. These last two artificial sources can be directly related to human activities such as fertilizer and pesticide application, erosion of soil materials from agricultural lands and animal feedlots, construction sites, transportation, accumulation of dust and Litter on impervious (paved or otherwise covered) urban surfaces, and others.

Besides the sewage and industrial wastewater discharges and erosion from agricultural lands or urban areas, many other activities can cause pollution. The cutting down of a forest results in a loss of protective cover and exposes soils, thus causing increased surface runoff and erosion during rain events. The sediment produced by land erosion can be classified as a pollutant. Sediment interferes with fish spawning and hatching because it can cover gravel beds and block light penetration, making food harder to find. Sediment can also damage the fishes' gill structures directly, by clogging the passage of water through oxygen-absorbing membranes.

There are several general characteristics that describe NPS pollution:

- NPS source discharges enter surface waters in a diffuse manner and at intermittent intervals that are related mostly to the occurrence of meteorological events (storms).
- Pollution arises over an extensive area of land and is in transit overland before it reaches surface waters.
- NPSs generally cannot be monitored at their point of origin, and their exact source is difficult or impossible to trace.
- Elimination or control of pollutants must be directed at specific sites.
- In general, the most effective and economical controls are land management techniques and conservation practices in rural zones, and architectural design control in urban zones.

As mentioned, the control of point sources has been achieved with increasing success, and nonpoint sources are becoming the focus of environmental policy-makers. There exists a problem with NPS pollution in both the rural and urban settings, and the specific sources contributing to the pollution in both cases are outlined below.

1.1.1 Rural (Nonurban) Nonpoint Sources

The rural sources are mostly related to agricultural activities. Agricultural pollutants have their origin in fertilizer use and pesticide applications, and generally the primary causes are agricultural methods of distributing soils by tillage (agricultural lands) and logging (forest land). Several other factors also affect pollution loading: soil type, climate, management practices, and topography of

the land. Land uses that produce the most pollution per unit area are animal feedlot operations and fanning on steep slopes. Forested lands and pastures, on the other hand, produce the least amount of pollution—that is, approaching background levels, which are pollutant levels produced by natural processes. The impact of pollution on receiving waters depends on the distance of the source from the nearest concentrated flow (stream) and on the processes taking place during the overland flow phase of the pollutants' transport (such as UV light absorption from sunlight interacting with organic compounds in fertilizer).

1.1.2 Urban Nonpoint Sources

Urbanization and related hydrologic modifications, such as the installation of storm sewer piping, may cause increased pollution loadings that are significantly above the original or background levels. The specific impacts of urbanization to a watershed will be discussed in detail in Section 2 of this report. The source of urban nonpoint pollutants varies considerably, ranging from urban bird and pet populations, street litter accumulation, tire wear of vehicles, abrasion of road surfaces by traffic, street sailing practices, and construction activities. Urban NPS pollution may contain many dangerous contaminants, which also will be discussed in detail in Section 2.

The primary factor in the variance of urban NPS pollution involves the use of land. Three basic urban land uses exist: residential, commercial, and industrial. Such categorization, however, is loose and can hardly be correlated with pollution generation. For example, residential areas can range from low-density, relatively "clean" residential suburban zones with 1 or 2 houses/acre, to high-density, congested urban centers with several hundred people residing on an area of 1 acre. Similarly, industrial zones can include "clean" light manufacturing as well as "dirty" heavy industries such as foundries, refineries, and mills. Obviously, the highest levels of pollution are produced in high-density residential areas and areas of heavy industrial activity.

1.2 Nonpoint Source Pollution—The Challenges

Nonpoint pollution is a major cause of our remaining water quality problems. Agricultural sources of pollution contribute to water quality impairments in 72% of assessed rivers, 56% of assessed lakes, and 43% of assessed coastal waters. Urbanization, including both urban runoff and storm sewers, contributes to water quality impairments in 11% of rivers, 24% of lakes, and 43% of coastal waters (EPA, 1996). Figure 1 lists the leading sources of water quality impairments for each of these three surface water types.

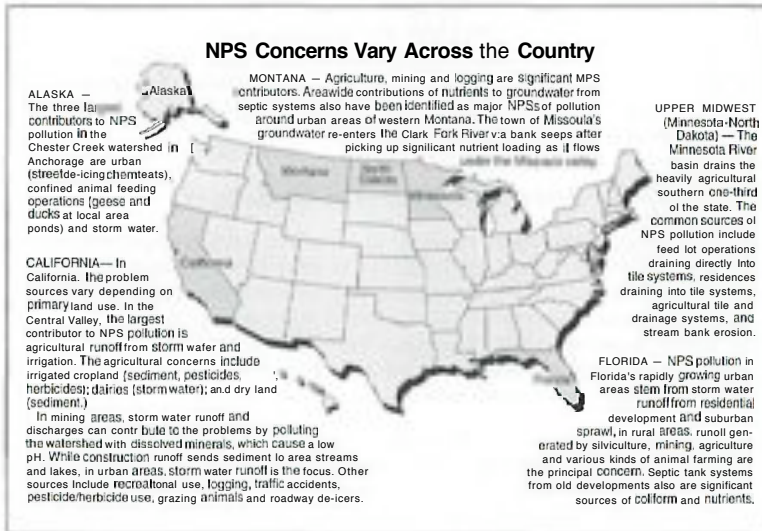
This report will focus only on the control of urban NPS pollution, though it mentions the other contributors often. An understanding of all contributors to water pollution is necessary to control a problem which is spread out over a large area, and varies in specific geographic regions of the country. Figure 2 defines different NPS concerns across the U.S.

The U.S. has had some dramatic successes in reducing NPS pollution to specific waterbodies. However, the country has yet to devise an NPS management program that both responds adequately to the large, national scale of the problem and has broad political support.

Figure 1: Sources of water quality impairments in rivers, lakes, and coastal waters (EPA, 1996)

Leading Sources of Water Quality Impairment Related to Human Activities			
Rank	Rivers	Lakes	Estuaries
1	Agriculture	Agriculture	Industrial dischargers
2	Municipal point sources	Unspecified non-point sources	Urban runoff/storm sewers
3	Hydrologic modifications	Atmospheric deposition	Municipal point sources
4	Habitat modification	Urban runoff/storm sewers	Upstream sources
5	Resource extraction	Municipal point sources	

Figure 2: Regional nonpoint source pollution concerns (EPA, 1996)



Defining the problem and developing cost-effective solutions is difficult. As the term nonpoint implies, these sources are spread out, cross many jurisdictional boundaries, and are complicated due to the intermittent nature of wet weather discharges. Therefore, there is no single, magic solution to the problem of controlling urban stormwater pollution. The goal of this report is to convince

environmental policymakers at the local, state and federal level that our best hope is to weave together several **different** types of pollution control efforts through a Watershed Management Approach. The Watershed Management Approach is built on three main principles:

1. The **target** watersheds should be those where pollution poses the greatest risk to human health, ecological resources, desirable uses of water, or a combination of these.
2. All parties with a stake in the specific local situation (called stakeholders) should participate in analysis of problems and creation of solutions.
3. The actions undertaken should draw on the full range of methods and tools available, integrating them into a coordinated, multi-organization attack on the problems.

Figure 3 illustrates the interconnection of these three key elements: risk-based targeting, stakeholder involvement, and integrated solutions.

1.3 Overview of the Clean Water Act

In 1972, Congress enacted the first comprehensive national clean water legislation in response to growing public concern for serious and widespread water pollution, appropriately called the Clean Water Act. The primary objective of the CWA is to restore and maintain the integrity of our nation's waters. This objective translates into two fundamental goals:

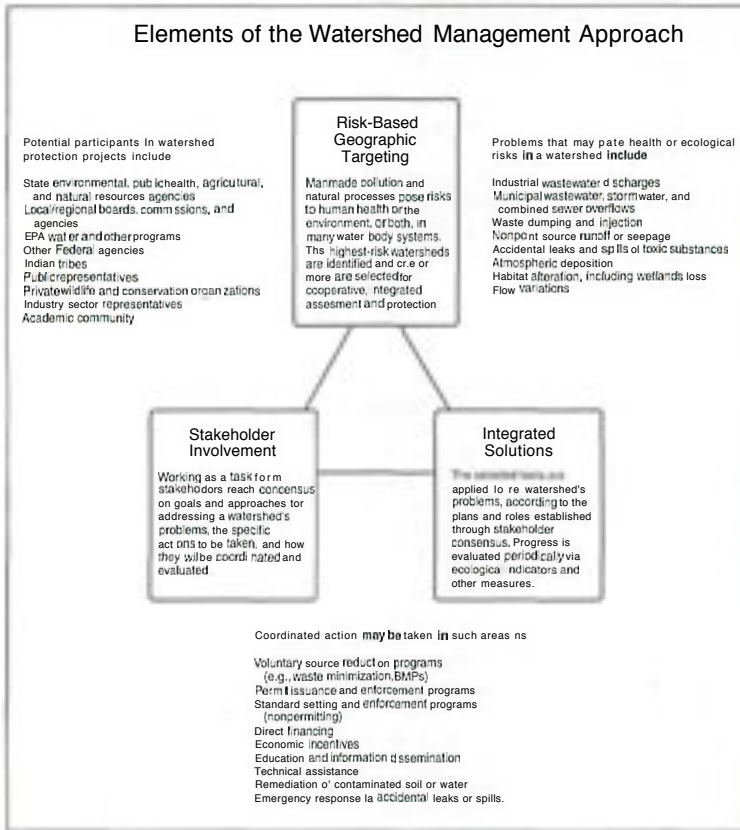
- Eliminate the discharge of pollutants into the nation's waters.
- Achieve water quality levels that are fishable and swimmable.

The motivation for these objectives was pure necessity. Lake Erie was dying. The Potomac River was clogged with blue-green algae that were both a nuisance and a threat to public health. Many of the nation's rivers were little more than open sewers and sewage frequently washed up on shore. Fish kills were a common sight, and natural wetlands were disappearing at a rapid rate. During the 1970s and 1980s, those problems were addressed through implementation of the National Pollutant Discharge Elimination System (NPDES) program, which focuses primarily on point sources of pollution. As pollution from "traditional" point sources was reduced, it became clear that the remaining pollution in most rivers, lakes, and other waters was the result of NPS discharge in stormwater systems.

Realizing that NPS pollution needed to be addressed on a national level, Congress established the National Nonpoint Source Program in 1987 when it enacted the CWA amendments of that year. The amendments included a new section (Section 319) that considerably strengthened the states' capacity to respond to NPS pollution. Section 319 established a three-stage program whereby states

- **conduct statewide assessments of their waters** to identify those that are impaired (that do not fully support state water quality standards) or threatened (that presently meet water quality standards but are unlikely to continue to meet water quality standards fully) because of NPS pollution;
- **develop NPS management programs** to address the impaired or threatened waters identified in the nonpoint assessments; and
- **implement their EPA-approved NPS management programs** to support their implementation efforts.

Figure 3: Elements of the Watershed Management Approach (EPA, 1999)



EPA has now approved assessments and management programs for all states and U.S. territories, and most states are now reviewing and improving their NPS management programs as resources and funding are constantly increasing.

With the Clean Water Act providing a framework for how to approach the water quality problems associated with NPS pollution, we can look more closely at the specific impacts of urbanization on the water environment, and the resulting increase in pollutant loadings to receiving waters.

2. Urban Nonpoint Source Pollution

The prevention and control of urban NPS pollution poses a distinctive challenge to the environmental manager. Increasing water quality problems and degraded coastal resources point to the need for comprehensive solutions to protect and enhance coastal water quality. This section presents the impacts of urbanization

on NPS pollutant loadings to coastal waters, as well as the effects of the pollutants on the coastal ecology.

2.1 Urbanization and Its Impacts

The negative impacts of urbanization on coastal and estuarine waters has been well documented, and can be attributed to the fact that mankind tends to rely heavily on coastal resources. Urbanization first occurred in coastal areas, and this historical trend continues. Approximately 80 percent of the nation's population live in coastal areas (Lampe, *at al*, 1996). During urbanization, previous open spaces, including vegetated and open forested areas, are converted to land uses that usually have increased areas of impervious surfaces, which are surfaces that do not allow for water to permeate. With a lower rate of permeation, this results in increased runoff volumes and pollutant loading because the polluted water is unable to enter the ground where it can undergo a natural dispersion and filtration process. Urbanization typically results in changes to the physical, chemical, and biological characteristics of the watershed. For example, natural undulations that would temporarily pond water are graded to a uniform slope, increasing the volume of runoff during a storm event. As population density increases, there is a corresponding increase in pollutant loadings generated from human activities. These pollutants typically enter surface waters (such as ponds and streams) via runoff without undergoing treatment.

The development of an urbanized watershed has significant effects on both the hydro logic and water quality characteristics of the surrounding environment. These changes are discussed in the following sections.

2.1.1 Changes in Hydrology

As urbanization occurs, changes to the natural hydrology of an area are inevitable. Hydrologic and hydraulic changes occur in response to site clearing, grading, and the addition of impervious surfaces and maintained landscapes. Most problematic are the greatly increased runoff volumes and the ensuing erosion and sediment loadings that accompany these changes to the landscape. Uncontrolled construction site sediment loads have been reported to be on the order of 35 to 45 tons per acre per year (EPA, 1996). In comparison, sediment loadings from undisturbed woodlands are typically less than 1 ton per acre per year (EPA, 1999).

Hydrologic changes to the watershed are magnified after construction is completed. Impervious surfaces, such as rooftops, roads, parking lots, and sidewalks, decrease the infiltrative capacity of the ground (ability to absorb water) and result in greatly increased volumes of runoff. Elevated flows also necessitate the construction of runoff conveyances (pipes, channels, etc.) or the modification of existing drainage systems to avoid erosion of stream banks and steep slopes. Changes in stream hydrology resulting from urbanization include the following (EPA, 1998):

- Increased peak discharges compared to predevelopment levels;
- Increased volume of urban runoff produced by each storm in comparison to predevelopment levels;

- Decreased time needed for runoff to reach the stream, particularly if extensive drainage system improvements are made;
- Increased frequency and intensity of flooding;
- Reduced streamflow during prolonged periods of dry weather due to reduced level of infiltration in the watershed (lower groundwater table);
- Greater runoff velocity during storms due to the combined effects of higher peak discharges, rapid time of concentration, and the smoother hydraulic surfaces that occur as a result of development

Figures 4 and 5 illustrate the changes in runoff characteristics resulting from an increasing percentage of impervious areas. Other physical characteristics that are affected by urbanization include the total volume of watershed runoff baseflow, flooding frequency and severity, channel erosion and sediment generation, and temperature.

Figure 4: Changes in runoff flow resulting from increased impervious area (EPA, 1992)

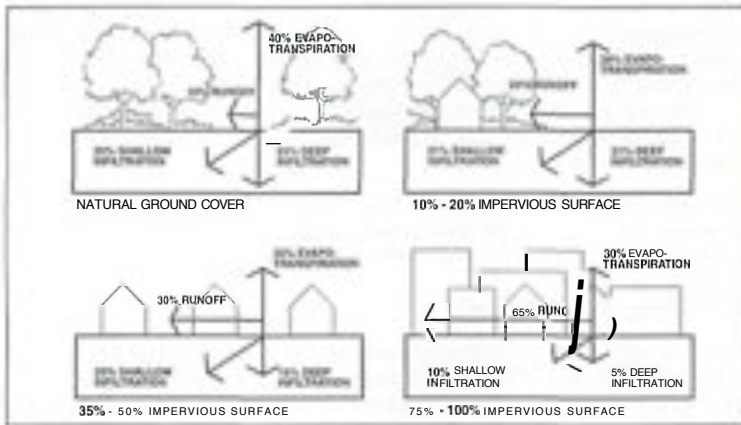
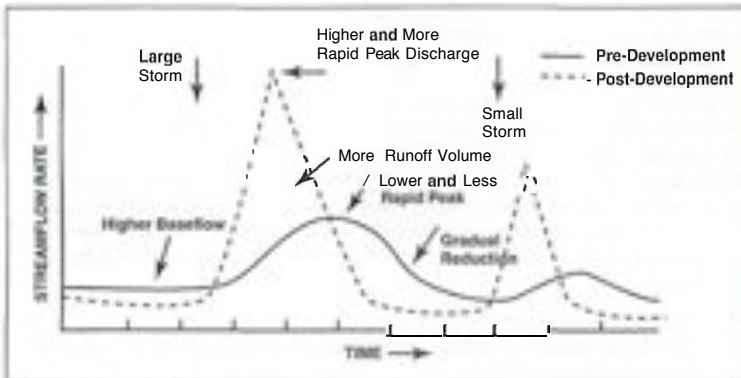


Figure 5: Changes in stream hydrology as a result of urbanization (EPA, 1992)



2.1.2 Changes in Water Quality

Urban development also causes an increase in pollutants. The pollutants that occur in urban areas vary widely, from common organic material to highly toxic metals. Some pollutants, such as insecticides, road salts, and fertilizers, are intentionally placed in the urban environment. Other pollutants, including lead from automobile exhaust and oil drippings from cars and trucks, are the indirect result of urban activities. The major pollutants found in runoff from urban areas include sediment, nutrients, oxygen-demanding substances (e.g., microorganisms), road salts, heavy metals, petroleum hydrocarbons, pathogenic bacteria, and viruses.

2.2 Nonpoint Source Pollutants and Their Impacts

The following discussion identifies the principal types of pollutants found in urban runoff and describes their potential adverse effects.

- **Sediment:** Suspended sediments constitute the largest mass of pollutant loadings to surface waters. Sediment has both short- and long-term impacts on surface waters. Among the immediate adverse impacts of high concentrations of sediment are increased turbidity (a measure of light transmission through water), reduced light penetration and decreases in submerged aquatic vegetation (SAV), impaired respiration of fish and aquatic invertebrates, and impairment of commercial and recreational fishing resources. Heavy sediment deposition in low-velocity surface waters may result in smothered reef systems, increased sedimentation of waterways, changes in the composition of bottom substrate (seafloor or riverbed), and degradation of aesthetic value. Additional chronic effects may occur where sediments rich in organic matter or clay are present.
- **Nutrients:** The problems resulting from elevated levels of phosphorous and nitrogen are a result of activities related to agriculture and are therefore not discussed in detail regarding urban areas. Excessive nutrient loading to marine ecosystems can result in eutrophication (algae growth), and depressed dissolved oxygen (DO) levels due to elevated phytoplankton populations. Surface algal scum, water discoloration, and the release of toxins from sediment may also occur.
- **Oxygen-demanding substances:** Proper levels of DO are critical to maintaining water quality and aquatic life. Decomposition of organic matter by microorganisms may deplete DO levels and result in the impairment of the waterbody. Urban runoff with high concentrations of decaying organic matter can severely depress DO levels after storm events.
- **Pathogens:** Urban runoff typically contains elevated levels of pathogenic organisms, or disease-causing organisms. The presence of pathogens in runoff may result in waterbody impairments such as closed beaches, contaminated drinking water sources, and shellfish bed closings. Onsite disposal systems (OSDS) such as septic tanks and leaching beds are a significant source of pathogen contamination. OSDS-related pathogen contamination has been implicated in a number of shellfish bed closings.

- **Road salts:** In northern climates, road salts can be a major pollutant in urban areas. Snow runoff over salted roads produces high salt/chlorine concentrations at the bottom of ponds, lakes, and bays. Not only does this condition prove toxic to living organisms, but it also prevents crucial vertical spring mixing of fresh waterbodies, a process that is vital to the ecological cycle in cold-weather climates.
- **Hydrocarbons:** Petroleum hydrocarbons are derived from oil products, and the source of most such pollutants found in urban runoff is vehicles' engines that drip oil. Many do-it-yourself auto mechanics dump oil directly into storm drains, unaware or oblivious to the effects of their actions. Concentrations of petroleum-based hydrocarbons are often high enough to cause mortalities in aquatic organisms.
- **Heavy metals:** Heavy metals are typically found in urban runoff. For example, the EPA (1998) reported on a study in the Chesapeake Bay that designated urban runoff as the source of 6 percent of the cadmium, 1 percent of the chromium, 1 percent of the copper, 19 percent of the lead, and 2 percent of the zinc. Heavy metals are of concern because of toxic effects on aquatic life and the potential for groundwater contamination. Copper, lead, and zinc are the most prevalent NPS pollutants found in urban runoff. High metal concentrations may bioaccumulate in fish and shellfish and impact beneficial uses of the affected waterbody, such as edibility of the seafood.

2.3 Other Impacts

Other impacts not related to a specific pollutant can also occur as a result of urbanization. Temperature changes result from increased flows, removal of vegetative cover, and increases in impervious surfaces. Impervious surfaces act as heat collectors, heating urban runoff as it passes over the impervious surface. Recent data indicate that intensive urbanization can increase stream temperature as much as 5 to 10 degrees Celsius during storm events (Lampe, *et al.*, 1996). Thermal loading disrupts aquatic organisms that have finely tuned temperature limits.

The salinity (sodium content) of estuaries can also be affected by urbanization. Freshwater inflows due to increased runoff can impact estuaries, especially if they occur in pulses, disrupting the natural salinity of an area. Increased impervious surface area and the presence of stormwater conveyance systems commonly result in elevated peak flows in streams during and after storm events. These rapid pulses or influxes of fresh water into the watershed may be 2 to 10 times greater than normal (EPA, 1999). This can lead to a decrease in the number of aquatic organisms living in receiving waters.

The impacts described in this section combine to define the overall effects of urbanization and the resulting pollution that is introduced into the environment as a result of these changes. If addressed individually, these impacts would force regulators to develop programs to protect the integrity of each resource, while still maintaining broad environmental goals. The regulation of these problems would be vastly expensive and would impinge on traditional community prerogatives, such as land use and economic development. Governments at all levels, therefore, must broaden their outlook on water quality protection, seeking

nonconventional, cost-effective ways to address the remaining problems. The Watershed Management Approach, if implemented properly, integrates several challenges of water quality enhancement and is described in detail in the following section.

3. Watershed Protection Planning and Program Integration

When land within a watershed is changed from its natural state to agricultural land and then to urban land, many complex interconnected changes occur to the natural systems within the watershed. These changes can and do have profound effects on the health of these systems as well as their inhabitants. As discussed in Section 2, one of the greatest changes is the alteration of the watershed's hydrology, especially the infiltrative capacity of the land. Additionally, the everyday activities of humans within the watershed add many potential environmental contaminants to the watershed that can be easily transported by precipitation and runoff

Managing stormwater and nonpoint sources of pollution present many complex challenges to the water resources manager that are somewhat unique and quite different from those encountered when managing traditional point sources of pollution. These challenges include (EPA, 1999):

- Integrating land-use management, because change in land use creates the **stormwater** problems.
- Educating the public about how everyday activities contribute to the stormwater/nonpoint source problem and how they must be part of the solution.
- Developing a management framework that is based on the fact that "we all live downstream" and that stormwater flows are not constrained by political boundary lines. These both point to the need for partnerships between communities, because of the inherent connections between ecosystems.
- Obtaining the cooperation and coordination of neighboring political entities that exist within a watershed.
- Not only managing stormwater from new development but retrofitting existing "drainage systems" that were built solely to convey runoff away from developed lands to the nearest body of water as quickly as possible.

Implementing a watershed management approach helps to overcome all of these challenges and, **just** as importantly, allows inclusion of planning efforts that can prevent problems in the future. This allows for more extensive use of less expensive nonstructural management practices, which are basically nonengineered applications that do not require construction of infrastructure.

3.1 Development of Watershed Management Goals and Objectives

An effective method to review site development is to first consider what the overall watershed management objectives are. One place to start looking for this type of **information** is within existing state water quality standards. Water quality standards give numerical values and narrative descriptions for various pollutants,

at levels that are protective to human and biological health, and assign designated uses for the resource. A management approach can consist of a review of the existing and potential designated uses for the resources within the watershed and can attain or preserve these uses. In addition, local agencies may have developed management objectives through such mechanisms as watershed protection districts, which provide differing restrictions on land use based on the proximity to the watershed.

A simple hierarchy of management objectives has been presented by the EPA (1999), which consists of the following:

- Reducing increases in pollutant loading and concentration
- Reducing the severity of impacts of pollutant loading and urbanization
- Addressing specific pollutants
- Protecting sensitive areas
- Controlling floods
- Restoring the area

3.2 Development of Recommendations for Mitigation

After consideration has been given to the degree to which changes in water quality, hydrology, and habitat alterations potentially affect the watershed and the site and after management goals and objectives have been identified, it is necessary to develop management strategies that mitigate impacts to the level desired. This is accomplished through the use of mitigation techniques, commonly referred to as Best Management Practices, or BMPs. These practices can take the form of engineered practices, called structural BMPs, or nonengineered practices, called nonstructural BMPs. BMPs can be implemented on a site-specific basis and on a regional or watershed basis.

In selecting BMPs for a site, it is important to consider (1) how the BMPs will function as a system; and (2) how the practice will meet watershed- and site-specific management objectives, such as pollutant load and concentration reduction, control of *storm runoff* volumes, and provision of habitat. These two considerations are detailed in the following subsections.

3.2.1 Best Management Practice Systems

Structural and nonstructural BMPs differ in their design, limitations, and optimal applicability. While some BMPs are implemented to provide a primary objective, secondary mitigation and benefits are also commonly provided. For example, a wet detention pond optimally focuses to improve water quality through pollutant load reduction but can also function to balance water hydrology and provide habitat. BMPs can be grouped into discrete functional units that address different aspects of stormwater management. These units are pollution prevention, runoff attenuation, runoff conveyance, and runoff treatment. These units, taken together, form the BMP system of watershed protection. The BMPs selected to meet watershed- and site-specific goals generally will be from all of these functional units, as described below:

- Pollution prevention: An effective approach to managing pollutants in urban settings is to prevent or reduce the potential for pollutant loading.

Many of the pollution prevention practices are referred to as nonstructural BMPs. These practices can include such activities as public education, zoning ordinances, site planning procedures, restricted use policies, and overlay districts.

- **Runoff attenuation:** One of the most effective ways to manage stormwater flows is to prevent and reduce them. Much of this can be accomplished through a reduction in site impervious cover. Reduction in impervious cover allows for increased infiltration. Other practices that attenuate runoff are drywells, depression storage, and appropriately placed infiltration trenches. Implementing these practices reduces the other impacts of development by reducing runoff volume, flood occurrence, pollutant loads and concentrations, and stream degradation.
- **Runoff conveyance:** Runoff conveyance systems serve to transport the storm flows from the point of origin to the runoff treatment system. Runoff conveyance systems can allow for limited treatment levels, as in the case of grassed swales with check dams and infiltration devices. Other conveyance systems for stormwater include structural elements, such as pipes with (low splitters).
- **Runoff treatment:** Runoff treatment practices are devices designed to treat stormwater runoff and remove pollutants through a number of processes, including adsorption, transformation, and settling before entry to the resource area. Treatment devices are considered the **final component** of the BMP system. Some familiar treatment devices include detention, retention, and infiltration.

Several additional issues need to be considered when developing recommendations for practices. Among these are acceptance of practices by landowners and the aesthetic quality of the practices. Although these issues seem minor, disgruntled landowners can inhibit implementation of effective long-term management programs. A frequently overlooked but critical consideration for stormwater management is the development of long-term maintenance and financing programs. BMPs, once installed, require upkeep and periodic repairs. Long-term urban runoff management programs require a commitment to maintain technical and program support staff.

3.2.2 Achieving Objectives and Meeting Watershed and Site-Specific Needs

To develop a management strategy, it is important to integrate watershed needs with site-specific needs. The simplest approach is to first consider the broader watershed needs and then "work in" site-specific needs around them. Examples of broad watershed management needs are protecting public water supplies, river corridors, wetland areas, and wildlife habitat. To address these needs, management practices, such as no construction/no disturbance buffer zones for protected areas, creative site layout practices, and site disturbance limitations may be utilized. On the site level, with broader watershed practices, incorporated, more specific needs can be addressed. Examples of site-specific needs are preventing or managing soil losses, lowering the postdevelopment discharge rate and volume, and reducing pollutant loads from the site. To address these needs, management practices such as developing and implementing a preventive soil

erosion control plan, and installing items such as temporary sediment basins, silt fences, and native plant species may be utilized.

It is important to remember that a combination of BMPs is often necessary to achieve desired objectives. No one single practice will provide all necessary mitigation or benefits.

3.3 Benefits of Watershed Planning

There are several benefits of the watershed planning approach, with both environmental and economic advantages. The most obvious benefit realized from a watershed management approach is the installation of BMPs to mitigate water management issues before serious problems result. Advance planning saves valuable resources at the state and local levels, which could be used in other areas. Economies of scale can also be realized as a result of the watershed approach. When installing regional practices, larger areas within the watershed can be treated on a per unit area cost basis, which reduces the costs to each stakeholder. Watershed planning can also eliminate restoration costs involved in development by examining the surrounding area proposed for development. Most restoration costs are associated with damage off site and downstream by runoff and sedimentation. As emphasized earlier, the amount and velocity of runoff flowing off site can cause severe erosion of streambanks and watercourses. With preliminary runoff control measures, much downstream and offsite damage can be prevented and controlled.

4. Conclusions and Recommendations

Significant reductions in urban nonpoint pollution can occur only when effective treatment, management tools, strategies, and programs have been fully developed and implemented. Given the clearer picture of the nature and scope of the problem, we can better understand how the pieces will fit together. Nonetheless, effective efforts will require time, patience, and cooperation. All governments, agencies, and organizations dealing with the issue of urban NPS pollution must work together to develop the technology necessary for a nationally comprehensive urban NPS control program. This development of technology is best undertaken using the comprehensive Watershed Management Approach described in this report.

I recommend the Watershed Management Approach to any urban community with a desire to reduce pollutant loadings to their waterways. Although this report focused on the use of the Watershed Management Approach for the control of nonpoint source pollution, the basic program structure can also be adjusted to combat point source water pollution, air pollution, and hazardous waste management. Community leaders need to stress planning as the key to reducing pollution in our world, because oftentimes the effects of our activities take several years to appear as pollution. The tools for a successful program are here; it is now up to the environmental manager to apply the tools to their specific problem.

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Allen Johannessen*Technical Consultant*

PROFILES IN PRACTICE

Proposing Fairly

One of the hardest parts of proposal writing is being completely fair to all parties. It's usually not a question of the writer trying to deceive the client, according to Allen Johannessen, whose career has included all stages of proposal preparation covering a wide range of technologies and budgets. "The hardest part is responding to details early in a project," when fine points may not yet be known, Johannessen says. "The signing of a contract is going to be based on your response."

He counsels honesty. "Don't lie to customers to get the business. Include as much detail as you can, especially regarding costs." Johannessen recommends supplying tentative estimates, labeled as such, if costs are uncertain. At the same time, writers must be fair to their companies and not make promises that can't be kept. "Don't pin yourself to the wall," he warns. "The customer may do that for you."

Johannessen makes useful distinctions about various types of contractual documents. He points out **that** when responding to a request for proposal (RFP), there may be room for uncertainty. Using phrases like "information not available" when you don't know something is acceptable, and if you must say no to a part of the RFP, the phrase "not planned at this time" leaves the door open to further negotiation. Later, responding to a request for quote (RFQ), requires real numbers and extremely precise writing. Information for an RFQ will essentially be part of the contract. Sometimes, Johannessen laughs, "the fine art of weasel-wording comes into play."

According to Johannessen, proposal writing is not getting any **easier**. "New technology is what's really hard," he says. When it comes to costs and schedules, "It's hard to know, and you have to leave yourself some room." "The key is to give as much information as possible," Johannessen says, to earn not only the customer's favor but the quality that truly wins contracts, the customer's trust.

GUIDELINES Using Graphics Appropriately in Proposals

- Use graphics to tell a story. Each visual must have a message or convey information directly related to the surrounding text.
- Adjust the size of your graphics so that they are appropriate for the page layout.
- Include at least one graphic in every section.
- Adjust the ratio of text and graphics to the audience and the situation. Subject matter experts will need fewer graphics than nonexperts.
- Keep graphics simple. Unnecessary explanations or complicated material within the graphic makes it hard for readers to get the main idea easily and with impact.
- Write captions for all graphics. Without captions, the interpretation of the graphics is left up to the readers.

Internet Resources for Chapter 14

Online Technical Writing: Proposals

<http://www.io.com/~hcexres/textbook/techreps.html>

A detailed summary of the proposal writing process, this site discusses the many situations that call for proposals and the different forms that proposals can take.

Guide for Writing a Funding Proposal

<http://www.learnerassociates.net/proposal/>

Written by Joseph Levine at Michigan State University, this online guide for proposal writing provides writing tips for writing each section of the proposal. Writing samples of each section are also provided.

Grant Proposal Guide from the National Science Foundation

http://www.nsf.gov/pubs/2002/nsf022/nsf0202_2.html

Take a look at this thorough guide for the preparation and submission of proposals for the funding of science research.

Ethos: Character and Ethics in Technical Writing

<http://www.nmt.edu/~cpc/ethos.html>

This interesting discussion of ethos in technical communication by Charles P. Campbell, from the New Mexico Institute of Mining and Technology.

Proposals come in all shapes and sizes: long formal ones in response to requests for proposal (RFPs), short informal ones within an office, requests for funding, bids on jobs, sales proposals, and so on. The one thing they have in common is that all of them are marketing tools designed to sell goods, services, or ideas to someone who has the power to say "no." In fact, most proposals are competing with other proposals, increasing the pressure on writers to catch an audience's attention and ultimately win the bid. Your job as a proposal writer is to convince readers to say "yes" to the quality of what you or your company offers.

An Overview of Proposal Writing

The classic definition of marketing is that marketeers need "to fill a need or create one." If proposal writing is a form of marketing, successful proposal writers think of themselves as filling an audience's needs or creating a desire for the product they're selling. Proposal writers must also understand the conventions of the type of proposal they're writing, know their competition, and know how to persuade the audience of the value of one proposal over another. Although the basic components of a proposal may be the same across the board, the nuances of the writing and the packaging of the material can vary widely and are often what win the day.

As always, the best proposals begin with a good plan.

Planning and Researching

The proposal planning process is extensive in companies whose livelihoods depend on winning contracts (such as aircraft manufacturers, computer networking equipment manufacturers, consulting engineering firms, and so forth). If you are writing a proposal for the first time, the sheer magnitude of the corporate process may seem intimidating, but it can be scaled down to apply to individuals as well. The first step is to do the initial research necessary to know your purpose and understand your audience so that you can develop a strategy.

Determining Your Purpose

Your main purpose when writing a proposal is to propose a solution to a problem. Whether the audience has expressly asked for proposals for solving a problem they recognize, or whether you have identified a problem for the audience and are proposing a solution, the basic point is the same: you are proposing a solution you want the audience to adopt. Table 14.1 shows typical kinds of proposals, their audiences, and their purpose.

As you can see from Table 14.1, the kinds of proposals that writers may be asked to draft are extremely varied. In some instances, the individual is writing alone; in others, companies employ specialists who work in teams to write the proposals. Large proposals are usually written by teams of five or more writers, medium-size proposals are written by teams of two to five writers, and small proposals by one or two. (For information on how to work in collaborative writing teams, see Chapter 6.) The large documents are usually in response to an RFP or are following strict guidelines from the funding agency, while the smaller documents may be unsolicited proposals or documents written in response to a memo, an e-mail, or a phone call request.

Because the costs for most goods and services are usually about the same, the most successful proposals win because they sell "value added"—something special about you or your company—beyond just the price. Even if you are writing a smaller proposal for your professor or supervisor, look for ways to show value added in your proposal.

Table 14.1

Types of Proposals

Proposer	Target Audience	Requesting
Engineering firms	Large corporations	Contract to design, build, or reconfigure something
Scientists	Government or corporations	Funding for research laboratories and materials
Academic institutions	Charitable trusts, corporations, other large agencies	Funding for new programs, buildings, equipment
Manufacturing firms	Business, industry, government	Contract to supply equipment
Nonprofit corporations	Government or trusts	Funding for operations
Employees	Supervisors	Permission to begin new projects or gain promotions
Students	Professors	Permission to pursue research for papers, theses, dissertations

Tip: *The requirements are usually stated clearly in the RFP. Occasionally the RFP is poorly written and you will have to decipher what the requirements are. In such instances, it is best to call the company that released the RFP to check the required elements.*

Analyzing Your Audience

Before you begin writing, you need to know exactly what your audience wants. Remembering the concept of "filling a need or creating one," your first step should be to identify the customer's or funding agency's needs by carefully reviewing the RFP or other form of request. Reviewing the document to assess requirements can take a substantial amount of time, whether the RFP is a large document (some government and commercial RFPs are 200 pages or more) or a small one. A good way to get yourself or your team organized in this planning stage is to develop a **compliance**

checklist (Figure 14.1). Simply defined, a compliance checklist is a grid that lists all of the requirements in the order they are presented in the RFP.

Preparing a compliance checklist enables you to turn organizing and responding to RFP or other proposal submission requirements into manageable tasks. It also reduces the risk that you will miss or fail to address one or more of the requirements. When you develop the actual proposal, you should keep a running tab on the checklist, checking off the items as you respond to them in the proposal. As you prepare the compliance checklist, keep the following guidelines in mind:

- Follow the order of the requirements listed in the RFP.
- Use the customer's or funding agency's terms, even if they are not the best ones.
- Begin each item with an action verb (such as "provide," "deliver," "address").

Once you have created your checklist and have a firm grasp of the requirements, the next step is to cull from that list the audience's real needs. What do they actually

Figure 14.1

Compliance Checklist for Request for RFP

RFP Section	Requirement	Proposal Section
Section 6	Address these areas:	
	—General information	I
	—Services	II
	—Methodologies	III
	—Security	IV
	Include our vision of an overall solution	I.A.I
	Provide customized technology	I.A.I
	Deliver personalized service	II.A.2

want done? How quickly? What are the hidden agendas that will make a difference if addressed? (For example, if you know that the client or funding agency has a history of accepting proposals that are favorable to environmental issues, you can specifically speak to those issues in your proposal.)

During this planning phase, be sure to think of the tangible and intangible features and benefits the client needs. (For example, will the client benefit from better community relations or gain greater positive visibility as a result of this project?) All the respondents to the RFP will promise the tangible goods requested, or they wouldn't bother to submit a proposal. It's addressing the *intangible* elements that will set your proposal off from the others. These client needs, known as key issues, should be written down in a form that you can review—or that can be reviewed by everyone on the project team—on a storyboard (see Chapter 1, pp. 19-21) or on an online grid that can be e-mailed to the entire team. When everyone agrees that the key issues are on target, you're ready to develop a strategy for convincing the customer or client that you can understand those issues better than anyone else.

Considering Multiple Audiences Almost all proposals are read by several people and most of them want different things from the document and read different parts of it. Writers who know this fact can plan ahead for the various kinds of readers and include what each needs in the parts they are likely to read.

There are three types of proposal readers:

- *Decision makers:* They read the executive summary and are looking for an overview of the offer and the bottom-line benefits; they ask, "Why you?"
- *Users:* They read the executive summary and sections of particular pertinence to their jobs; they ask, "What does it do for me?"
- *Technical experts:* They read the technical sections and ask, "How does it work? Can you prove it?"

In large proposal submissions, a fourth type of reader may be present: attorneys and other administrators whose job it is to ensure that the proposal complies with all of the RFP requirements. Be certain that you have completed all of the appropriate forms and have paid close attention to details. Your detailed compliance checklist should be of great help to you in preparing for this type of reader.

Many proposal writers take the time in advance to find out who will be reading what they submit and tailor appropriate sections accordingly. When such research is not possible, use your best judgment about including answers for questions raised by all types of readers. If the overall proposal connects specifically with the various audiences, its chances of winning are much stronger.

Developing Themes

Determining an effective strategy for connecting with your audience means that you need to decide in advance what story you want your proposal to tell. All

documents tell some sort of story, and proposals are especially good vehicles for storytelling because they are often narrative in their form and organization. The best stories include *themes*—motifs that run throughout the narrative. Find themes tied to the features of your product or service that will capture the imaginations of your audience (see pp. 362-364 later in this chapter for a discussion of how to incorporate the themes into your written work). To find those themes, think in terms of four questions:

1. What are the client's or funding agency's issues and focus?
2. What are the features you can provide?
3. What are the benefits of those features for the client or agency?
4. What proof do you have that can substantiate your claims?

A features and benefits chart is a good method for organizing your thinking on these questions (see Figure 14.2). If the key issues are visually tied to your features, benefits, and proofs, you can readily see the essential strengths you bring to a proposal.

These strengths are the value-added components you can offer over and above the basic goods and services, and they are what differentiates you from the competition. Those two concepts are what the themes should communicate: *value added* and *differentiation*. For example, after developing the chart shown in Figure 14.2, the proposal writers might decide that the following themes will create the most positive response from the client: competitive edge, top-quality service, personal attention, and understanding of needs. The writers then collaborate to write a

Figure 14.2

Features and Benefits Chart

Key Issues	features	Benefits	Proofs
Ability to increase competitive advantage	Our global network of offices	Worldwide access	News release praising our accessibility
Timely delivery	Electronic delivery of information	User receives information instantaneously	Testimonials from specific users
Flexibility	Provides simple, menu-driven systems	Users can tailor software for their own needs	Provide an example of tailored software
Service	Timely maintenance schedule and free service calls	Users are never without support	Provide maintenance and repair cost analysis

theme statement—not to share with the client, but for their own use—that serves as a focus and guide as they develop the proposal:

**Theme
STATEMENT**

We will show how we can help them increase their competitive edge by devoting a special section to our success stories with recent clients who are in direct competition with them. We will also indicate that our service is top quality and that we maintain personal contact with our customers so we continue to understand their needs.

With these points firmly in mind, writers can establish certain themes from the beginning of the proposal and continue to reinforce them throughout the document. A later version of the theme statement—polished and targeted to the client—will appear in the proposal itself. Note the theme in the sample executive summary at the end of this chapter (pp. 377).

Considering Ethical Issues

With the pressure of the competitive proposal process comes the temptation to bend the truth and make claims that you or your company may not be able to keep. As you write to convince an audience, you may find that you move from effective marketing to overblown “hype”—exaggerated claims designed to catch attention but not grounded in the truth. Proposal writers often confront ethical dilemmas such as the following:

- Should I claim that I've talked with experts in the field and they're in support of the proposal when they haven't truly offered their support?
- Should I shorten the time frame for the deliverable product even though I know a longer schedule is necessary to do the job effectively?
- Should I claim an initial budget lower than I know the project will ultimately cost?
- Should I make promises I know neither the company nor I can keep?
- Should I "pad" my resume by adding experiences I don't have?

Careful proposal reviewers are aware of these common temptations and insist on specific proof of any claims made. Proposals that omit such supporting evidence are usually set aside for further research or are rejected outright. It's extremely important to note that people who are caught submitting proposals containing false or exaggerated information lose all credibility with the client and often with the entire institution or industry.

Outlining

The final planning stage is to develop an outline and a document specification that includes a schedule for completing the proposal's components. The outline itself should follow the order requested in the RFP or, if there is no RFP, should be organized in a logical sequence that emphasizes the features and benefits you offer. (See Chapter 1, pp. 21-23, for information on developing a document spec.) An easy

way to outline a proposal is to use the compliance checklist (see p. 349). It already follows the RFP's requirements in order and is therefore an ideal tool for generating an outline that will be responsive to the client's needs. Remember to use the RFP's numbering scheme and to use headings liberally to aid readability.

If you are working collaboratively on a proposal team, this stage is an excellent time to hold a kick-off meeting and distribute writing assignments to everyone. These assignments should be keyed clearly to the outline, and a list of them should be made available to the entire team so everyone knows what each team member is doing and what the various deadlines are.

(See Chapters 1 and 2 for more on planning and researching.)

Organizing

Keep in mind that the organization and component of every proposal should be tailored to the RFP and the specific situation. Most proposals, however, have four basic sections: front matter, introduction, body, and back matter. See Figure 14.3 for an overview of what is typically included in these sections.

Traditionally, the first step in drafting proposals has been to write the proposal itself and then to write the executive summary. However, the executive summary is probably the most-read section of the proposal and is the primary selling tool for decision makers. At this stage, because of your planning efforts, you know what your themes are, and you have an outline for the entire document. It makes sense, then, to try your hand at the executive summary first and draft the sections of the proposal itself afterward. Proceeding in this order allows you to develop your themes at the start so you can continue to reinforce them within the document's text. An added reason to begin with the executive summary is that it is a manageable size; you can iron out what you want to say here without getting lost in the sheer volume of pages in the document.

The Executive Summary

An executive summary in a proposal is different, to some extent, from an executive summary in a report (see Chapter 13). Although a proposal's executive summary provides the same type of information and it is the document in miniature, its primary purpose is to get past the screening committee whose job it is to read executive summaries and eliminate noncontenders. To create an executive summary that works:

- Make the executive summary stand alone; don't cross-reference other sections of the proposal.
- Consider giving it a design that is different from the rest of the proposal.
- Use a ratio of one-third visuals, one-third text, and one-third white space.
- Use high-quality visuals—they sell your ideas best.
- Keep the executive summary short—approximately one-tenth of your proposal, but never more than sixteen pages (to accommodate packaging it in an even number of pages in brochure format).

Figure 14.3

Basic Components of a Proposal

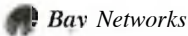
- **Front Matter.** The front matter, which is typically numbered with small Roman numerals, includes the cover page, the title page, a letter of transmittal, the table of contents, a list of illustrations, and an executive summary (or abstract, in shorter proposals).
- **Introduction.** The introduction generally includes:
 - a *statement of the problem* that reviews the client's situation and establishes the need for action;
 - an *overview of the approach* that highlights key features and benefits of your solution to the problem;
 - a *statement of scope* that indicates the boundaries of your solution, including what you will and will not do or be responsible for; and
 - a *statement of organization* that gives readers a road map to the rest of the proposal and indicates its major divisions.
- **Body.** The body includes:
 - a *statement of the work*, sometimes called the *research design* or *technical proposal*, that describes in detail what you have to offer, again highlighting the features and benefits;
 - the *plan* that describes all phases of how you will accomplish the work you propose, including a schedule;
 - the *statement of costs* that details all anticipated costs, often relying more on numbers, including cost analysis tables, than on words; and
 - a *statement of qualifications* that describes you or your company's experience, personnel, and facilities in relation to the client's needs.
- **Back matter.** The back matter includes:
 - *resumes* for all the people who will be involved in the project; and
 - *appendixes* that contain any necessary attachments—documents such as maps, letters, or questionnaires, that support but are not integral to the body of the proposal.

There are two basic types of executive summaries appropriate for proposals: (1) the brochure model and (2) the narrative model.

The **brochure model** (Figure 14.4) usually accompanies large proposals and is often bound separately for easier distribution to the decision makers. It begins with a strong statement of a single theme—polished from the "in-house" version your group has worked with—that is set off from the rest of the text for emphasis. Other themes that you developed for your earlier working version are treated on subsequent pages, each page conveying a single theme, so that the brochure itself is a sequence of *themes* specifically connected to the customer's key issues. The summary as a whole tells the story of how your product, service, or approach is unique and superior to your competitors' in meeting the customer's needs.

Figure 14.4

Brochure Model



EXECUTIVE SUMMARY

Executive Summary

Bay Networks' flexible, seamless ATM-LAN router solution offers unparalleled scalability and connectivity. Ours is a true standards-based solution that can change and grow without compromising your initial investment.

To satisfy Exponential Federal Corporation's need for ATM-LAN routers in support of an integrated ATM testbed, Bay Networks is pleased to offer the only product capable of meeting current and future requirements. We recognize the integrated ATM testbed as a stepping stone toward full-scale system development, and understand that EFC's network requirements will increase as the ATM testbed effort progresses. The inevitable growth demands a backbone that can handle multiple FDDI, T3, and ATM. This backbone is Bay Networks' Backbone Link Node (BLN). It is at the core of a solution offering EFC the following:

- Seamless, multilevel ATM routing
- Interconnectivity with **any** local or wide area network
- Fast, reliable data transmission
- Simplified network management
- Full investment protection

Bay Networks' Backbone Link Node (BLN) and serial interfaces provide seamless, multilevel ATM routing as well as LAN and WAN interconnectivity.

Our solution will provide EFC with ATM routing at both the remote facility and desktop levels. Local area network connectivity includes support for Ethernet/802.3, 4- and 16-Mbps Token Ring/802.5, as well as **FDDI**. Wide area connectivity is provided by synchronous lines operating **from** 1200 bps to 52 Mbps, including Fractional T1, T1/E1, and T3. Our solution supports every major protocol—IP, OSI, DECnet Phase IV, IPX, VINES, AppleTalk Phase 2, XNS, Transparent Bridge, Translation Bridge, NML, SRB, DLSw, and APPN.


Bay Networks serial **interfaces** provide the connectivity that EFC will require to build wide area networks. **All** Bay Networks serial interfaces are protocol independent, supporting all LAN and WAN protocols, providing maximum **interoperability** for attached networks. Wide area connectivity is provided by an array of interfaces that include synchronous, ISDN, BRI, PRI, HSSI, MCT1, and MCE1. All of Bay Networks serial interfaces support dynamic reconfiguration. This feature permits them to meet EFC's changing connectivity requirements.

The BLN is the fastest, most reliable, and most flexible base unit for EFC's applications.

The Backbone Link Node has a symmetric multiprocessor architecture based on multiple Fast Routing Engines. Its Parallel Packet Express (PPX) processor interconnect delivers the highest performance in the industry today—up to 1Mpps. Its traffic distribution, load sharing, and redundancy features make it extremely reliable as well as fast.

Figure 14.4

Brochure Model (continued)


Bay Networks
EXECUTIVE SUMMARY

Site Manager provides easy access to advanced internetwork node management functions, interoperates with existing applications.

Partnering with Bay Networks means EFC's investment in advanced internetworking is safe; the neworkyou design today will meet the needs of the organization tomtow.

The BLN sets the standard For network availability for mission-critical applications. Dynamic reconfiguration and non-disruptive operational servicing features enable EFC lo make quick on-line changes from a local or remote workstation.

Site Manager is a platform-independent, SNMP-based application designed expressly for configuration and management of Bay-Networks nodes.

This Windows-based interface provides point-and-click access to a comprehensive set of node management capabilities, including:

- Centralized configuration management to ease network setup and expansion
- Real-time statistics analysis to enhance network performance tuning
- Real-time event and trap monitoring lo simplify problem identification and isolation

Site Manager interoperates with all the leading, general-purpose SNMP-based network management platforms, including HP Open View, SunNet Manager, and NetView for AIX.

All Bay Networks products are standards-compatible, and we remain committed to the development of products based on Industry standards. We recognize this as the most effective strategic approach to ensuring an open path for network growth. Our standards-based approach eliminates the threat of proprietary solutions that would force our end users into dead-end architectures.

We maintain an active role in several industry consortia devoted to multivendor interoperability of networking products. Our participation in organizations such as the ATM Forum, Fast Ethernet Alliance, Advanced Networking Test Center (ANTC), and Desktop Management Task Force (DMTF) assures EFC of our commitment to protecting its investment in our standards-compatible products.

Why Bay Networks?

ATM connectivity is a critical factor in positioning EFC to meet its longterm information transport requirements. Bay Networks, the merged company of Wellfleet Communications and SynOptics, is the first vendor to offer a truly seamless solution that allows for ATM connectivity. In choosing Bay Networks, EFC will partner with an industry leader whose *top-quality* products, responsive service, com-mitment to industry standards, and ongoing research and develop-ment ensure your ability to face the challenges of network evolution.

Exponential Federal Corp.
Page 2

► **Tip:** *Using an outside column is especially useful for executive summaries in proposals, whether they are the brochure model or the narrative model. Known as a "sidebar," this allows space for you to add callouts (key phrases) that highlight the features and benefits. These callouts not only highlight important points, they also reinforce the themes you want to communicate.*

Unlike the common three-fold brochure with narrow panels, executive summaries packaged as brochures are in booklet form to allow for more information on each page. Keep in mind that such a format means that the length of the brochure must be a multiple of four pages, including the front and back cover.

The **narrative model** (Figure 14.5, p. 358) is more appropriate for smaller proposals. It is bound into the proposal itself and contains visuals, but not quite so many as the brochure model. The general order of narrative summaries is as follows:

1. Statement of your purpose
2. Concise statement of your offer
3. Answer to the question "Why me?"
4. List of the customer's key issues linked to your features and benefits
5. Details of your offer
6. Strong closing statement of theme

After writing the executive summary, you can turn your attention to drafting the sections of the proposal itself.

The Proposal

Developing sections of the proposal is much easier once the executive summary has allowed you to think through the way you want to focus your effort. At this stage, you have already organized the entire document into its components and have created a logical order (keyed to the RFP). All that remains is to draft each section. If you are working in a team, you may be responsible for only some of the sections, while others draft the rest. You need some guidelines for the approach to the section that will make your section of the document consistent with the others. If you're working alone, you still need to make sure all the sections are coherent and consistent in approach.


► **Tip:** *When stating your themes, don't promise the world. Promise only features and benefits that you can substantiate with proof. Whenever you can, use numbers and other verifiable facts such as customer references and testimonials or third-party test data. Visuals can also serve as effective proofs if they incorporate photographs and other hard data.*

Each section of the proposal should include the following elements:

- Section number and title (heading) keyed to the RFP
- Content determined by the RFP

Figure 14.5

Narrative Model


Bay Networks
Page 1

Executive Overview

Bay Networks is proposing our Access Stack Node (ASN) routers for 56 Kbps branch access and our Access Node (AN) routers for 9.6 Kbps branch access. Our high-performance Backbone Node (BN) routers are being proposed for the central sites. All Bay Networks products can be managed using a common management system, Optivity. Optivity can provide a single interface to the internetwork.

Our advanced multiprotocol routing solutions offer industry-leading power and performance for everything from remote sites to high-performance, highly available enterprise backbones. Featuring a symmetric multiprocessor architecture that minimizes the impact of component failures and processing bottlenecks, Bay Networks' broad and scalable routing family delivers the highest possible performance, availability, and configurability for your network. Our router products provide unsurpassed connectivity and interoperability, supporting all popular network routing, bridging, and WAN protocols; LAN and WAN media; and environments such as IBM SNA, FDDI, and ATM.

Reliability and efficiency are important requirements within the banking industry. To this end, Bay Networks provides reliability, availability, security, and performance at all network levels: component, system, and support. Bay Networks offers the highest reliability of individual components. At the system level, cost-effective network designs from Bay Networks can keep critical banking networks and applications running flawlessly.

Below is a sampling of some of Bay Networks' installed accounts:

- AmeriTrust Corp., Cleveland, OH
- Chase Manhattan Corporation, New York, NY
- CitiCorp, New York, NY
- Great Western Financial Corp., Los Angeles, CA
- NationsBank Corp., Charlotte, NC
- Wachovia Corp., Greensboro, NC

Bay Networks is confident that our proposed solution will benefit First Union today, and in the future. Our products provide unparalleled performance and investment protection.

- ' Clear themes connecting the customer's key issues to the features and benefits
- Proofs of the benefits you promise
- An opening, middle, and closing that are logical and allow the section to be self-contained to some extent

(See Chapter 3 for more on organizing.)

Designing

Planning the proposal's design should occur early in the planning process because the design affects the story you are telling and the way readers will perceive it. Three design issues are specific to proposals:

- Deciding on an effective format
- Using graphics appropriately
- Writing interpretive captions

To see how these techniques work in actual practice, look at the sample proposal at the end of this chapter (pp. 372-375).

Deciding on an Effective Format

As discussed throughout this chapter, the format you choose for a proposal depends on your company's style guide, the RFP, and the situation. Some companies have standards for proposal layouts and design already in place, and you must follow their guidelines. Others allow you to be more creative—and still others have style guides but are amenable to improving these guides if you have good suggestions. Only you will know whether office politics will allow you to implement changes.

If you are working from an RFP, the proposal's organization is probably dictated already, but you may have freedom to design the document in the way you think best: traditional one-column format, with no sidebars (see Figure 14.5), or a two- or three-column format, with sidebars (see Figure 14.4). Look at copies of other proposals that have gone to the same audience. What are the standard practices? Are there unspoken rules about format? Admittedly, you run a risk if you submit a document design that is significantly unlike the usual forms: it may capture the client's attention positively or negatively. See Table 14.2 for advantages and disadvantages of multicolumn proposals.

Done well, the three-column layout with the sidebar message column is highly professional and impressive. Done poorly, it can make a proposal seem choppy and insufficiently detailed.

Using Graphics Appropriately

Graphics are especially useful in proposals because readers tend to remember concepts presented with a combination of words and visuals more than they do concepts presented with words alone. As marketing tools, graphics are essential. See *Guidelines: Using Graphics in Proposals*.

Table 14.2

Designing the Proposal

Number of Columns	Appropriate for	Advantages	Disadvantages	Tips
One-column	Short proposals (3-5 pp.)	<ul style="list-style-type: none"> • Can use larger font. • Longer paragraphs look shorter because they are not squeezed into narrow columns. 	<ul style="list-style-type: none"> • Text can look dense and old-fashioned. 	<ul style="list-style-type: none"> • Use wide margins on sides, top, and bottom to make text look less dense. • Use frequent lists and heads to "chunk" the text. • Use high-quality, attractive typeface. • Use different size type for headings and text.
Two-column	Medium length (5-50 pp.) and long (50-200 pp.) proposals	<ul style="list-style-type: none"> • Use software to make document more polished and pages less dense. 	<ul style="list-style-type: none"> • No space for callouts. • Columns are narrow and may cramp text. • Document may seem longer. 	<ul style="list-style-type: none"> • Use short paragraphs to avoid look of elongated text in narrow columns. • Consider using a "rule" or dividing line between columns. • Use short heads to fit into column width.
Three-column	Medium length or long proposals; executive summaries	<ul style="list-style-type: none"> • If you combine the two right-hand columns for text and use the left column as a sidebar, you have the best of both worlds: A wider text column and room for callouts in the sidebar. • Most polished and professional look. 	<ul style="list-style-type: none"> • Length of the proposal may increase significantly. • Design may look cluttered if poorly done. 	<ul style="list-style-type: none"> • Don't neglect the sidebars—make sure they are well-written. • Key the sidebars and main text to the themes, features, and benefits. The sidebars should work if read alone, but should also be connected to the main themes.

GUIDELINES Using Graphics in Proposals

- Use graphics to tell a story. Each visual must have a message or convey information directly related to the surrounding text.
- Adjust the size of your graphics so **that** they are appropriate **for** the page layout. Graphics that are placed in the sidebar column must be simple and readable. Save complicated visuals for within the text when you can use more than one column to display them.
- Include at least one graphic in every **section**. To avoid delivering dense, dry text, try to integrate graphics throughout the proposal, not just in a few sections. These visuals can be charts, tables, line drawings, and so forth.
- Adjust the ratio of text and graphics to the audience and the situation. Subject matter experts will need fewer graphics than nonexperts. An executive summary may include many more **visuals** than the body of the text because the decision makers who read it may be nonexperts in the subject matter. Think about the audience and the type of material **you** are presenting to them. If they may need extra help in understanding the themes or the material itself, include more graphics.
- Keep graphics simple. A graphic should focus the reader on the story you want to tell. Unnecessary explanations or complicated material within the graphic makes it hard for readers to get the main idea easily and with impact.
- Write captions for all graphics. Without captions, the interpretation of the graphics is left up to the readers. Remember, it's *your* story, and you should maintain control of it.

Writing Interpretive Captions

In proposal writing, more so than in other writing, captions serve as interpretive screens for the reader. When you understand that readers look at any graphic through the lens created by its caption, you will probably not write captions such as this: "Figure 2.1: The Ethernet Router." This caption simply conveys the product's name; it is not an interpretive lens. A caption should provide information; it should tell the reader what to look for and what to see in the visual. For example: "Figure 2.1: The Ethernet Router provides large-scale technology in a compact package." Readers looking at that graphic will note the small size of the router and envision great power inside a tiny box. By writing such an interpretive caption instead of just providing a bland title, the writer has linked the graphic to the themes of the proposal.

To write interpretive captions:

- ' Remember that the reader will see the graphic through the lens of the caption.
 - Link themes, features, and benefits to the graphic. The visual may stand as proof of the benefits you claim.
 - Place the caption below the graphic in most instances.

A successful design requires creativity and a keen sense of the document as a marketing tool. The page format, graphics, and typeface will be your tools to reinforce and extend the themes you want to communicate to your audience.

(See Chapter 4 for more on designing.)

Editing

Developmental editing (see Chapter 10, p. 234–235) can make a significant contribution to proposal writing. Don't wait until the entire document is finished to begin editing it. Instead, work with an editor from the outset to focus on the following editing issues specific to proposals:

- Stating your themes persuasively
- Establishing equivalence chains
- Writing sidebars that work

A developmental editor will read your drafted prose soon after you have written it (and well before your final deadline) and will ensure that what you say in the proposal—at both the conceptual *and* the sentence levels—conforms to and conveys persuasively each of these aspects of the proposal.

Stating Your Themes Persuasively

Persuading audiences of anything requires a careful mix of subtlety and direct appeal. Your behind-the-scenes persuasive tactics need to be subtle because audiences don't respond well if they feel they are being overtly manipulated. On the other hand, proposals are marketing tools, and readers expect them to clearly *sell* what is being offered. A proposal that makes a lukewarm sales pitch is not likely to be a contender.

The themes you establish are the subtle persuaders, while the design of the proposal and the strong claims within the text are the direct sales pitches. For quite a few writers, the overt marketing strategies are easy and take center stage, while the more indirect techniques are either missing or lost in the background. To make your proposal more persuasive than most, you need to learn how to make the document persuade on both levels. Doing so requires an understanding of the classical rhetorical devices of **logos**, **ethos**, and **pathos** and the use of **equivalence chains**.

The Use of Logos, Ethos, and Pathos These three "appeals" stem from classical Greek rhetoric and represent the categories of persuasion: an appeal to logic or reason (logos), an appeal to ethics or character (ethos), and an appeal to emotion (pathos).

Logos: Presents a reasonable case for your product by listing facts and figures, offering substantial proof of your claims, and suggesting why your approach is objectively the best one to take. *Logos highlights objective fact.*

Ethos: Offers testimony from people or institutions the audience trusts. In a courtroom, the use of expert witnesses is a form of ethos as is the use of public policy arguments; in proposals, using letters of reference or other testimonials works well, as does using the public appeal of a clean environment, high moral values, and so forth. *Ethos highlights the testimony of respected authorities.*

► *Tip: Always check your proposal to make sure that the appeal to reason is the dominant impression the audience will have. Ethos and pathos should serve in supporting roles.*

Pathos: Targets the emotions of your audience. This appeal is the most dangerous because it can go astray so easily. While appealing to the subjective nature of readers can be a powerful marketing tool, you run the risk of tipping into melodrama or overdone hype. In formal proposals, pathos can include suggesting ways to solve the audience's frustrations, promising better quality of life, and so on. *Pathos highlights the audience's subjective inner wishes and desires.*

Understanding these categories can serve as a heuristic to spark ideas as you write. Keep a running tab on the kinds of appeals you are using. If your document relies too heavily on one, consider incorporating more of the others.

Establishing Equivalence Chains

After you have established your themes and checked them for a combination of the three appeals, you are faced with the task of threading those themes throughout your document—of establishing "equivalence chains": chains of words that reinforce your themes. Some ineffective writers simply repeat the same words over and over, drumming the themes into the clients' heads with such redundancy that they ultimately work against the project. To weave the ideas into the fabric of the text more subtly, let the combined effect of many connotative words create a powerful impression through the document. The Steps to...Creating an Equivalence Chain show how this technique works.

Writing Sidebars That Work

Some writers use a sidebar format only for the executive summary (see again Figure 14.4), while others use the technique for the entire proposal. It is more common to use this technique only for the summary, but you may decide the format works for the whole document. Whichever method you choose, the callouts in the sidebar column should serve to highlight key points of the sections and draw readers into the main text. For those readers who skim only the sidebars, the collective effect of the callouts should provide a clear enough picture of the proposed features and benefits to sell the ideas on their own. See Guidelines: Writing Effective Sidebars.

If you choose to use the sidebar format, be thoughtful about implementing it. If you get carried away with the bells and whistles of design, you may produce a document that no longer looks serious.

Steps
to

CREATING AN EQUIVALENCE CHAIN

1. Develop a theme statement (see pp. 350–352, 362).
Bay Networks offers the client tailored maintenance and networking service with expandable solutions.
2. Decide what are the essential theme words in that statement.
... "tailored maintenance"... "expandable solutions"
3. **Make** a list of synonyms and synonym phrases for those words.
direct sales and service
complete line of networking products and support
global offices and international service sites
committed to customer satisfaction
solution integration
one source for service and support
full responsibility
100% reliability
deliver results
support technology's evolution
4. Repeat these synonymous (or "equivalent") words at strategic locations throughout the document to continually emphasize your point and create a sense of coherence. Using this subtle technique to state your themes persuasively makes your prose forceful without seeming manipulative—a key factor for effective results. These "equivalence chains" tie the prose together while subtly creating persuasive contexts for your ideas. And the audience is left with powerful impressions of what you can do for them.

For example, the following proposal excerpt uses an equivalence chain emphasizing the company's capacity to do large-scale marketing around the globe (the theme words are underlined here):

Worldwide, suppliers of In Line products number over 5000 including such global giants as Sport Mart and Playmania, Pembington's, with 403 outlets in the U.S. and Canada, is our largest North American customer... Our position as the only globally capable supplier who is not also a competitor, combined with our broad experience, uniquely qualifies us as a I2 partner—one who will promote your interests worldwide.

(Note the other uses of themes in the samples at the end of this chapter, pp. 368-383.)

Editing a proposal for all of these elements takes time and a significant amount of effort. Writers who think they can draft a proposal quickly and save editing for the last minute are likely to produce inferior work. Effective technical writing depends on budgeting enough time to edit well and to revise accordingly. It's especially useful to collaborate with a developmental editor from the beginning. Good writers realize that editing must happen throughout the writing process—it should not be done hastily at the end. If you edit documents as you write them, work

GUIDELINES **Writing Effective** Sidebars

- Use sidebar messages (callouts) to emphasize your themes. Each callout should both state necessary information and clearly express your theme(s). You don't have to use the exact words that are in the main text. Write strong messages that emphasize the features and benefits of your ideas or products.
- Limit sidebar messages to five or six lines. If the callouts are longer, they compete with the main text. You want these short comments to have punch and to highlight the text, not replace it.
- Use hyphens sparingly. An occasional hyphen is all right, but avoid multiple hyphens. They diminish the verbal and visual impact.
- Use graphics if they enhance the themes. The sidebar is a good place to use small graphics if they enhance the themes, appeal to the client's imagination, and are not too small or too complex to be discernible. Keep them simple and don't overuse them. Too much of a good thing can become a liability rather than a benefit.
- Write in the active voice. Sidebars are no place for passive constructions that diminish action. Be as forceful and upbeat as possible.

closely with an editor as you develop the prose, and then give them another edit or two when they're complete, your end product will be of much higher quality than it would be if you rush it out the door and into the mail.

See Chapter 5 for more on editing.

Following Up the Proposal Submission

The last step in the proposal process is to follow up with the client after you have submitted the document. There are several reasons to do so, but the primary one is to keep your name in the forefront of the customer's mind. It's not a good idea to send off the proposal and then simply sit back and wait for the results. If it is appropriate and not in violation of the RFP, call the client's office:

► **Tip:** *Some federal agencies and other government offices forbid post-submission calls—in fact, calling these offices is illegal. Be sure to clarify the status of your client before placing any follow-up calls.*

- Ask if the proposal has been received.
- Ask about the evaluation process and decision time frame.
- Offer additional information.
- Offer and arrange for a technology demonstration or an on-site visit.

The more you stay involved in the process, the more likely it is your proposal will be successful.

Tips for International Communication

As is true when you write for any international audience, writing effective proposals requires that you understand the culture of the target audience. (See Chapters 1 and 3 for a discussion of cultural contexts.) In many high-context cultures (such as Asian, Japanese, Arab, and some Middle Eastern countries), people rely heavily on word of mouth and on oral promises. They may thus view as unnecessary and perhaps offensive a request to put RFP information in writing or to give too much background material in the proposal itself. If these details have already been discussed orally, then reiterating them in writing may indicate a lack of trust or faith. In many instances, these cultures rely on more informal relationships and discussions to establish the foundations and standards for the document.

In low-context cultures (such as the United States), writers need to establish in writing the framework for their documents—both RFPs and the proposals themselves. Not doing so may indicate incomplete research and a lack of professionalism.

Be careful not to stereotype high- and low-context cultures and neglect to do the proper research on proposal customs. In Germany, for example, written proposals are rare, even though it is usually considered a low-context culture. Instead of relying on written documents, large companies in Germany have entire divisions whose sole purpose is to build trusting working relationships with other companies through personal contact. Only after the relationships have been built are the agreements finalized on paper.

For more on cross-cultural communication, see Chapter 7.

Quick Review

Proposals are marketing tools that tell—and sell—your story to the audience. As such, they follow the classic marketing strategy of feeding a wish or creating one. No matter what your situation—as part of a team writing a complex proposal in response to a lengthy RFP, or as an individual writing a brief proposal in response to a memo or phone request or even an unsolicited proposal—the strategies you should follow basically consist of these steps:

- Assess requirements.
 - a. Create an RFP or a Proposal Submission Guidelines compliance checklist.
 - b. Identify the client's or funding agency's key issues and focus.
 - c. Consider multiple audiences.
- Develop a strategy.
 - a. Determine themes based on the client's or funding agency's key issues and focus.
 - b. Link the features and benefits of your proposal to these issues.
 - c. Write an outline.

- Draft the proposal.
 - a. Write the executive summary or abstract first.
 - b. Consider using storyboards.
- Review and revise the proposal.
 - a. State themes persuasively.
 - b. Use language keyed to the customer or the funding agency.
 - c. Write sidebars that work.
 - d. Select an effective proposal design (one-column or two-column formats or one-column format with sidebars).
 - e. Follow up the submission when appropriate.



Exercises

1. Write a short, unsolicited proposal to gain permission for a project you want to take on either at work, in your community, or at school.
2. Collaborate as a team on writing an executive summary for a proposal. Your process should include the elements of planning, organizing, editing, and designing discussed in this chapter. Include sidebars if you think they are appropriate, and make sure that all members of the team contribute to developing the document.



Community Action Project

You may already know of an organization looking for funding in your local area. If they have identified a possible funding agency, offer to help them write the grant proposal. If you know of an organization that needs money to fund a worthwhile project for your community, search the Internet and check your town government offices for potential grant sources. On the Internet, keywords such as "community action grants" will bring up many funding agencies for such projects. Once you have identified an appropriate source, work with the community group to write the grant proposal. Be sure to follow the proposal submission requirements exactly and pay attention to the persuasive themes you weave throughout the document.

Request For Proposal (RFP) Sample



612.746.4230
www.netdynasty.com

Request For Proposal (RFP) Sample

Context helps proposal team target company's vision

Net Dynasty LLC E-commerce Web Site

Keywords

Company Background

Net Dynasty is a web design and internet marketing company located in downtown Minneapolis, Minnesota. Currently, we are a small team of highly specialized individuals with years of experience in web design, web development, search engine optimization and internet marketing. We began with a very simple goal: Make ourselves as valuable to our clients as possible. We accomplish this by providing solutions that drive business goals - creating awareness, generating leads, and improving customer satisfaction.

Gives objectives of project

Project Description

Currently, our web site only offers static information about our services and products. The objectives of the e-commerce site are to process sales on-line, maintain effective on-going communication with existing customers and attract new customers by providing products on-line in an easy to download format. The expansion of netdynasty.com will include the development on an on-line storefront with live credit card processing.

Design Requirements

The design of the site must be Section 508 compliant to allow the disabled to view the site effectively. Additionally, the visual layout of the site must align with our current design and brand standards.

Successful proposal should follow the order of these requirements

Technical and Infrastructure Requirements

- The store must be designed to run on Windows 2003 server running SQL Server and IIS.
- The site must be programmed in ASP.NET with C#.
- All programming must meet strict W3C standards as outlined on the w3c.org web site.

Functional Requirements

- *On-line Catalog*
4,200 items total. Each item includes a name, price, description and three images.
- *Shopping Cart*
Ability for customers to add products/services to a cart. Each item added should display other complimentary items to the customers.

- *Credit Card Processing*
Visa, MasterCard, Discover and Pay Pal must be accepted safely on-line using 128-bit encryption.
- *Order History*
Every customer should have the capability to see a history of all their orders for up to one year.

Estimated Project Duration

Final implementation and site launch is scheduled for January 1, 2006.

Assumptions and Agreements

- Participating vendors will be asked to present their plans to the review panel.
- All costs associated with the preparation and presentation of the proposal will be borne by the participating vendors.
- Proposals and their accompanying documentation will not be returned.
- Proposals will be considered final as submitted and may not be altered unless requested by the review panel.
- Proposals should be accompanied by three references that can speak to similar projects in scale and scope.

Submission Information

Please submit one electronic version of your proposal to Brian Bierbaum (info@netdynasty.com) no later than 4:00 pm CDT on November 11th, 2005. Proposals should include a response to all aspects of the evaluation criteria. Proposals should include the name and contact information of persons to be contacted for clarification of the proposal if needed. Proposals should include a summary of your approach to the work, any exceptions to be taken, and any alternative or additional information that you deem important to the representation of your team.

Submission of a response to this request for proposal does not bind Net Dynasty LLC to engage the vendor to provide the requested service. Net Dynasty LLC reserves the right to reject any and all proposals, accept any proposal terms it deems to be in the best interest of the organization, waives any informalities in proposals submitted, and waive any minor irregularities or discrepancies in proposal procedures. Net Dynasty LLC reserves the right to retain a copy of your submittal after selection has been made. The vendor is solely responsible for the costs it incurs in submitting a response to the RFP.

For Additional Information or Clarification

Contact: Brian Bierbaum, 612.746.4230, info@netdynasty.com

Basis for Award of Contract

Proposals will be evaluated on the following criteria:

- Team Experience 20%
- Personnel Strength 10%
- Project Understanding 45%
- Schedule Understanding and Approach 15%
- Differential Advantage 10%

Request
evidence of
experience

Specific *time*
and date for
submission

Details of
submission

legal
material

Contact
information

Weighting of
criteria



612.746.4230
www.netdynasty.com

Anticipated Selection Schedule

The schedule for selection of the development team is tentatively set as follows:

- Pre-proposal Informational Conference Call September 29-30, 2005
- Proposals Due November 11, 2005

Pre-proposal informational meetings may be arranged through the primary contact listed above. The intention of these meetings is to allow the opportunity to ask questions with regards to the RFP, assuming RFP has already been reviewed.

THIS RFP AND THE NATURE OF WORK SOLICITED IS THE CONFIDENTIAL AND PROPRIETARY INFORMATION OF NET DYNASTY LLC AND THE INFORMATION CONTAINED HEREIN MAY ONLY BE USED AS NECESSARY TO PREPARE A PROPOSAL FOR SUBMISSION TO NET DYNASTY LLC.

Additional resources available on-line at:

<http://www.netdynasty.com/articles/business/rfp/>

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Sample Student Proposal

BILL CLARK
3509 45th Avenue NE
Seattle, WA 98115
206.525.5213

25 May 2006

Dear Dr. Wright:

Your suggestions about an independent study course during the summer quarter led me to the Computer Science Department, Dean Brown, and Professor Karl Lieberherr. When Dean Brown realized that I am a technical writer, she suggested that I write some UNIX-related documentation for the department.

Professor Lieberherr and his colleagues have developed the Demeter system, which meets object-oriented programming needs in the C++ programming language. Undergraduate students using the "User's Guide to Demeter System/C++" have asked for an edition of the guide that explains the concepts in a low-key manner.

Professor Lieberherr and I met on Thursday, May 21, to discuss the project. We agree that the independent student would include the following:

- Studying the existing document and related documents
- Ongoing discussion of the revision with Prof. Lieberherr, his PhD students and the students who use the document
- Studying a UNIX textbook
- Writing, editing, and revising the User's Guide

If the English Department handles the independent study paperwork, Prof. Lieberherr agreed to serve as a "consultant" to the project. I'm currently reviewing all the material before meeting with him again on Friday afternoon, May 29, to continue project planning.

Does this project meet your criteria for an independent study? I intend to follow a standard documentation development cycle, first creating a documentation plan for review and approval, then arranging a review process and developing a schedule that ensures delivery by the end of the summer quarter. I'll call you on Wednesday afternoon to see if this plan meets with your approval and to get information about registration procedures.

Thanks for your help.

Sincerely,



Bill Clark

Identifies purpose

Connects to faculty member's request

Identifies need

Statement of work

People involved

Plan and schedule

Sample Short Proposal

Reconfigurable Battery System for Power Management in Mobile Applications

Introduction

In order to satisfy the increasing power demands of mobile electronics, engineers have placed considerable effort into designing low-power **circuitry** TO offset the increasing number of features and components in the device. While most of the work has been placed into efficient power consumption, there has been very little investigation into efficient power dissipation from the battery. Nearly all mobile devices run off a single battery-source system, whether it be a lone battery or a series combination of batteries. Removing the constraint of using all the batteries simultaneously in a fixed configuration allows a new opportunity to increase the efficiency of power supply from batteries.

Background

A reconfigurable battery system takes an aggressive approach by selecting which batteries to drain and in which configuration (i.e. parallel, serial). This type of system can take advantage of battery properties that a fixed configuration cannot. For instance, batteries in this system can be used periodically to allow the recovery effect to take place which reattaches chemical bonds and in turn extends the battery life as can be seen in figure 1. When the device draws higher current, multiple batteries can be placed in parallel to reduce the discharge on a single battery, which increases the drained capacity of the battery as shown in figure 2. Using these schemes will greatly increase the percentage capacity of the battery that is drained and thus extend battery life for the device.

Figure 1 Recovery Effect¹

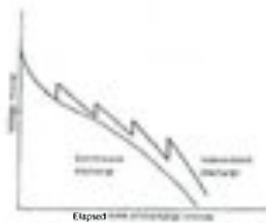
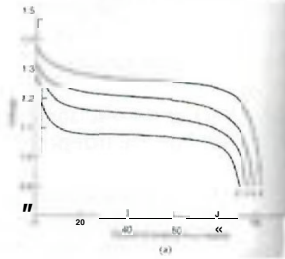


Figure 2 Decreased Discharge Rate¹



Problem Statement

This projects aims to find the optimal power scheduling of four batteries in multiple configurations, including serial, parallel, and many combinations of the two, to fully discharge the capacity of the battery and thus extend the operating time of a mobile device.

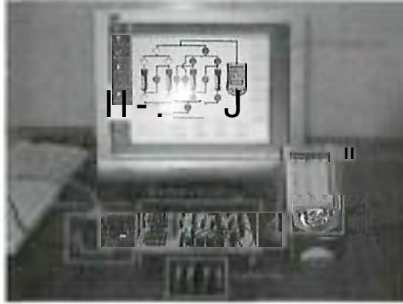
Specific focus of project

The work will further continue by building an automated system for power scheduling and batten¹ reconfigurations. The battery system will be self-containing and running in the background so that the user, and even the device itself, will need not be aware of its presence.

Current Work

¹ LINDS, D. 1995. *Handbook of Batteries*, McGraw-Hill, New York.

Figure 3 Curtail Work



A prototype board as shown above in Figure 3 has been created along with a user interface to the PC to control the switches as well as gather battery data. The current setup can reconfigure the battery into many formations including single/double/triple/quadruple batteries, parallel, serial, and countless combinations of the three. The user interface on the PC can change configurations as well as save voltage and current data through manually pressing the buttons or reading a script and executing time-driven events. The system is very close to stand-alone simulations on draining batteries on a PocketPC.

Proposed Work

The first step in the project is to run simulations on the existing prototype board. Battery types including Nickel-Metal Hydride and Lithium-Ion as well as various handheld electronics such as PocketPCs, Palm Pilots, and digital cameras will be used for the simulation to measure the power improvements in a wide arena of applications.

Once the simulation data supports a level of appreciable battery life improvement, a major revision of the prototype board will be designed with automation in mind. A microcontroller will be used to control the switches and implement the optimum power scheduling found in simulations.

The system must also be designed with power consumption two orders of magnitude less than the main device so that any battery life gains from the system will not be countered by power loss from this additional overhead circuitry. At the same time, cost and size must be kept at a minimum to ensure the technology will become commercially viable. The Texas Instrument MSP430 microcontroller is an excellent choice that can satisfy all the constraints of the system. The SBS1M430 TDK software will also be required to program that particular microcontroller.

The revised board will be reconstructed on a printed circuit board (PCB) layout by a vendor such as ExpressPCB to render a more robust and portable system that can be more easily integrated into devices. The system at this point can be "fine-tuned" in software for various devices and batteries.

Project Schedule Pint Quarter

This section gives credibility to the proposal: The author has completed preliminary work.

Clear
deadlines

Week	Activities
1-4	Undergo simulations on various batteries and devices
5	Formalize optimal power schemes
6- 10	Design revised battery system board
Second Quarter	
Week	Activities
1	Submit PCB layout for manufacturing
2	Assemble battery system on PCB boards
3-4	Test performance of boards on various batteries and devices
7-10	Prepare System and documentation for publication

Budget Justification

The first half of the project is devoted to simulations on various batteries and mobile devices. This will use the iPaq PocketPC initially but will also venture into other devices such as the Palm Tungsten E mentioned in the budget. This will ensure that the results are not limited to a single device but can be demonstrated on a variety of devices. Some additional iPaq batteries will be needed so that multiple batteries are drained in simulation which is the essence of the whole project. The batteries will in fact not be limited to iPaq simulations but will be used for other devices such as the Palm Pilot and later a digital camera. The simulations will include Lithium-Ion batteries but will also test out Ni-MH and Alkaline batteries as shown in the budget. Instead of purchasing multiple battery chargers for these various battery compositions, it would be convenient to use a single universal battery charger that will charge all the various batteries.

In the second half of the project, a major revision of the prototype board will require a development kit for the new microcontroller unit. The Texas Instruments MSP430 is an inexpensive yet powerful solution. The ESI232 MSP430 hardware along with the SBSIM430 software development kit will be necessary to develop the new board. Once the design is complete, a printed circuit board will be constructed from a vendor such as ExpressPCB. The boards will mainly consist of the microcontroller mentioned above, International Rectifier MOSFETs, and some other components. All of these parts have been mentioned in the budget,

Proposed Budget

Item	Cost
ESI232 Evaluation System MSP430 microcontroller	200.00
Palm Tungsten E	200.00
2 iPaq Batteries- Part # DLP305590-01	104.00
4 Prototype ExpressPCB boards	119.00
SBSIM430 IDE software development tool	100.00
MH-C777PLUS-II Universal Battery Charger	90.00
30 International Rectifier HEXFET Power MOSFETs	69.00

Item	Cost
Miscellaneous PCB components	30.00
20 Alkaline A A batteries	20.00
Rechargeable Ni-MH AA batteries	12.00
Total	\$944.00

Sample Grant Proposal

Ms. Rose McIntire
Program Officer
Corporate Giving Program
500 Parkway, Mail Stop 99999
Redwood City, CA 94065

Dear Rose,

Plugged In respectfully submits its proposal to the Corporate Giving Program for \$25,000 to support its computer education program for young people.

Plugged In is an innovative program that bridges the technological gap between East Palo Alto and Silicon Valley. We offer a variety of programs that serve community members of every age and background. This particular proposal seeks funding for one of our most important programs: our computer education program. This program is the cornerstone of our organization and our strategy to bring technology to low-income children and teenagers.

To reach our mission, Plugged In seeks to launch an innovative partnership with X Corporation consisting of funding and volunteer efforts. We look forward to exploring the possibilities with you. Thank you for considering our request. Please call Magda Escobar, our Development Director, if you need additional information.

Sincerely,

Bart Decrem
Executive Director

Grant Proposal by
Plugged In- technology at work in east palo alto

*Cover letter
presents
themes
"Innovative"*

*Appeals
to social
responsibility*

*Contact
person*

TO: X CORPORATE GIVING PROGRAM

Submitted on: January 11, 2007

Executive **Summary**

Plugged In seeks \$25,000 to fund an innovative computer education program for young people in K-12. The program will serve 250 children and teenagers annually, teaching low-income young people to take advantage of the educational and economic tools and opportunities presented by computer technology.

Contact: Magda Escobar • Plugged In • 1923 University Avenue • East Palo Alto, CA 94303

(415) 322-1134 voice • (415) 322-6147 fax • mescoabar@pluggedin.org • <http://www.pluggedin.org>

A. Organizational **Overview**

Plugged In's mission is to bridge the technological gap between East Palo Alto and the neighboring Silicon Valley. Located just a few miles from the heart of Silicon Valley, East Palo Alto is an ethnically diverse low-income community of 25,000 that has been largely left behind in the economic boom that has transformed neighboring communities. Plugged In offers a broad range of technology-related services that aim to allow all people in our community to take advantage of the educational and economic opportunities created by information technologies.

B. Description of Programs

Plugged In works to bring computer access and education and economic opportunity to all community members of East Palo Alto through a variety of programs:

*Themes of social responsibility and innovative technology
These themes continue throughout the proposal:
Opportunity
Innovation
Social Responsibility
Others?*

EDUCATION:

Plugged In operates an after-school program called Community Kids and runs an education program that offers computer classes to community residents of all ages and backgrounds. Community Kids offers art projects, physical activities, snacks, and computer-based academic tutoring to children age twelve and under. Our computer education program teaches classes that range from Introduction to Computers to HTML to graphic design. Classes are run in partnership with community-based organizations and schools. This proposal seeks funding for our classes that target children and teenagers.

ENTERPRISE:

Started as a Web page design business, Plugged In Enterprises has evolved into a series of incubated information businesses that employ local teens and young adults. The largest of the projects, *Plug In!*, is funded by America Online. A group of local teens has created the largest original content teen site anywhere on the Internet. In addition to *Plug In!*, teens operate an additional three businesses: desktop publishing, multi-media production and web page design. Plugged In Enterprises creates the opportunity for the young people of East Palo Alto to be pioneers in the information revolution—first, by teaching them high-end technological skills that are in demand in today's economy and second, by teaching them to market and sell their skills to paying customers. Twenty-five young people are currently employed by Plugged In.

ACCESS:

To ensure that everyone in our community has access to the Internet and computer-related technologies, we operate a computer **drop-in** center and run a community networking program called *epa.net*. The drop-in center operates seven days a week for 70 hours. It offers Internet and research access; word processing, graphic design and spreadsheet software; computer tutorials and technical support. *epa.net* has connected 18 different community organizations to the Internet over the past year. We have helped organization set up Web pages, provided them with a Web site, given them modems and trained them to use the Internet for their work. This project was recently awarded the National Information Infrastructure Award, the leading

forum for the recognition of extraordinary achievement on the Internet.

C. Population Groups Served

Plugged In serves people of all ages and backgrounds in East Palo Alto and the Belle Haven area of Menlo Park. Our community is approximately 40% African-American, 35% Hispanic/Latino, 10% Pacific Islander and 14% Caucasian. We serve approximately 500 people per week-75% of which are children and teenagers.

Despite its proximity to the high-tech center of our country, our community has not reaped the benefits of the technological revolution:

- *Low incomes:* Our community has the lowest per-capita income in the county.
- *Weak job market:* There are only 900 jobs available for a population of 25,000 in East Palo Alto. Neighboring Palo Alto has 80,000 jobs for 75,000 inhabitants, Additionally, many of these positions are in the technology industry and require technical skills our residents do not have.
- *Limited access to computer technology and communication:* A survey conducted by Plugged In showed that only 19% of East Palo Alto residents have computers in their home vs. 50% in Palo Alto.

Please see the attachments for a list of achievements to date.

D. Project Description

Plugged In seeks \$25,000 to fund its computer education classes for children and teenagers. Our approach is very aggressive in targeting this population since we believe that the earlier a person is introduced to technology the more open and creative they will be in their efforts to utilize technology for their educational and economic advancement. In order to cultivate this willingness to learn about and utilize information technologies, we have developed an educational approach that incorporates the following elements:

*Low student to teacher ratio: We work with an average of six young people at a time. This allows us to provide each student with individualized

attention and allows each student to explore independently on a computer.

***Project-based approach:** Each of our classes takes the form of a project. While working on a project, Students develop a variety of skills. We believe that the project approach provides a meaning and a context to the learning process. Projects explore topics that enhance school-based learning. The finished project for a class can be a magazine, a computer slide-show, an oral presentation or a web page.

***Flexibility:** Because we are a community-based organization, we have the opportunity to explore issues that may not be a part of the standard school curriculum. Although we have learning objectives and lessons plans for all classes, we have the opportunity to explore issues that come up in the course of a class and to "deviate" from the curriculum when it is appropriate.

Technology as a tool: Although technology literacy is one of the goals of our classes, we believe that technology is a powerful enabling tool, that can support critical thinking and other developmental skills.

Curriculum for each class is developed by the instructor for that class, within a framework which focuses on process issues. For example, all classes have the same structure: they start with a warm-up exercise, which is followed by a vocabulary review. After that, the instructor introduces the session's topic. Then, the students work on their project for the class. At the end of the period, the team reviews their work and there is a wrap-up exercise. This approach to curriculum development provides the instructor with the freedom to develop his or her own content while ensuring continuity and structure between classes.

Our computer education classes are delivered to children and teenagers in two modes: 1.) partnerships with community-based organizations and 2.) Plugged In Enterprises high end computer trainings.

Community Partnerships: Most of our classes are taught in partnership with a diverse range of community-based organizations and schools. We reach 200 through this educational track. The following are our some of our partners:

Shule Mandela Elementary School. Shule Mandela is an Afrocentric private school in East Palo Alto. We work with their third through eighth graders.

East Side Prep Academy: East Side Academy is the first private high school in East Palo Alto. We work with their ninth graders.

Children's Preservation Network: CPN is an afterschool program for neighborhood children. We provide computer classes to their children ages five to eleven.

Next Generation Daycare: Next Generation is a family day care. We work with their five - nine year olds.

Green Oaks Elementary School. We work with their fourth-grade bilingual education class.

MOMZ: Mothers on a Mission to Save our Children send their twelve year old sons to learn about computers.

Examples of the types of classes we will offer are as follow:

Shule Mandela: In partnership with Shule Mandela, we offer a series of computer courses meant to teach children how to use computers through creative projects. The first quarter of the academic year focuses on an introduction to basic computers. The second quarter consists of introduction to applications like Microsoft Word, Kid Pix and HTML. The third course focuses on a project. These students are completing personal Web pages. These students are in the fourth grade.

MOMZ: Our MOMZ program graduated seven teenage boys this spring. To graduate, these young men had to pass a 21-point quiz testing their knowledge of Macintosh operating system, Microsoft Word, HTML, and Internet access. Each of these young men created their own Web page. Omar Brownson, our teen classes instructor, hosted a graduation party that included a presentation of certificates and pizza. Each young man received a certificate containing a sample of his classwork. We start a new class each year.

Plugged In Enterprises: Additionally, we offer computer classes to teenagers that are interested in being a part of Plugged In Enterprises. The applications and skills taught in this program build upon basic computer skills and expand their technical expertise in desktop publishing, multimedia production and web page design. The structure for these high-end classes is the same as that described above. The focus, however, is on building skills that are marketable and generate income for teenagers. An example of this education track is our multimedia computer education program:

Multimedia Production: During the first 12 week phase of the multimedia program, we concentrate on training our young people to use multimedia production tools. They get hands-on experience using 3D graphics and animation software like KPT Bryce to create background scenes and Specular Infini-D to create and animate objects. They learn to use digital video editing software, Adobe Premiere, to shoot and digitize video, edit their videos and import graphics. Also, they are trained to use multimedia authoring software like Macromedia Sound Edit 16, Adobe Photoshop, and Adobe Illustrator. Our trainings consist of small projects to help them become familiar with the applications. Our students work on portfolios and create documentaries with graphics and interviews.

Forty-eight teenagers participate in this educational track.

Please visit our web site at <<http://www.pluggedin.org>> for samples of our curriculum and examples of projects that have been completed in our computer education classes.

E. Project Evaluation

While the content varies from class to class, we will measure our success in achieving the programs' goals in the following ways:

By keeping attendance sheets for all classes: Attendance sheets will be compiled into weekly program reports.

By keeping class journals for all classes: Journals will be written by the instructor for each class and are sent to all staff. In addition, journals will be posted on the Internet, where they can be reviewed by staff, board

members and flinders.

By keeping a portfolio for each class: We will maintain a computer portfolio for each class, which includes finished products as well as other work generated during each class.

By conducting quizzes: Students will be tested on basic class competencies.

F. Budgets

Plugged In requests \$25,000-one-third of our budget for computer classes for young people. Our total budget for computer classes for children and teenagers is \$82,650. Seventy-five percent of all our classes are targeted towards this age group.

Plugged In recognizes its sponsors by displaying their logos on our brochures and web site and recognizing them in the media attention we generate. Please see the attachments for the project budget and the agency budget.

G. List of Key Staff Members

Please see the attachments for the list of key staff members.

ATTACHMENTS



PROFILES IN PRACTICE

Neil Perlin

President

Hyper/Word Services

Documenting Online

Sheer coincidence prompted Neil Perlin to become a technical writer who specializes in online documentation. "As was the case with so many others who brought an eclectic blend of backgrounds into the field in the 1970s and 1980s, childhood loves of science and literature led me to an undergraduate program in astrophysics. That is, until I discovered that my math skills didn't extend beyond partial differential equations." So Neil shifted to a degree in English literature; the family joke was that Neil could write instruction manuals for spaceships.

After college, Neil studied accounting and earned an MBA, with a minor in operations management. For a short period of time, he worked as an accountant, then turned to freelance writing, where he answered an ad for a major computer company and wound up writing their users' guide for a general ledger accounting system. The family joke became that Neil did write instruction manuals for spaceships.

"Like any field, this one has its factional feuds, market dislocations, and similar problems. Unlike most fields, however, online documentation is constantly changing. This means there is always a new direction for people who want to sidestep the problems in order to focus on the work."

The biggest and most enjoyable challenges for Neil are writing and organizing material for different online media, programming that material to function online, designing the material to make it usable, and keeping up with and staying ahead of the rapidly changing technology. "I'm doing things now that I would not have predicted five years ago and would not even have imagined in 1979. Twenty-five years after entering the field, I'm still challenged, still having fun, and can't imagine retiring!"

Neil has three pieces of advice for anyone entering this field: "First, make sure you enjoy technology. Our ultimate product is information—content—but how that content gets to its users is becoming increasingly driven by technology. Writers who don't like dealing with technology will become marginalized. Second, think of yourself as an independent consultant. The days of a long-term job and well-defined, stable base of professional knowledge are disappearing quickly. It's crucial to define your own professional direction and drive yourself to keep up. Finally, learn basic business concepts like marketing, finance, and return on investment. The information we produce is becoming increasingly tied into the company's product lines and has an increasingly strategic aspect. If technical communicators can't speak about their product in strategic terms, someone else will."

GUIDELINES Organizing Hypermedia

- Think in terms of structure rather than format. Begin the organizing process by developing a preliminary tree diagram (called a "site map") showing the information links.
- Design the material with the reader in mind and anticipate all possible choices and approaches people may take, and think of structures that allow different ways of entering and navigating the material.
- Develop primary links between topics so readers can navigate out to related information.
- Supplement the primary links with secondary links. To provide more navigational freedom, you might create shortcut links so readers can bypass levels in the hierarchy or associational links that allow readers to connect to related parts of the Web site or connect to other relevant Web sites.
- Provide clear orientation information on the home page of the Web site.
- Make the return path easily accessible no matter how far out readers have traveled. Make sure there are at least two ways to return: directly back to the contents page, or back screen-by-screen, the way the user came.
- Use graphics judiciously.

Internet Resources for Chapter 15

Concise, SCANNABLE, and Objective: How to Write for the Web

<http://www.useit.com/papers/webwriting/writing.html>

This online article by John Morkes and Jakob Nielsen provides a discussion of users' online reading habits and their reactions to text on the screen.

Writing for Multimedia: A Guide by Michael Butzgy

<http://writing.atomicmartinis.com>

Contains considerations for Web writing, processes and guidelines on how to write tutorial scripts and effectively use the Web for testing purposes.

"Information Architecture Tutorial" by John Shiple

http://hotwired.lycos.com/webmonkey/design/site_building/tutorials/tutorial1.html

Practical and informative tutorial on creating a Web Site architecture; audience analysis, identifying and planning for content, and functional requirements.

Research-based Web Design and Usability Guidelines

<http://www.usability.gov/pdfs/guidelines.html>

This site provides pdf versions of the comprehensive guide to web site design published by the U.S. Department of Health and Human Services.

Electronic Media: Online Help, Web Site Design, and Blogs

In today's world, much of the communicating that people do is electronic—"online" rather than on paper. These online communications take many forms and serve many purposes—from e-mail messages and online documentation to Web pages. In fact, it is probably misleading to call online written products "documents" because they often transcend print to incorporate sound, video, and animation. A better term is online **media**—a name that connotes the many facets of electronic communication. When you text message from your cell phone or download content for your iPod, you're participating in the world of online media.

The innovative communication techniques made possible by online technology have convinced some people that we are heading for a paperless society. As they see it, "hardcopy" (paper) letters, manuals, books, reports, and so on will no longer be necessary as all information will be composed, transmitted, stored, and read online. While that view may be extreme—paper books and other hardcopy material will always be a part of our world—it is true that electronic technology is changing the way we communicate.

As a technical professional, you will use online media every day, and you may find yourself responsible for designing electronic texts. To do your job well, you should know how online media differ from paper documents. This chapter discusses those differences and gives the basic principles for writing and designing technical prose that will be read directly from computer screens of all sizes.

Understanding the Differences Between Online and Print Media

When readers pick up a paper document, they have limited choice about how to access the information the document contains. Traditional documents are read from beginning to end or from top to bottom. Occasionally, readers may choose to

read in reverse order; more frequently they use an index or table of contents to go **directly** to the segment of the document that concerns them. But even with these methods of entering reports or manuals, readers generally read each segment from beginning to end, top to bottom. Therefore, we can say that traditional print documents are "closed" material; readers do not have a say in creating the order or the connections between the parts.

Documents that are read using nontraditional reading paths are more "open," more responsive to the user. Hardcopy reference books are a step in this direction, as they are designed for readers to search for the material they need. Such books are heavily cross-referenced, allowing readers to find the links between items: one reference may lead to another section, footnote, endnote, table, and so on. But even print reference books require a kind of traditional path through the document. Truly open electronic documents depend on a linking system known as *hypertext* or *hypermedia* to give users many more choices about how to navigate through the information. In hypertext, users don't "read" the material, they "browse" or "view" it. Much online information is so interactive that users can browse through many links and actually create a body of material that meets their needs. The final text is dynamic and has shared authorship between writer and reader.

In the last few years, hypermedia has advanced to include many new implementations, including "**wiki**," a type of Web site that allows visitors to easily add, remove, and edit content. A "wiki engine" is the software that powers this technology as a collaborative authoring tool. The most popular application of this technology is the "**Wikipedia**," a growing, free encyclopedia that anyone can edit. Another wiki application is "Intellipedia," a system used by the U.S. National Security Director that lets the nation's 16 intelligence agencies share information. And **another**—Zillow.com, the Seattle Web site that pulls local property records to give instant estimates of home values across the **country**—**installed** a wiki tool enabling visitors to add information about their houses.

Many project teams use this tool to enable faster, more efficient teamwork. For example, MIT's Center for Collective Intelligence rolled out a wiki handbook inviting researchers to jointly post and edit their ideas about harnessing knowledge. Software developers use wikis to increase creative input from team members. Document translation groups even set up **wikis** to allow more comments on the accuracy of their translations. The list of applications is growing exponentially.

Not all online documents are as open and interactive as wikis. Some, such as e-mail, are simply a faster way of communicating than going through traditional postal channels (known as "snail mail"). In e-mail messages the content is static but the delivery is lightning fast. Writers using this medium rarely take the time to compose long, formal correspondence. E-mail messages are like a conversation: brief, cryptic, and filled with shortcuts such as acronyms and other abbreviations. Incorporating these shortcuts in "instant messages" (known as "**IMs**") has become a way of life for many people. (See Chapter 9 for a detailed discussion of writing e-mail.)

Another difference between online and print media involves readability. Reading a computer screen is harder on a reader's eyes than reading hardcopy pages.

When you are communicating online, realize that dense paragraphs of prose won't work for your readers, who may be straining to see the print on a screen where the resolution may be poor, the text background inappropriately contrasting with the typeface, and only a portion of the text fitting on one screen. When the size of the screen is reduced to that of a cell phone or a PDA (personal digital assistant) such as a Blackberry™, readability is further compromised.

The notion that writers can take any print document and make it "electronic" simply by putting it online without any changes is wrong. To write effectively online, you need to understand the essential differences between print and online media, and the differences among the many online media available. Table 15.1 highlights some of the essential differences between hardcopy documents and online material.

As Table 15.1 shows, when you are working with any online application, you must think about a document as a multidimensional, not a one-dimensional, system in which users create their own branching paths through the information—in a sense, where users have control over the text sequences. In this environment, your

Table 15.1

A Comparison of Hardcopy Documents and Online Media

Hardcopy Documents	Online Media
Paper documents; traditional in organization	On-screen documents; often nontraditional in organization
Closed documents with limited means of access	Usually open documents in which users create their own reading paths
Contain prose and graphic illustrations	Capable of going beyond prose and illustrations to incorporate video, audio, 3-D graphics, and so on
Depend on traditional page design principles	Depend on screen design principles, similar to video design
May be long, requiring cross referencing and turning pages	May involve extensive cross references; users must click on "hot buttons" to link to other material
May contain theory and "nice to know" background information	Theory kept to a minimum; the focus is on practical, immediately usable information
Slow-paced	Fast-paced
Can be modular, but each module can extend several pages	Modular with the best design requiring no scrolling from screen to screen; user can have multiple windows open at once
Often depend heavily on text	Often depend heavily on graphics
Author has maximum control; user has very little control beyond what the author allows	User has maximum control and may even modify what the author produces

primary task is not laying out the final page or screen but defining the inner structure of the document so users can find the information and the links they need.

Planning and Researching

Familiarity with online applications is essential for doing business today. For example, e-mail is the preferred mode of quick communication; in most companies it has replaced the telephone as the most efficient method of communicating. If you work for a computer company, you will probably be responsible for writing online documentation and help files for computer users who no longer have the patience or the time to read paper manuals. And as most companies use the Internet for advertising, direct sales, training, inventory control, order and production control, and so forth, you may be asked to design Web pages or to create and monitor bulletin boards, chat rooms, and conference groups.

To write effectively online, you should understand the types of media and their various purposes (see Figure 15.1).

Figure 15.1

Types of Online Media

Online Media Type	Description
E-mail	An abbreviation for "electronic mail" sent via computer from user to user.
Online help files	Computer "how to" material located online rather than in a manual. These files are usually accessed via menus that pull down or drop down over the text already on the screen.
Online documentation	An entire computer manual designed for online rather than hardcopy use. The manual can be a user guide, reference guide, or tutorial, among other kinds.
Online services	Large, commercial information services (such as America Online) often containing quick access to the Internet, software catalogues, news services, e-mail, financial data, online versions of magazines and newspapers, shopping services, and so forth.

Figure 15.1

Types of Online Media (continued)

Online Media Type	Description
Bulletin boards (BBs)	Small, often nonprofit, message and downloading forums where users can access information about specialized topics (such as an organization or an interest group).
Listserv groups or news groups	Forums where people who subscribe to the "list" can discuss topics related to the list title. Discussions on such lists and groups may be highly interactive or more formal, depending on the type of list and who is administering it.
Instant messaging	The capacity to send an e-mail message to someone already working online. The message interrupts the online work so that the recipient can view it immediately.
Chat rooms	"Real-time" informal conversations between two or more people who are logged on to a bulletin board or an online service at the same time. ("Real time" means that information or data are exchanged immediately, rather than being stored for later retrieval.) In real-time messaging, two or more users can see one another's messages as they are typed.
Conference groups	Real-time or asynchronous (not at the same time) conversations among a group of people online, occurring in a specific area of an online service or BB and centering on a particular topic. These groups can include listservs and news groups. Students often are assigned to conference groups in various courses.
The Internet	The network of linked computers and networks around the world.
World Wide Web (WWW)	A powerful hypertext/hypermedia system for exploring Internet resources.

Determining Your Purpose

E-mail, the Internet, and the World Wide Web are all types of online media, but they are at different places in the online media spectrum. Generally, online material can be placed on a continuum between two categories: traditional and nontraditional. The techniques for writing material closer to traditional characteristics resemble techniques for writing hardcopy documents but require attention to brevity and screen design. Those closer to nontraditional forms require effective screen design as well as attention to the interactive nature of the product's structure.

Analyzing Your Audience

One of the first things you should do when planning online applications is to think about your users. If you're writing traditional online help, you need to think about what questions those users may have as they work with the software. If you're composing hyperdocuments or pages for the Internet, your primary concerns are what users want to know *first*, as a home base, and then what links you need to include on that home page to take users wherever else they might like to go.

Understanding the audience for online media also includes two other research tasks: (1) exploring the design of online applications already in place, and (2) gathering information about *cognition*, or the learning process, especially as it applies to the way people understand visual material. Discovering what is already in place is easy; you simply log on to the Web and browse and/or ask for software demonstrations at computer stores or exhibitions (such as MacWorld, PC Expo, and Comdex). It might help to keep a notepad handy so you can jot down URLs (Uniform Resource Locators) and ideas that strike you as useful.

Researching visual cognition is a harder job, requiring access to professional journals and proceedings from professional conferences. You can actually use the Web itself to do some of this research—at least you can find titles of articles, papers, and other resources you can track down when you get to the library. Some of this material you can download directly from the Web, but most of the material will require further steps on your part. A good starting point for any research on technical writing is *Technical Communication*, a quarterly journal published by the Society for Technical Communication (STC [www.techcomm-online.org]). Another good source is *Intercom*, the STC national newsletter.

With a good grasp of the current trends in writing and designing online documents and applications, and with an understanding of the theory behind visual learning, you will be better prepared to combine the prose and graphics necessary for writing online material that effectively reaches your audience.

(See Chapters 1 and 2 for more on planning and researching.)

Organizing

The key to organizing online media—especially hypermedia—is to think in terms of the document's *structure* (how a document's parts relate to one another) rather than its *format* (how it looks). Because a hypermedia document lets readers navigate

through it by means of built-in links, you must anticipate all of the readers' possible choices. You must think not only of its static structure (how the elements are joined and how they are related) but also of its dynamic structure (how readers of the document may choose to navigate within and beyond the document during a browsing or viewing session). In other words, a dynamic view of document structure introduces the notion of your readers' pathways—every possible pathway that they may follow. Thinking about designing the format for individual pages or groups of pages becomes less important in this hypermedia environment where navigation of the overall structure is primary.

Although there isn't space here to give complete lessons in how to author hypermedia products (that would require another book), this chapter alerts you to the key elements in designing online material. One main point to remember when organizing text for this type of interactive "user-directed navigation" is that hypermedia links are of two types: (1) those allowing readers to go out to related text, tables, figures, and any other material, and (2) those that get readers back from the linked-to material to wherever they were before the link. For more help with the basics of organizing material for nontraditional reading paths, see *Guidelines: Organizing Hypermedia*.

GUIDELINES Organizing Hypermedia

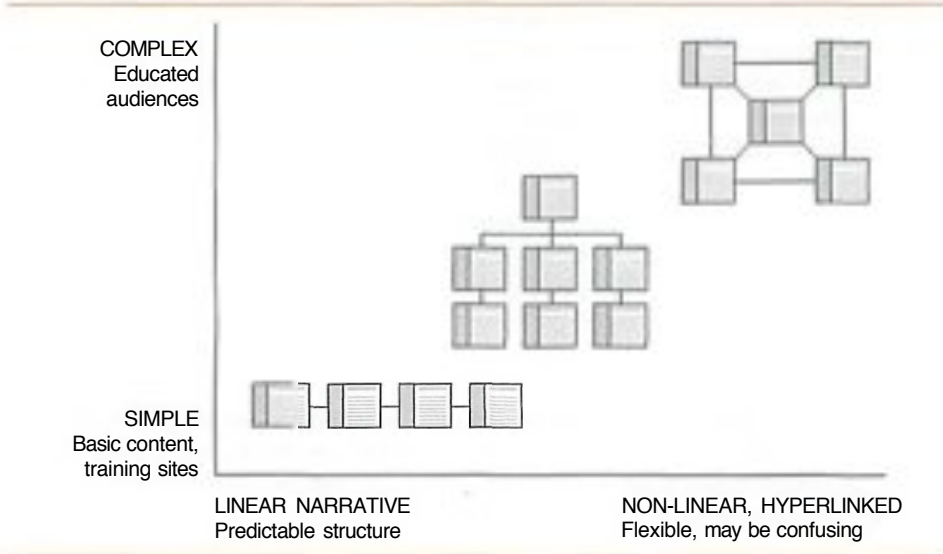
- Think in terms of structure rather than format. When you design hypermedia (Web pages and other online "linked" texts), you must conceive of all of the parts and how they relate as a network. Readers navigate from one part (or "node") of the network to another via electronic pathways called "links." Each Web site, for example, is a small network of nodes and links with the larger network of the World Wide Web. Although hypermedia information structures come in many configurations, the most prevalent is the hierarchical structure with categories and subcategories (see Figure 15.2). Usually, you begin the organizing process by developing a preliminary tree diagram showing the information links. This diagram, known as a "site map," makes it possible to see the connections between the parts and thus to create links for all the choices a user might need.
- Design the material with the reader in mind and anticipate all possible choices. As the above guideline illustrates, you need to have the reader/user firmly in mind at the beginning of the organizing process. Because users will not proceed from page to page or screen to screen in chronological order, you must anticipate the many ways they may zig or zag. You need to anticipate the various directions and approaches people may take, and you need to think of structures that allow different ways of entering and navigating the material.
- Develop primary links between topics so readers can navigate **out** to related information. As you look at the many connections between the parts, use the hypertext authoring tool (a software program such as Gofive, Dreamweaver, freeway, HotMetal, or BBEdit) to create linked paths through the information. These links should be "intuitive," reflecting commonsense, natural connections to the readers.

Guidelines Organizing **Hypermedia**, *continued*

- Supplement the primary links with secondary links. To provide more navigational freedom, you might create shortcut links so readers can bypass levels in the hierarchy or associational links that allow readers to connect to related parts of the Web site or to connect to other relevant sites.
- Provide clear orientation information on the home page of the Web site. As discussed in Chapter 3 (pp. 54–55), readers need preliminary road maps to information structures to set their expectations. Include a brief orientation to the organization on the first page (the "home page") of the Web site.
- Make the return path easily accessible, no matter how far out readers have traveled. On every screen you should design a way for users to find their way back to where they started. Like the breadcrumbs dropped by Hansel and Gretel or the ball of string Theseus unraveled as he searched the Minotaur's maze, the return "hot button" is reassuring for users and encourages them to explore information with less fear of getting lost. Make sure there are at least two ways to return: directly back to the contents page, or back screen by screen, the way the user came.
- Use graphics judiciously. Because so many graphics software packages are on the market today, you may be tempted to include many more graphics than users need for navigation or illustration purposes. In fact, too many graphics will get in the way of the information and can be annoying. Use only the ones you need. In some cases it may be wise to give users the option of a text-only version (without graphics at all) to help those users with computers that download graphics slowly. More tips for designing effective online graphics appear later in this chapter, on pages 394–399.

Figure 15.2

Three Common Structural Patterns for Online Media Design



Although you must initially design the product's architecture, hypertext has revolutionized the way we communicate. Like a mansion built with scores of interconnected rooms, hypertext media does not provide endless possibilities for traveling through it, but the houseguests certainly can maneuver through the doors and hallways in patterns all their own. It's up to the writers/builders to think ahead about what routes might be useful.

(See Chapter 3 for more on organizing.)

Designing

Designing text to be read on screen is different from designing hardcopy pages. You must take into consideration that (1) the audience can see only one screen at a time, so that long passages unable to fit readily on one screen must be fragmented into sections that the reader "scrolls" through, and (2) reading text on screen is a strain on the eyes, especially if the background contrasts poorly with the type. Readers aren't as patient with screens as they are with paper documents, which means that you need to get your message out fast.

Because of these and other differences in the way readers process hardcopy and online material, much research has gone into the best methods for designing online content, user interfaces, and graphics.

Designing Online Content

According to a study by Sun Microsystems, it takes 50 percent longer for an individual to read material on a computer screen than in hardcopy. As a result, people tend to speed up the reading by skimming the text, searching for what they want. Even the most patient people become impatient when the text is long and they can't find quickly what they need. Text online (whether it's for a Web page or a help screen or any other online product) should be as concise as possible and should use bullet points or other reader cues to direct the audience's attention to the important information. (See Checklist: Electronic Design Best Practices for more help with online design.)

HARDCOPY

Nebraska is filled with internationally recognized attractions that draw large crowds of people every year without fail. In 2002, some of the most popular places were Fort Robinson State Park (355,000 visitors), Scotts Bluff National Monument (132,166), Arbor Lodge State Historical Park and Museum (100,000), Carhenge (86,598), Stuhr Museum of the Prairie Pioneer (60,002), and Buffalo Bill Ranch State Historical Park (28,446).

ONLINE COPY

In 2002, six of the most visited places in Nebraska were:

- Fort Robinson State Park
- Scotts Bluff National Monument

- Arbor Lodge State Historical Park and Museum
- Carhenge
- Stuhr Museum of the Prairie Pioneer
- Buffalo Bill Ranch State Historical Park

Designing Online Graphical User Interfaces

A key part of the online design process is to think about the design of the graphical user interface (GUI)—the icons, menus, and other elements the users see on the computer screen. You may already have developed a GUI "standards guide." If not,

CHECKLIST Electronic Design Best Practices

- Have I chosen common fonts? When choosing type fonts for the online text, select fonts that are likely to be used on 99 percent of the Internet computers, not highly specialized characters that few computers can replicate. (Common fonts are Arial, Tahoma, Verdana, Helvetica—and the most common, Times New Roman.)
- Have I limited each screen to a single concept? Screens can accommodate only about 150 words, and you don't want to use that many. Focus on only one idea per screen.
- D Am I facilitating skimming and scanning to make communication easier? Use groupings and subheadings to chunk information into smaller units.
- Have I organized a hierarchy? Organize the content into a starting page that provides an overview and several secondary pages that each focus on a single topic.
- Am I using illustrations effectively? Place photos before you place the text because users will look at the pictures first and then read the explanations.
- Am I designing for consistency? Use repeating patterns from page to page. That includes repeated colors, design, layout, and typefaces.
- Am I linking to other Web sites with discrimination? Use links to external Web sites to build trust in the credibility of your site, but avoid overdoing it. Be sure to conduct periodic spot checks of these links to ensure that none has gone dead.
- Am I providing a road map? Always indicate where the user is in the structure of the Web site and provide ways to escape quickly. For example, you might include numbers for each page (*1 of 3, 2 of 3, 3 of 3*) or add headers or footers on the pages. Somewhere on each page should appear a button to allow the user to return to the "home" page or other pages on the Web site.
- Have I made my Web site **useraccessible**? If the target audience is the general public, make sure the site fits in at least a 640 x 480 or 800 X 600 pixel screen. Most general users do not have the *computer* capacity to view larger areas.

(See Figures 15.3 and 15.4 for examples of Web page design.)

Figure 15.3

Poorly Designed Web Page

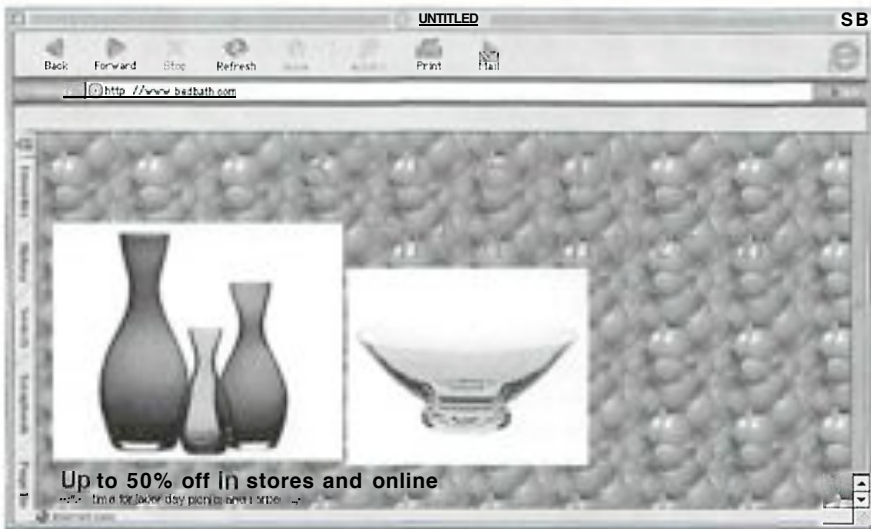


Figure 15.4

Well-Designed Web Page



that's the **first** step you'll need to take to write good online help files and other screens that require user interfaces.

Developing GUI Standards Users need to be able to have all the "equipment" necessary on each screen to navigate easily and call up the help files when they need them. When you're writing online help, the basic interface must be designed carefully so that users understand intuitively how to navigate. If your company has designers in house, the best plan is to set up a meeting of the designers, writers, and software developers and to initiate a process for developing GUI standards. If you're working alone, establishing your own set of standards is ultimately a timesaving **device—and** a favor to future users. Solo writers can modify the standardization process to include input from whatever other people are available and useful in such a process.

Rather than developing the interface for a software product by happenstance, you should tap into collective wisdom during the planning stages and create a standard design that is usable, consistent, and intuitive for users. The Steps **to . . . Developing GUI Standards** is an outline of a process that many writers have found helpful.* Eric Schaffer's work on developing GUI standards, though published in 1993, is still the best advice for planning user interfaces. You can use this process as a solo writer or use it as a guide for collaborating with a writing group.

After completing these steps, the GUI standards guide should be ready for implementation. Such a plan works well in medium-sized to large companies where teams of writers create online documents. But even a single-authored document can benefit from such forethought. If you work out a sensible, consistent GUI strategy beforehand, your final document will be much easier to produce and will appear more professional.

Testing for Usability Once the GUI prototype is completed, the next step is to begin the usability testing process by generating a list of the questions users might have. Creating such a list requires extensive audience analysis and conversations with actual users. You may want to contact representatives in the customer service department to find out the most common questions they field each day, and you might also want to conduct your own tests with users in a testing lab or in a less formal setting. A good rule of thumb is to ask at least five people to use the interface as you observe them. Make notes as you watch. Where do they get lost? What help do they need?

If you decide to do usability testing in a lab, it's a good idea to start with some simple testing strategies, such as a paper prototype. One method for creating a useful paper prototype is to put on individual pieces of paper the information that would appear on individual screens in the finished product, highlighting the hyperlinks (buttons) on each screen. A test subject sits down with the stack of

*Eric M. Schaffer, *How to Develop an Effective GUI Standard* (Fairfield, Iowa: Human Factors International, 1993).

1. Define what you're trying to do.
2. Gather data (about users, task flow, work environment, corporate strategies, and so on).
3. Develop plans for general interface issues (standard keys, color, icons, and so on).
4. Define your guidelines, including:
 - *A checklist of tasks to be done in creating help systems.* This list should incorporate everything from user interviews through the editing and production process. You can categorize these tasks in a variety of ways—for example, according to who needs to do what or the date by which particular tasks must be done. Having such a checklist in place will ensure that almost nothing gets through the cracks. (See Chapter 1, pp. 21-23, for help on writing a document specification.)
 - *One or more templates to apply to the screens to ensure a consistent "look and feel."* These templates (standardized models for screens) should include the placement of buttons, the use of color, the number of items on the screen, and the use of fonts and their meaning (what font is used for what level of heading).
 - *Style principles*, such as using active voice, present tense, concise wording, consistent terminology, and typography.
 - *Design principles*, such as how many levels of secondary windows you will allow. (Secondary windows appear when users click on primary windows.)
 - *A statement of your assumptions*, including but not limited to who the users are and under what circumstances they will use the online help.
5. Define the screen types you will use (types of menus, browsers, forms, toolbars, and so on).
6. Draft an actual model for each screen type.
7. Establish design standards and write a rough draft of a standards guide based on the examples you created in steps 5 and 6.
8. Review, test, and revise the guide.
9. Distribute the guide for wider review and revise as necessary.

papers/cards and uses a pencil to "click" on the hyperlinks, preferably talking his or her way through the choices and noting any confusions that occur. The tester then presents what would be the next screen without comment. A third person can record the subject's actions and comments (or you can use a video camera). While this process does take preparation and test time, it's a good way to spot potential problems before investing a lot of time and money in development. You can catch

many design problems early in the cycle when they're easier and less costly to fix. (See Chapter 10, pp. 237-239, for more on usability testing.)

The best plan for beginning a hypermedia document—a Web page, for example—is to think about the audience you're targeting, the content you want to convey, and the purpose of the page, whether it is for yourself or for a business. A page displaying personal information will be designed differently from one that is trying to instruct or provide specific information on a subject or a product. Spend the first planning stages brainstorming about what should be included and who is likely to read the material.

When you know what you want to say and what the audience's needs are likely to be—what questions they may have and what links to other texts they may need—and when you've agreed upon standards, you're ready to turn your full attention to organizing the document.

Designing Online Graphics

Obviously, graphics are an important part of Web pages. A graphic can explain a difficult concept or break up large amounts of text. It can help make a page more appealing, too. The disadvantage of having graphics on a Web page is that they take a long time to download; if you have a graphics-rich page and it takes several minutes to download, people may not have the patience to wait. See *Guidelines: Using Graphics in Electronic Design* for the basics about using graphics in electronic design.

Most browsers now make it possible to design textured backgrounds (also known as "wallpaper") for Web pages. This feature is simply a graphic element or color that is repeated or presented as a series of tiles and acts as a backdrop for the text. When

GUIDELINES Using Graphics in Electronic Design

- Use graphics to define complex concepts, rather than using dense text.
- Make sure your graphics correspond clearly to the surrounding text.
- Use graphics of a consistent size, if possible.
- Use audio or video to set a tone or explain a concept. But remember that unnecessary music can be annoying. Keep background music to a minimum, if you use it at all.
- Use manageable media that will load and download quickly. People are justifiably impatient with sites that take up to a minute or longer to download.
- Use color consistently, especially if your Web site has several screens.
- Use no more than a **handful** of colors on any page. Stick to darker colors where possible because bright colors will not be as vivid.
- Flashing or blinking text is often annoying. Keep it to a minimum.

► **Tip:** Remember that the textured background, like all aspects of Web pages, may appear different to different browsers and on different monitors, and remember too that the wallpaper itself is a graphic file that increases the download time for your document.

choosing such backgrounds, be careful to select textures that don't overwhelm or interfere with the text. Check contrast—color coordination with the typeface—and "busyness" of the background. The purpose of such a backdrop is to enhance the page's legibility, not detract from it.

Developing and Designing a Marketing Web Site

If you are in business for yourself or are marketing a product for a company, you may want to know some general "rules" for designing a marketing Web site. When you design such an online site, you need to use specialized techniques that will sell your product, service, or idea. Think about what you want the audience to know. What impression do you want to create? How can you keep the attention of Web "surfers" and draw them into your material? What links do you want to make to other Web sites that might enhance your visibility on the Internet? You need to think in marketing terms. See the suggestions in Guidelines: Creating a Marketing Web Site.

GUIDELINES Creating a Marketing Web Site

- Make your purpose clear. Get your message out quickly so potential users don't pass you by. Make the title and opening information explicit. Doing so makes it easier for people to locate your site with Internet browsers, because these browsers use the initial page to extract keywords for cross referencing.
- Make it easy to reach you. If you are using the Web to market your products or to create easy access to your company, you can set up your Web page so that clicking your company's name will open an e-mail dialog box. All the user has to do in this preaddressed box is type in a subject and message, then click the Send button.
- Make your site easy to navigate. If your site has several layers or pages, make sure the user can easily get from one to another. You may want to put page link buttons at the top of each page or in some other highly visible spot. Navigation buttons should be obvious and consistent across all of your pages. Make sure that your key content is no more than three pages into your site. If your Web site is more than 15 pages, it's useful to have a site map or a search feature to be sure your visitors can easily find what they're looking for.
- Make your site easy to find. You can link to dozens of free online search engines, including Google, Yahoo!, AltaVista, Excite, and many more.

continued

Guidelines Creating a Marketing Web site, cont'd

- Don't overdo the graphics. Maintain an attractive but professional appearance. Remember that graphics take time to download, so you might want to provide a text-only option for impatient users or those with slower modem connections. It's also a smart idea to reuse graphics. Doing so brings visual consistency to your pages, and it also speeds things up. Once a computer loads a graphic, the image is stored in the browser's cache and when the user clicks to another page with that same graphic on it, it's already on hand.
- Give the user enough information. People use the Internet to gather information before making purchases or taking some action. Be sure to provide enough facts to influence the user's decision. However, a Web page that takes too long to download causes many users to click away from it impatiently. Keep the number of elements on each page to a minimum and develop a focal point to which the user's eyes are immediately drawn.
- Don't overuse humor. Humor pales rapidly on repetition and often evaporates on translation. For most online documents, users want information in a hurry, and humor is just extra words.
- Don't let your Web site get stale. Web viewers will get bored if your site never changes. Major companies completely overhaul their Web sites every few months—not the look, necessarily, but the content. Always put the date of the last update on your Web page so users know how current the information is.

J

Developing and Designing a “Blog”

Weblogs (shortened to “blogs”) are a form of Web site. But blogs are a special kind of Web site and have unique characteristics. You can easily recognize blogs—they are usually a paragraph or two long and run down the middle of a page, although some are longer. They are also interactive with the entries dated and presented in reverse chronological order, the most recent at the top. At the bottom of each entry there are usually links that allow readers to post and read comments about the content.

Some Weblogs are private journals intended only for a handful of family members and close friends. They include personal photos and musings on life in general and the specific issues important to the author. Other blogs are professional and are used as a platform for experts on various subjects or as a marketing tool for businesses. In some companies, project development teams use blogs to communicate with each other and with test markets.

Types of Blogs Generally, blogs in organizations can be classified into two main categories: Internal and External. Under each of these headings fall specific types:

External Blogs	Internal Blogs
Sales blogs	Knowledge blogs
Relationship blogs	Collaboration blogs
Branding blogs	Culture blogs

Safes *blogs* market products or services/get donations for charities or political parties, and so forth.

Relationship blogs aim to create or strengthen relationships. For example, blogs offering technical support or specific information useful for clients or customers.

Branding blogs strengthen the profile of the organization by focusing on topics of interest to people in the company's target audience.

Knowledge blogs give internal employees information about what's going on in the organization.

Collaboration blogs provide a medium for project team members to share ideas and insights about their work.

Culture blogs strengthen the organizational culture by providing a forum for social or non-work-related information.

While these types categorize most blogs in the "blogosphere" (the world of blogs), some inevitably fit in more than one category and thus are considered hybrids. Here's a sample entry from a **blog** that is simultaneously a collaboration **blog** and a relationship blog:

Submit Feedback Directly to the Project Team

In an effort to enable more direct communication with our users, we have setup a Microsoft Connect site for Project. You can now submit bugs that you have found in Project 2007 and suggestions for features you would like to see in future releases of Project directly to the Project team. While we may not be able to directly respond to every submission, we do promise to read and consider every bug and feature suggestion we receive.

Follow these steps to submit feedback -

1. Go to <http://connect.microsoft.com>
2. Click on "Available Connections"
3. Select "Microsoft Office Project 2007"
4. Click the Feedback link on the left.

On the feedback page you can submit bugs and feature suggestions by clicking on the "Submit Feedback" link. You can also search feedback submitted by other users and add comments, votes, and validations. Vote on whether you agree with the **bug/feature** suggestion and use validations to indicate if you have experienced the same problem.

Note, you don't have to sign in to search existing feedback, but you must sign in with a Windows Live ID or Microsoft Passport account to submit new feedback or comments on existing feedback. To log in, click the sign in button in the top right-hand corner of the page.

If you are a part of the Office 2007 Technical Beta, you should continue to use the same bug submission tools you have been using.

Posted: Thursday, July 13, 2006 12:27 AM by [Heather O'Cull](#)

Filed under: [Feedback](#)

Comments

Many companies maintain a traditional Web page and a companion blog. The traditional page offers the formal information about the firm's product, while the blog focuses on interesting side issues that relate to the main page but aren't specifically tied to it.

For example, Stonyfield Farm has an official Web site and multiple blogs, none of which is directly about yogurt. Instead, each deals with topics of interest to people who will *buy* yogurt—one provides a forum for people to exchange advice about babies, another tells the story of an organic dairy farmer. The content is always updated to keep people coming back to the site for fresh ideas. Stonyfield's CEO, Gary Hirshberg has this advice for companies who want to start such a branding blog:

I'd say **two** things . . . : One, if you're going to go into this as a marketing device, be careful. That's not just what it is, and if you treat it that way consumers will see through it. You have to be willing to let go and allow a really honest expression of genuine things that are going on. Second thing I would say: Don't use it to sell. The minute you start selling with a point of view instead of having a chat, you're going to lose people,

One of the main characteristics of most blogs is that they are written in an informal style emphasizing the human voice. Because of that style, people are enticed to read and respond to the content almost as if they were having a conversation with a friend. Gaining that emotional connection with their target audience is a big part of **businesses'** interest in blogging. For example, here's an entry from a blog on business advertising:

The Intuitive Life Business Blog



Dave Taylor has been involved **with** the Internet since 1980 and is widely recognized as an expert on both technical and business issues. He has been published over a thousand times, launched four **Internet-related** startup companies, has written twenty business and technical books and holds both an MBA and MS Ed. Dave maintains three **weblogs**, *The Intuitive Life Business Blog*, focused on business and industry analysis, the eponymous Ask Dave Taylor devoted to tech and business **Q&A** and *The Attachment Parenting Blog*, discussing topics of interest to parents. Dave is an award-winning speaker, sought after conference and workshop participant and frequent guest on radio **and** **podcast** programs.

Investment Advice Via Email? I don't think so...

I'm just getting back **into** the office after having taken a long, boring drive from Kansas City to Boulder, Colorado. Without realizing **it**, as I was slogging along **I-70**, my mailbox was filling up with more than its usual dose of spam, unsolicited commercial email, junk, cr*p, etc etc.

Nothing unusual, really, but as I'm operating right now on a cylinder or two short of my usual, I sat and looked at a bunch of the spam, just out of some perverse sense of **curiosity**.

Here's what I want to know: **does anyone actually buy prescription drugs or stocks based on these commercial messages?**

Continue reading "Investment Advice Via Email? I don't think so..."

The audience is invited to respond to the question and in so doing is drawn in to a conversation about the relevance of spamming as a marketing tool.

Another reason blogs work well is the interactive nature of the conversations. Bloggers can get immediate feedback on products, ideas, and other topics they introduce on the site. Be forewarned, however, that readers will tell you what they

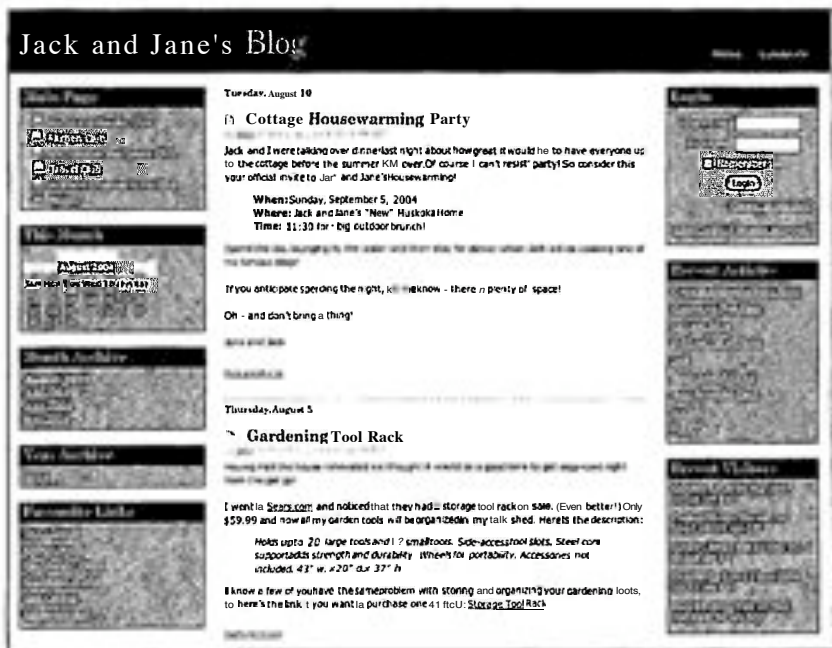
really **think**—the negatives as well as the positives. Such honest (and almost instantaneous) information can be extremely useful if you are prepared to hear it.

Design Guidelines To design a professional blog, keep in mind these usability guidelines:

- Include at least one photo or illustration. People are drawn to and remember pictures much **more** than unadorned text.
- Use headlines that give readers the gist of your blog's content. When people surf the Web, they are likely to read only the first few words of a **headline** before deciding whether to stop and read or move on. Headlines such as "What's up?" don't work as well as "Setting Sail on a Homemade Boat."
- Use big fonts for headlines, even 36 point type:

Setting Sail

- Use contrasting or subtle color as background to make the headlines stand out. These color bands may span the full length of the top or the bottom of the window, while the rest of the content often runs more narrowly down the middle of the page. Links to other blogs and other related sites are on the left- or the right-hand side.



Source: Screen shot from "business blog" from http://home.blogware.com/whosblogging_samples.html. Reprinted by permission of TUCOWS International Corporation.

- Use "speech bubbles" with graphics for some of the content to create more an informal and whimsical tone:



Source: Screen shot of Stonyfield Farm logo and dialogue box. Reprinted with permission of Stonyfield Farm Inc. Reprinted with permission

- Keep the content updated. Establish a regular posting schedule and stick to it.
- If you add links to other blogs or Web sites, make them easily visible and use titles that indicate clearly what the links are about.
- Highlight links by underlining them or using a different background color or both.
- Remember that your blog is public and may be read by more than your target audience. Don't include anything you wouldn't want your current or future employer to see.

To get started as a blogger, you can turn to many different software packages, some of which are free. *Blogger.com* is basic free software, as is *WordPress.com*.

(See Chapter 4 for more on designing.)

Editing

Unlike organizing and designing, the editing done on any online application is not much different from that done on hardcopy technical documents: the rules of clear and concise style apply, as do the basics of good grammar and punctuation. But there is one major difference: to do a good job of editing online information, you must view the document online. This in itself imposes limitations on how you can mark up the document. Some word processing programs allow you to make changes and

enter comments on a base document in a different color. You can also annotate a Windows help file by attaching computerized Post-it notes to it. Many editors and writers, however, still prefer editing on a hardcopy, which is a problem for editing online material thoroughly because the editors do not see the material online, the way users will view it.

► *Tip: Because writing online has such creative potential, it's easy for writers to get hooked on visual embellishments that are so plentiful in today's software. But no amount of whiz-bang technology can save a document that's poorly edited. Don't get lost in the visuals at the expense of the text; remember to build in sufficient time for a thorough edit.*

Having a document online can also enhance the communication when the author and editor are not in the same room—or even in the same building—by facilitating the flow of questions and answers via e-mail. The two parties can work with the document online without having to wait for a hardcopy to be delivered. (On the other hand, the editor who has access to the document file must resist the temptation to change a text without telling the author, a sin that's made quite easy by

the online formal.) See Guidelines: Editing Online Documents for the basics of editing online.

(See Chapter 5 for more on editing.)

GUIDELINES Editing Online Documents

- Be concise. Long paragraphs of dense text produce eyestrain and also force users to scroll through unnecessary screens to research one topic. Be brutal in editing out wordiness.
- Choose media that enhance the message but do not become distracting. Simultaneously presenting animation, sound effects, music, voice, video, and so forth can overshadow your real message. Check that the media and the content work well together.
- Choose clear navigational aids. Some writers like to create Web pages that seem totally free-form, with no apparent navigational aids. They argue that intuition is enough to get users through the information. Writers who go this route usually lose their audience. Make sure your users can easily see how to navigate your site.

continued

 **Guidelines: Editing Online Documents**, *continued*

- Make frequent and effective use of lists. Information is easier to grasp online when it is presented in list format. That doesn't mean all of your material should be formatted in lists—but you should place some key information in highlighted lists to attract attention to it.
- Avoid "used-car sales pitches." Remember that the words you put on the screen create an impression by their tone. Be sure to sound professional, not overly dramatic or heavy-handed. It might help to read your prose aloud and listen to how it sounds. If you can imagine yourself actually saying the words to a person, then the tone is appropriate.
- Make appropriate use of acronyms and abbreviations. In an attempt to be concise, sometimes you may be tempted to use acronyms and abbreviations instead of the entire words. Be selective about doing so because your audience may not know the terms and you can't count on them having read the previous pages or files where you've explained them. Use only shortcuts that you are sure your audience will understand.
- Allow enough time to proofread carefully. Because screens are hard to read, it's easier to miss typos and misspellings when you are editing. A misspelled word on a Web page looks amateurish and is an instant credibility killer.

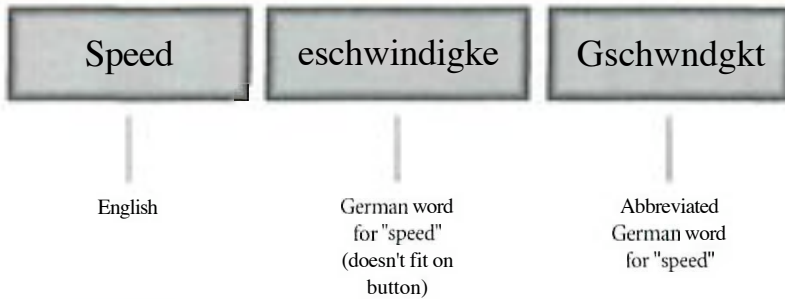
 **Tips for International Communication**

If you're editing an online document that will be translated for international audiences, you need to pay attention to some specialized editing considerations.

- Keep in mind that the word count in English will not be the same as the word count in another language. What appears as a single-window topic in English may be boosted to multiple windows because of language inflation. Usually, translating English into other languages increases the word count by about 30 to 50 percent.
- Make sure that the links in your hypertext documents are translatable keywords. If they aren't, edit the translated material carefully to ensure that the new keywords make sense to the target culture.
- Be prepared to change the graphical user interface (GUI) because it may not work in a different language. For example, consider the word "speed" in a button on the screen. The German word for speed is "Geschwindigkeit." Even allowing for 30 to 50 percent expansion of text in translation, the word is larger than the button it captions (see Figure 15.5).

Figure 15.5

An Example of GUI Problems in International Communication




Quick Review

Writing online text requires a fascinating mixture of multimedia skills. In today's visually oriented society, people's impatience with dense text and bulky hardcopy volumes makes online documents especially important. With the advent of the Internet and the World Wide Web, almost anyone can author a Web page and distribute personal or professional information to a global audience. For a business or industry to remain competitive in today's market, their writers must know how to write and design effective online material.

- Paper documents and online media are different and require different writing, organizing, and designing techniques.
- Online media are often nonlinear and require writers to organize for nonlinear reading.
 - When organizing online material, think in terms of structure rather than format.
- Hypertext, a system of links between topics, allows users to create their own paths through the information. Designing hyperdocuments depends on writers anticipating the many paths users may take.
- Web sites are often marketing tools that require designers to use specialized marketing techniques to draw the audience's attention.
- Designing effective online screens requires special attention to readability issues. The key is to keep the text concise and use graphics to focus readers' attention rather than distracting them.



Exercises

1. Find a WWW page and apply the guidelines for editing online documents found on page 405. Analyze the Web page's strengths and weaknesses in terms of that list.
2. Establish a clear set of graphical user interface (GUI) standards for your office or for your group project in class. Follow the guidelines suggested on pages 396-398. If this is a classroom project, distribute the standards to your classmates and to the instructor for review; if this is a work project, ask as many colleagues as possible to participate in the review process.
3. Design your own Web page. Pay attention to the guidelines presented in this chapter, and be sure to have at least five people check your site and give you feedback on its content and design.



Community Action Project

Volunteer to build a Web site for an organization or a small business in your town. Begin by researching the target audience and determining what their needs are, and then structure the information into a site map on paper. Distribute the map for feedback from the organization and at least five members of the target audience several times before you "go live" with the content.

PROFILES IN PRACTICE

Ann Wilson Buttram

Technical Editor

*Oak Ridge National
Laboratory*

Writing and Editing Newsletters

Ann Wilson Buttram's loves of reading and writing led her to a career that includes work as a newsletter editor. After college, she edited publications for the University of Tennessee's Office of Continuing Social Work Education. "I worked on all sorts of materials, including *Stimulus*, the alumni newsletter for the school." It was here that Ann was given an introduction to project funding needs. "The newsletter was supposed to be a quarterly, eight-page publication, but it was a lean time for social work funding, and there were often no funds for the newsletter. It shrank to four pages and was published only once or twice a year for a while." Today, 20 years after Ann worked on the newsletter, *Stimulus* is still around and back to eight pages.

She became newsletter editor at the University of Tennessee's Computing Center, where the *UTCC Newsletter* was published monthly. Ranging from 14 to 20 pages, "the newsletter required much more work and attention. Many of the articles were "how to" pieces on using hardware and software resources and the audience was vast, ranging from beginners to sophisticated supercomputer users producing advanced research. We kept very high standards; articles were reviewed for technical accuracy, readability, and usability."

Ann is currently a member of Publishing Services at Oak Ridge National Laboratory (ORNL), a multiprogram science and technology laboratory currently managed for the U.S. Department of Energy by UT-Battelle. "Among my early assignments was the *RCRA/CERCLA Update*, a quarterly eight-page newsletter published through DOE's Office of Environmental Guidance (EH-23)." Read primarily by DOE facility managers across the United States, this newsletter is one of many tools to help with legal and financial decisions regarding compliance with environmental laws. Ann's most recent newsletter assignment was called *Oak Ridge Reservation Land Use Planning Process*, with a focus on information related to the possible use of land no longer needed by DOE for mission purposes. The audience included local, state, and federal officials (mayors, governor, representatives, and senators) and heads of regulatory agencies.

Ann's experiences with each of these newsletters were both positive and challenging. "They involved a great deal of writing, substantive editing, and extensive interaction with contributors and reviewers, the subject-matter experts. All were team products. In producing these documents, I've had the opportunity to learn about many areas outside my own expertise, which has made for a very interesting career."

GUIDELINES Marketing Documents

- Understand the purpose of your marketing document.
- Determine your audience.
- Choose **the** best medium **for** your message.
- Use an eye-catching design and be sure your document is balanced, attractive, and orderly.
- Be sure to proofread and edit your document.
- Elect a method of delivering your marketing document, either via print copy distribution **or** via electronic distribution.

Internet Resources for Chapter 16

Putting Together a Brochure

http://www.wyattcomm.com/heres_how/HH_brochure.html

A brief guide for creating and developing a brochure.

Seven Tips for Creating Newsletters that Work

http://www.buyerzone.com/features/news_and_deals/news000216-2.html

Useful information on designing a Web-based newsletter.

Creating Marketing Brochures

<http://entrepreneur.com/homebasedbiz/homebasedbasics/marketing/article38034.html>

Although this article is geared to the small business owner who wants to get the word out about a product or service, this is an interesting article with invaluable tips.

Fliers, Brochures, and Newsletters

Writing in the technical professions isn't always about conveying technical information. Occasionally, you may need to try your hand at writing with a different purpose: marketing a technical product or a service. This type of writing not only conveys information but also captures the audience's imagination.

Understanding Marketing Writing

Marketing writers have a knack for communicating with flair—they combine words and design to "grab" readers and move them to action. Unlike most other technical documents, marketing pieces encourage people to read not because they have to, but because they want to. Attracting readers' attention—getting them to pick up the marketing piece in the first place—is a craft that differs from technical writing in purpose, strategy, and style.

- *Purpose* Technical writing informs or conveys information. Marketing writing can do those things *and* attract attention, excite interest, and persuade.
- *Strategy* Technical writers strive to appeal to logic. Marketing writers strive to appeal to emotions. (Proposal writing uses the emotional appeal as well. See Chapter 14, pp. 362-363 for more on these appeals.)
- *Style* Technical writing uses objective, technical language. Marketing writing uses vivid, sensory language.

Even though the two types of writing differ significantly, you may find yourself in a situation where you have to do both. This chapter gives you an overview of marketing writing and the basic tools you'll need to write and design some of the most common marketing pieces: fliers, brochures, and newsletters.

Planning and Researching

As you begin planning your material, it's important to have a general sense of the various types of marketing pieces and their functions. That way you will be better

equipped to know whether you're using the right strategy and whether you have chosen the best medium for your message.

Determining Your Purpose and Audience

While audiences for technical documents want to know how to *do* something, audiences for marketing documents usually want to know how to add to their skill set, do something differently, work more creatively, or make more money. Appealing to these desires is the overall goal of marketing writers.

Marketing documents come in all shapes and sizes. Figure 16.1 lists some of the types, their specific purposes, and their intended audiences. This chapter focuses most fully on the last three. As noted, many technical professionals—

Figure 16.1

Marketing Documents

Type	Purpose	Audience
Direct mail/ e-mail	Announce new products and special offers	Potential customers
Fact sheets/ data sheets	Support sales by providing details and specifications	Lay people or technical people, depending on the product
Press releases	Announce new products or company news	Newspaper readers, radio listeners
Case studies	Illustrate company's success by showing how it has helped real customers	Potential customers interested in in-depth information
Fliers	Announce a new product or event	Potential customers or attendees
Brochures	Promote products or services and motivate the customer to action	Usually, general public
Newsletters	Build a sense of community; share information	Organization employees, existing customers, or people interested in a special product

especially those in small companies or **start-ups**—are called on to create these marketing pieces. Most often, the documents needed are fliers, brochures, and newsletters.

Fliers are meant to be mailed (either via snail mail or as e-mail attachments), posted on bulletin boards, distributed by hand, or displayed on tables where people will be able to easily pick them up. Usually, they are one page long and therefore the most cost-effective to produce and mail. However, their short length limits the information that they can contain.

Brochures are usually of two types: sales brochures or informational brochures. Sales brochures are created to sell a company's product or services and focus specifically on results, outcomes, and benefits to the customer. For example, a brochure for a new wireless service might describe the details of coverage and the various pricing plans, and explain why each is useful for various types of customers. Informational brochures are created to educate the reader, thereby raising the profile of the company and promoting goodwill. For instance, an electric utility company might publish a brochure on ways to save energy, giving specific tips and data on how much the customer might save by taking a few simple steps. Both the customer and the company benefit from that exchange of information. Regardless of the type, most brochures are simple front and back, four-panel publications or front and back, six-panel publications. This extra space allows you to include much more information than you can in a flier.

Newsletters are primarily vehicles for sharing **news**—either within a particular organization or among customers. But another, specialized type is the subscription newsletter. Each type has a different function. Organizational newsletters keep employees up to speed on what's happening throughout the company, such as new hires, upcoming events, recent promotions, and so on. They build company team spirit by making employees feel part of a caring community. Newsletters can also be used to disseminate information to a group of existing **customers**—a monthly letter from your local farmer's market or garden shop, for example.

Subscription newsletters, on the other hand, are designed for people interested in information about a specific product or service, such as vintage Ford Mustang owners or money market investing. People who subscribe to these newsletters pay to gain tips on the product and to learn more about others with the same interests. Both types of newsletters can be many pages long and can be as large as commercial newspapers or as small as 8½ x 11 inches.

As you can see, there can be some overlap in purpose and audience among these marketing pieces. Many organizations use this repetition as a marketing strategy, creating brochures and fliers for the same **product**—fliers to pique interest and brochures to give more details. Add mention of the product or event in the company newsletter and the organization can be fairly sure the target audience will not only hear about the event, but will also remember it. With careful planning, coordinated marketing efforts get results.

(For more on planning and researching, see Chapters 1 and 2.)

Organizing and Designing

Designing text for marketing documents requires writers to think first about the key points they want to stick in the audience's minds, then about the possibilities and limits of the page design. Choosing great text but displaying it poorly will defeat your purpose. Likewise, using an eye-catching design with ho-hum text won't get the job done either. In marketing pieces more so than in any other document type, design and text are inseparable.

Principles of Marketing Design

The first thing the eye notices about marketing design is the shape of the page layout. It should be pleasing to the eye and draw the audience's attention to the most important points. You make that happen by paying attention to these basic principles:

- Proportion
- Contrast
- Harmony
- Alignment
- Proximity

Proportion means that the margins and relationship of type and art are balanced and seem to work together. For example, long, thin type styles work best with long, thin layouts. Short, wide type works best with short, wide layouts.

Contrast is useful for attracting attention. Vary the elements on the page (type, color, size, line thickness, shape, space, and so forth) to emphasize differences and make important points stand out. For example, **HEADLINES** should contrast in size to **Subheadings**. Main ideas should be large and bold in color with supporting detail smaller and in softer shades. Of course, be careful not to overdo the variety or you may create a page that looks chaotic.

Harmony means that all of the design elements must work together throughout the piece. Although you need contrast for emphasis and interest, be sure the parts of the design cooperate instead of seem discordant. For example, colors should blend well and type styles should complement each other. If the document is longer than one page, repeat versions of the same visual elements on all of the pages to create unity within the document.

Alignment is the key to presenting a sophisticated, orderly look. When items are aligned on the same vertical or horizontal plane, there is an invisible line that connects them, in both your eye and your mind. For example, items aligned flush left on a document seem connected, while items aligned flush right are part of another connected group. This principle applies to artwork as well as text.

Proximity means that items related to each other should be placed close together. In general, people tend to unify items when they appear in groups of three or four. The three or four items become one visual unit rather than several

separate units. For example, mailing addresses are usually three lines long and are viewed as a single unit. Three is also the usual number of musical pieces played in a symphony concert, usually appearing in a grouping in the center of the program.

Following these basic principles, you can design all types of marketing pieces. To give you even more confidence, here are some special tips for fliers, brochures, and newsletters.

Fliers

Fliers are one-page documents that focus on one key point and answer the questions *what*, *when*, and *where* with limited or no attention to *why* or *how*. Because you have such limited space, the organization and design must coincide dramatically with the message to communicate your point well. The first step, then, is to determine the main message you want to get across and what action you want from the audience. For example, do you want to focus on the product's stylish looks or its efficiency? Do you want the audience to call you for more information or to come to a promotional event? Once you know the answers to these questions, you can design the flier to accomplish these objectives (see Figure 16.2).

• *Tip: If you use photographs of actual customers using the product or service you're promoting, be sure to show people with whom readers would want to be associated. Remember to emphasize the product's benefits and advantages to the customer.*

Begin with a headline at the top of the page that identifies your main point. That heading should stress the reason to read the whole piece and set the theme for what follows. In the body of the flier, use illustrations to reinforce the theme.

Feature your company's name and logo prominently. If you want customers to contact you, list your contact information clearly. It's also a good idea to give a deadline for their actions: *For more information or to place an order, contact Debra at (206) 268-9000. Due to a limited supply, orders received by November 1 will be given top priority.*

Brochures

Brochures share with fliers the technique of a highly attractive front page, inviting readers to pick them up and read them (see Figure 16.3 on p. 415 and 16.4 on pp. 416–417). However, the front panel of a brochure has another function: to entice readers to open to the subsequent panels. Once readers do open the brochure, they should see information designed attractively across all the panels, and they should be able to find what they need to take further action. Remember that readers will give the brochure little time to make its point. As a designer, you have to create a mix of text and visuals that will keep their attention and stick in their minds after they've finished reading. In general, use the guidelines in Figure 16.3.

Figure 16.2

Flier

Main point

**Decatur's Community Theater
Presents**

Theater logo



Illustration sets mood



What

A witty, rollicking festival of songs and humor

When

WHEN:
April 12-13 & 19-20, 2006 — 7:30 p.m.
April 14 & 21, 2006 — 2:00 p.m.

Where

WHERE:
Decatur Civic Center Theater

Sponsored By

Doug and Peg Schmalz and ADM Foundation

**Tickets Available At The
Decatur Civic Center Box Office
217-422-6161**

Figure 16.3

Brochure Guidelines

Panel	Content	Design
<i>Frontpanel</i>	Topic/title, visual image, company name and logo, clear identification of intended audience.	Title in 18+-point type.
<i>Inside panels</i>	Information about the product's benefits for the customer. Divided into segments. Supportive facts such as customer testimonials or examples. Comparative data with competitors and industry benchmark information. Key thematic words. Answers the questions <i>who, what, when, where, why,</i> and <i>how</i> .	Use readable-size font (10- to 11-point type). Limit sentences to 15 words or less. Limit paragraphs to 2-4 sentences. Use visual images and white space effectively. Let text and graphics stretch across two panels to avoid rigid column structure. Provide headings and subheadings.
<i>Back panels</i>	List of current clients or customers. Contact information (and map?). Brief summary/highlights of topic. Middle back panel can be used as space for a mailing address and stamp.	Same design elements as inside panels.

Newsletters

Whether you're writing an in-house or a subscription newsletter, you need to organize and design the content so that it provides information and entertains readers (see Figure 16.5 on p. 418). Even financial newsletters often contain human-interest stories along with the "hard news"—it's the combination of facts and fun that makes newsletters appeal to the audience.

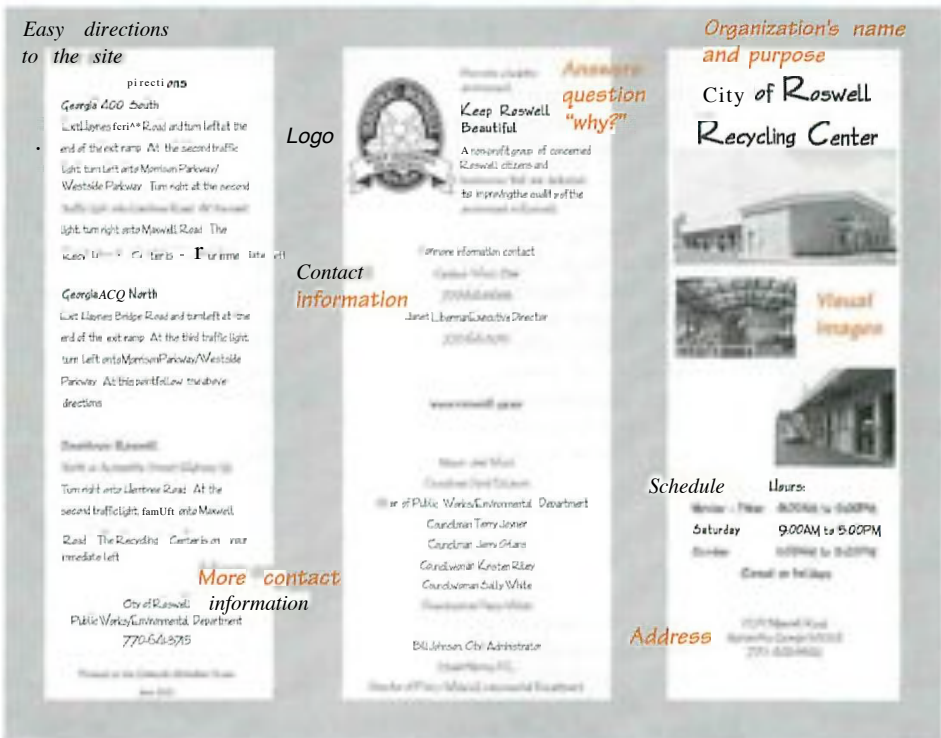
All newsletters have some design features in common. The first page contains a *banner* that includes the publication's title and logo, date, volume, and issue number:

Tech News! *Sept. 2007, vol. 3, issue 3.*

On that page also is a table of contents for the issue, a headline for the major story, and at least the first portion of the story (with a page number for the continua-

Figure 16.4

Brochure



tion). Your goal is to hook readers to turn the page and read on. You may also place a large visual on the front to attract readers' attention, and, if you have space, you can begin a second story that continues on the inside.

Throughout the inside text use concise, attention-getting headlines for the main stories and short subheadings to break up longer stories into readable chunks. Remember that most newsletters use a two- or three-column design, so your line length is shorter than in full-page text. That means overall story length must be short and the sentence lengths must be short as well (10-15 words).

It also creates interest if you intersperse photographs within the text to feature people, rather than abstract concepts. When you include photos, be sure to use descriptive captions including names and company department, if applicable. Keep in mind that people love to read about people—themselves and others. The more people you can mention, the more popular your newsletter will be.

Somewhere in the text—most often on page 2—place the *masthead*, which is a box that lists the newsletter staff: editor, writers, graphic artists, and other contributors, as well as contact address and e-mail.

Figure 16.4

Brochure (continued)

Answers

What Can You Recycle at the Roswell Recycling Center?

Plastic

The Recycling Center takes plastics numbered 1 or 2 and plastic bags. To determine what number, plastic containers are turned the container over and look for a triangle. The designated grade number of plastic is inside the triangle. Rinse the containers thoroughly. Labels do not have to be removed. Lids should be removed.

#1 Plastics - PET/Polyethylene
Terephthalate Mostly found in soda containers.

#2 Plastics - HDPE/High Density Polyethylene Found in milk containers, detergent bottles, yogurt containers, and water bottles.

Plastic bags - Grocery, cleaning, shopping bags.

Not Accepted Plastics numbered 3, 4, 5, 6 or 7. Any other types of plastics not designated.

Glass

Rinse glass jars, remove lids, and separate by color. Colors are clear, brown and green. Labels don't have to be removed.

Not accepted Mirrors, CRT's, drinking glasses, light bulbs, and stained glass, iron windows.

Paper

The Recycling Center accepts all types of paper. Please separate into the following manner.

Newspaper, including glossy inserts. Remove the newspaper from staples or fasteners before placing on the bin.

Mixed Paper - junk mail, adding machine tape, return messages, colored paper envelopes (including those with plastic windows), brochures, copy paper, newsletters, post-it notes, paper with tape, lined legal pad, scratch pad, retobook paper.

Computer Paper - Green or white bar feeder type, computer paper, shrinkable computer paper.

Magazines - Other uses before recycling - share with a friend or take to public facilities.

Phone Books and White Paper Manuals with glue.

Regular Cardboard and Paperboard Food Containers - This includes cereal boxes, shoe boxes, toy boxes, and brown paper bags.

Corrugated Cardboard Moving boxes - should be broken down and flattened.

Drink Boxes/Milk/Juice Cartons - These containers are made of paper that is coated with plastic or aluminum. Rinse containers and flatten them. Bring to the cardboard recycling area.

Hard Back Novels / Paperback Books: Special breaks provided for these items.

Metal

Metal should be clean and then separated into one of three categories.

Ferrous Metals - Contains iron which is magnetic. Includes food containers, metal lids to glass containers, metal hangers, and many appliances. (There is a \$10 charge for each appliance that contains frozen.)

Non-Ferrous Metals - Non-magnetic. Includes copper tubing, plumbing materials, electrical wire, brassieres or fixtures, aluminum siding / shed doors and lead weights.

Aluminum Drink Cans - Non-magnetic. Separate from other aluminum. Includes beer/soda cans, aluminum slates and aluminum foil.

Miscellaneous:

Car Tires - \$200 charge per tire.

Packaging "Peanuts" / Styrofoam Bits: This item is stored at the center and is provided free of charge.

Furniture, Clothing, Etc.: Goodwill has a trailer at the Recycling Center. For information on the items that Goodwill accepts, call 404-377-0511.

Please cover all plastic, glass, and metal containers.

770-442-8522 More contact **information**

Page layout includes 3 columns and cross-column text

The Roswell Recycling Center offers bins of the facility to school groups, clubs, and other interested individuals or groups. Workshops or meetings are available at the Roswell Recycling Center. For more information or to schedule a workshop or to place an order, call 770-442-8522.

Source: Reprinted with permission of the City of Roswell Recycling Center, Roswell, GA.

Electronic Delivery: HTML or PDF?

On some occasions, you may want to distribute your marketing documents to your audience electronically. Doing so has many advantages. You can reach a broader audience quickly and much less expensively than paying printing and postage costs. However, once the document leaves your computer you have to depend on the audience to read and perhaps print what you have sent. With so many variations in people's computers, software, work environments, and workloads, it's hard to tell what actions (they will take).

To make their choices easier, you should decide what the best electronic format for your document is. Do you want your audience to read the material on the screen or do you want them to print it in hardcopy? If you want to put a flier or a brochure on a Web site, you will likely use HTML code to create the document. If you want your audience to print the flier, then the better choice is to use portable document format (PDF).

Figure 16.5

Newsletter Front Page

Banner

Feature story

Visuals to attract attention

Table of contents for issue



BLDD COLUMNS

VOLUME 7, ISSUE 3

BLDD Projects Displayed at the 2003 Joint Annual Conference of IASB/IASA/IASBO

Two BLDD projects were recently selected for display at the 2003 Illinois Association of School Boards (IASB) / Illinois Association of School Administrators (IASA) / Illinois Association of School Business Officials (IASBO) Joint Conference. The conference will be held at the Hyatt Regency Hotel in Chicago, November 21-23. The projects on display in the Educational Environments Exhibition include Cerro Gordo Elementary School (Cerro Gordo CUSD No. 100) and the new Normal Community High School (McLean County CUSD No. 5).

Cerro Gordo Elementary School
 Project Architect: Paul Adams, AIA
 Project Director: Chuck Kress, AIA

Primarily designed to replace the original circa 1930 grade school, this new addition combines a 1950's addition with a new addition of 12 classrooms. The plan for the addition includes three pods of four classrooms surrounding a central commons space. The project also includes a multipurpose room that serves as a gymnasium, cafeteria, and media center.

The building exterior utilizes form and scale to create a residential feeling consistent with the adjacent neighborhoods. A main entrance, located on the east, has direct access to school offices. All who visit the school must enter the office before gaining access to the rest of the building. A second entrance, located on the south, is used primarily for bus drop off and pick up.



The interiors reflect both the traditions of the community and the importance of the work that is done there. The main entry lobby features large expanses of glass between the lobby and the office providing a feeling of openness. The lobby features a traditional "compass rose" pattern in the terrazzo flooring. The wall opposite the entry doors is faced with brick laid in an arch pattern reminiscent of the old building.

Finally, BLDD salvaged the stonework from the "900 building" and incorporated it into the brickwork to serve as a lasting memorial to that building.

Normal Community High School
 Project Architect: Bruce Maxey, AIA
 Project Director: Randall West, AIA

This new 300,000 square foot High School is designed to accommodate 1800 students. The building plan was developed



BLDD News:

- K-12 PREVENTIVE MAINTENANCE WITH THESE WALLS ON THE taARM) 2
- BLDD WEBSITE REDESIGN 3
- WIC COLLEGE OF PHARMACY 4

Source: Reprinted with permission of BLDD Architects, Decatur, Illinois.

HTML is the code used to create Web pages, and it is best used for documents meant to be read online. HTML cannot maintain all of the original formatting of most documents. To create marketing material for the Web, follow the guidelines given in Chapter 15, pages 399-400.

► **Tip:** *In rare instances when you want to add a PDF link to a Web page, don't link directly to the PDF. Most links don't let users know that there is a PDF file rather than an HTML file, and PDFs take longer to download. Avoid annoying Web surfers who are expecting material to appear immediately on screen. Instead, link to an intermediate page where the contents of the PDF are summarized in HTML. From there, forewarned users can link to the PDF and download it.*

PDF files are primarily for documents the audience will print. PDF files look the same on screen as they do in print, regardless of what kind of computer, printer, or software the audience is using. You can send PDF files as an attachment to an e-mail or you can link them to a Web site.

Most marketing documents that are meant to be posted or displayed on tables for the people to pick up are best done the old-fashioned way: printed and either mailed or hand-delivered. Fliers and brochures certainly fall into that category. Increasingly, brief newsletters are appearing online, but they are most often distributed in hardcopy versions as well.

(See Chapters 3 and 4 for more on organizing and designing.)

Editing

Marketing writers target the heart as well as the head. The words they use are designed to have an impact on not only the logical side of their readers, but also the emotional side. No matter what kind of marketing piece you are creating, you need to use a style that causes readers to respond with more than their intellect. As you write, use the guidelines on page 420 to make your language come alive.

Tips for International Communication

Marketing writing can be challenging if you are writing for a different culture. Because these documents depend on appealing to emotions, you need to be sure that you understand the customs and expectations of your target audience. Mis-gauging audience emotions could produce the opposite reaction from the one you want. Before you write, consider how the audience's culture might affect the following:

- **Conversational tone:** U.S. audiences expect a subjective and casual tone in marketing pieces, as do most audiences in the United Kingdom. In fact, that's often what differentiates the neutral writing found in technical documents from the more personable language in fliers, brochures, and newsletters. But too much personality may seem patronizing and unprofessional to some international audiences. When writing for a different

GUIDELINES Writing Marketing Copy

- Focus on the reader's needs. Use "you" words that focus on the reader's needs rather than merely describing the product or service. "Do you want to increase your productivity?" rather than "This widget increases employee productivity."
- Write in a conversational tone using words at the level of a lay reader. Avoid highly specialized, technical language. "DataWise helps you store your computer files quickly and easily" rather than "DataWise Corporation (DWC) focuses on implementation of processing methods for electronic storage of information."
- Support any claim you make. Offer specific proof: facts, examples, customer testimonials, and so on. "Our widget surpassed XY2 Company's widget in the October 2004 Efficiency Survey" rather than "Our widget is 20 times faster than the nearest competition."
- Choose strong, action-oriented verbs and vivid **adjectives**. "Connect with the power crowd!" rather than "Be part of the administration."
- Use encouraging language and avoid threats. "Trust us to help you succeed in today's economy" rather than "If you miss this opportunity, your company may lose money."
- Evoke the physical world and sensory feeling. "Feel the surge. ElectroCorp!" rather than "ElectroCorp creates powerful equipment."
- Use standard grammar, not slang. "We understand your needs." Rather than "We're hip to your needs." (Slang goes out of style very quickly.)

(See Chapter 5 for more on editing.)

culture and a different language, keep your tone more formal and less conversational.

- **Types of support for marketing claims:** To convince your target audience that your claims are valid, use evidence they respect. In some countries (Mexico, for example) intensity of emotion is most convincing, while in the United States factual information works best. In many Arabic countries, the best support for a claim is the number of times it's repeated. "I would stake my reputation on the fact that Wizzard's Widgets are the best in the world" may work in some places, while "Customer surveys in 15 locations show overwhelmingly that Wizzard's Widgets are superior to Wally's" works best in **others**.
- **Sequence of information:** Low-context cultures, such as the United States, prefer the direct approach in marketing. For these audiences, deductive order (moving from claim to supportive evidence) is most appropriate. "Wizzard's Widgets are superior to Wally's. They are low maintenance, inexpensive, and easy to ship." In high-context cultures, people find inductive order

(moving from evidence to claim) most persuasive. In Japan, for example, details come before the concluding claim. "Wizzard's Widgets have few maintenance problems, they are inexpensive relative to other brands, and they are easy to ship. Therefore they are superior to Wally's."

PDFs for International Audiences

If you are creating a PDF for electronic distribution to many countries, format the printable documents for different sizes of paper. Some countries use 8½ by 11 and others use different standard dimensions. Make sure your document will fit both.

For more about cross-cultural communication, see Chapter 7.

Quick Review

Marketing writing:

- Informs and excites
- Appeals to emotions
- Uses vivid, sensory language
- Focuses on readers' needs

The main principles of design in marketing are:

- Proportion
- Contrast
- Harmony
- Alignment
- Proximity

Fliers are usually one page and announce a new product or event. They focus on one main point.

Brochures can be of two types: sales or informational. They are usually four to six panels and promote products or services and motivate customers to action.

Newsletters can be of two types: organizational or subscription newsletters. They build a sense of community and share information. Subscription newsletters are for people who will pay to get timely tips and information on a special product or service.

Exercises

Design a one-page flier for an event at your school or organization. Be sure to balance visual images with text and include all the necessary information people might need. Make it eye-catching enough to attract attention and make the text large enough to be readable if the flier is posted on a crowded bulletin board.



Community Action Projects

1. Many organizations in your community need help marketing their products or services. Find a small company or organization that could benefit from a marketing brochure and offer to design it for them. Research the target audience and the company's needs (including marketing budget) before you begin the design process and provide at least two versions of the flier for client feedback before choosing the final design.
2. Develop a pilot newsletter for an organization to which you belong. Try to feature human-interest stories along with "hard news" and include as many people as possible.



Technology Challenge

Using graphics software, design a four- to six-page retail catalogue for an imaginary store.

PROFILES IN PRACTICE

J. Suzanna Laurent

President

*Laurent Technical
Communication Services*

Presenting Successfully

"Over the years, I've learned that life is much too short to work in a profession you don't like." Suzanna spent 24 years working in positions that were not particularly satisfying or challenging, but these jobs helped her earn a living while she and her husband raised a family together. When her youngest child was in school, Suzanna became a member of the American Business Women's Association and went on to serve as a national officer on the board of directors of ABWA, combining her love of writing with a keen interest in helping others by delivering programs and presentations to various chapters throughout the country. "In that position, I learned that I truly loved to show others how to help themselves grow personally and professionally." She also discovered a genuine talent for making presentations.

"I was delighted that my new profession would allow me to do a wide variety of work while using my talents and education as a writer. I can write almost anything, develop user interfaces, design Web sites, deliver training, ensure the usability of my product for its intended audience, and much more. If I get bored, I can switch to an entirely different community of practice and use my writing skills in a completely different area. There will always be a need for good writers to design and explain technical information in a wide variety of formats. Even after working in technical communications for 18 years, I am still excited."

The most fulfilling aspect of Suzanna's job is hearing positive feedback from women who've attended her presentations and have gone on to fulfill their goals and ambitions. "It validates the fact that I can and do impact other peoples' lives. That's why I love making presentations—I know that I can actually make a difference in the life of someone else!"

Her advice to prospective technical writers? "Make a lifelong commitment to education and remember that education doesn't stop with formal schooling. And if you want to get involved in training and making presentations, sharpen your interpersonal skills and conquer your fears of public speaking—join an organization that will help you hone your skills, whether by working with others on a team or participating in running an organization. The key to success is to gain practical experience that will carry you throughout your journey in life."

GUIDELINES Presenting Visuals

- Limit each visual to one idea.
- Illustrate only the main points, not every detail. Use phrases rather than full sentences in your visuals.
- Use fewer rather than more visuals.
- Use colors in moderation, but use them consistently and for a purpose.
- Use type fonts that have thick, readable characters, and be consistent in their use. Don't overcrowd the visual.
- Allow the audience time to read a visual before you begin your explanation.
- Paraphrase the text of the visual; don't read it word for word.
- When you've finished discussing the point the visual illustrates, remove it from the audience's view.

Internet Resources for Chapter 17

Allyn & Bacon Public Speaking Web Site

<http://www.abacon.com/pubspeak/>

This Web site contains some great information to help you organize a speech. The site is divided into five sections (Assess Your Speechmaking Situation, Analyze Your Audience, Research Your Topic, Organize and Write Your Speech, and Deliver Your Presentation) and even includes interactive exercises and links to great speeches delivered throughout history.

Presentation Skills

<http://lorien.ncl.ac.uk/ming/dept/Tips/present/present.htm>

Designed for engineers, this site offers advice on oral and poster presentations and includes links to other useful sites.

Presentations.com

<http://www.presentations.com/>

Although this Web site has a commercial feel, it is packed with useful information on how to create a visual presentation, how to deliver it, and the type of technology currently available to help you carry out a presentation successfully. The Creating section of the site contains a Case Studies section that contains several articles that discuss how visuals have been used in different kinds of presentations from court cases to classroom situations.

Professional Presentations

Technical professionals must be skilled not only in writing clearly but in presenting their ideas orally as well. The ability to explain complex technology and science to the public, clients, government regulatory agencies, and other interested audiences requires a clear understanding of the dynamics of speaking in front of a group, communicating information for listeners rather than readers.

In one respect, oral communication is a lot like written communication: you need to plan ahead and prepare material that meets the needs of an audience. What's different in oral situations is that you're "live" and must consider the dramatic elements of tone of voice, physical gestures, and even appearance. Like an actor on stage, you need to constantly gauge the audience's reactions and make adjustments *as you are speaking*.

Planning and Researching

The process of planning and researching oral presentations is much like planning and researching documents: you need to pay attention to purpose and audience. A first step is to double-check facts and material to make sure you're current on the topic, especially if you are speaking to a knowledgeable audience. It's embarrassing for the audience, but especially for the speaker, when the supposed "expert" on the topic has misgauged the knowledge level of the audience or has based the talk on outdated facts or figures. Being caught in situations like this is avoidable if you do sufficient research up front.

Engineers, scientists, and others who work in business and industry frequently give presentations at business meetings, seminars, conferences, trade shows, public hearings, and corporate training sessions—to name just a few of the situations where professionals must be able to convey information orally. While these presentations are numerous and seem varied, most are one of three common types:

- " *Explanatory presentations*: explaining complex technology to a group unfamiliar with the material. For example, a scientist might explain the effects of a new drug to a hospital staff or to an interested lay audience.

- *Descriptive presentations*: describing action taken or project phases completed. For example, an engineer might describe for the client steps taken in the first phase of an environmental cleanup project.
- *Persuasive presentations*: persuading an audience of the value or safety of a product, technology, or idea. For example, a marketing manager might need to convince potential customers to trust—and then to purchase—a newly developed product.

Sometimes a single presentation contains elements of all three of these categories (almost all communication is persuasive to some degree), but one purpose will always dominate. Knowing the dominant purpose enables you to prioritize your ideas so that you can connect with your listeners and be better prepared for the audience's needs and potential questions.

Analyzing Your Audience

The major factors affecting oral presentations are (1) the audience, (2) the method of delivery (including the visual aids), and (3) the venue. Generally, the audience is either an *in-house group* of people who are somewhat familiar with the material you are presenting—or at the very least familiar with the environment for your research and the reasons for your presentation—or a *group outside of your company* who may or may not be at ease with the information you are communicating. They may be similar or highly diverse; they may be eager to hear what you have to say or they may be suspicious and resistant to the material. Either way, it's good to know as much as possible about them in advance so you can plan a talk to satisfy the majority of the people who are listening to you.

The method of delivery depends on what the audience expects and on the decisions that the presenter makes. Speakers usually try one of these approaches: (1) the presenter reads a prepared paper; (2) the presenter delivers a memorized speech; (3) the presenter speaks extemporaneously from a prepared outline or note cards; or (4) the presenter "wings it" and talks without notes or a preliminary plan. From your own experience listening to talks, you probably agree that someone standing in front of a room reading a paper to an audience is often boring and that a memorized speech works only if the presenter is skilled in drama. The presenter who speaks without notes can be wonderful if practiced at such presentations but can also appear scattered and disorganized. Most often, the best speakers are those who work from notes and support their presentation with effective visual aids.

The **venue**—that is, the setting—also plays an important role in the presentation. Audiences react differently in different environments—and the visuals you choose and your method of delivery certainly will depend on the venue. If you are speaking in a small conference room to a few people, you can expect a more relaxed atmosphere and you can be less formal. But if you are standing at a podium in a large hall or auditorium, the presentation must of necessity be more formal.

These three elements of a professional presentation—audience, delivery, and venue—add dimensions to the planning process that can cause confusion unless you have a method for sorting them out into a sensible—and usable—pattern.

Planning Grid

As you begin the planning process, you can organize ideas about your presentation into a **planning grid**—a structured overview of the conditions you may encounter.

Figure 17.1 shows a planning grid that has been filled out by an engineer who is preparing a presentation for a town meeting in which a proposed highway overpass is on the agenda. Notice that he has put a checkmark next to the characteristics that describe his presentation situation—and note, too, that he has added comments that expand his thinking about the presentation (the audience needs, the use of color to enhance the visuals). As discussed in Chapter 1 (pp. 13-16), analyzing your audience

Figure 17.1

Completed Planning Grid for Oral Presentation

Purpose of the Presentation	Audience	Venue	Delivery	Visuals
Explanatory:	Internal	Small	Read	Type — Overheads & scale model of overpass
	External ✓	Large ✓	Memorize	
Descriptive:				Size — Large (must be legible from far distance)
	Professional Peers	Podium	Notes ✓	
Persuasive: ✓	Non-professional ✓	No podium ✓	Other	
	Needs: Assurances and few disruptions to their lives			
	Attitudes:			
Comments: Mostly persuasive Explanations secondary	Comments:	Comments: Hand-held microphone	Comments:	Comments: Use color— show graphics of why overpass is necessary. Use statistics.

is an essential step in knowing how to connect with them. That step is especially important in oral presentations because the audience is real, not abstract. The people you're addressing are right there in front of you and will express their pleasure or displeasure (anger? excitement? boredom? interest?) without hesitation. If you fail to address their needs, you will know it. It thus pays to do some preliminary thinking about what your audience needs so that you will not irritate or bore them. Your comfort level as a speaker and your success as a communicator depend on it.

Visual Media

Many speakers plan what they want to say without thinking about the visuals a live audience might want to see. In some cases, that approach may be appropriate, but more often than not, knowing the type of visuals the audience will respond to is a factor in determining the presentation's content. For instance, if your listeners are nonprofessionals, you probably need to use more illustrative graphics to help them understand the concepts. Do you have the capability of using computers for presenting your visuals or are you using a slide projector or an overhead projector? The potential for the interactive nature of your visuals is limited if computers are not available. (Some presentation software allows you to make changes to the visuals as you are speaking or allows you to rearrange the visuals quickly and zoom in on details, depending on the wishes of the audience.) Take the time to think about the types of visual aids that will work for your intended audience as you plan the content of your presentation. If you wait too long to think about and create visuals, they will seem like an afterthought.

Length

Nothing will undercut the effect of your presentation more than speaking too long. Even if you have comprehensive knowledge about your subject and want to convey it, you must plan ahead and shape your presentation to fit the time allotted. In conference presentations and many other venues, speakers are given a set time limit and are expected in fairness to other speakers to observe it. Sometimes speakers set their own limits. If you are in that situation, think carefully about how much your audience can take at one sitting. Usually, 30 minutes of solid talk is enough. If you need to speak longer, break up your presentation with active visual aids (such as videos or multimedia presentations) or audience participation. (A sample presentation outline, with notes on timing, appears at the end of this chapter, pp. 443-444.)

A final tip on planning: Allow enough time in advance not only to prepare your presentation but to practice it *at least three times*. No matter how prepared you may think you are, until you actually stand and deliver your talk, you really won't know how the words will sound, how the timing will work out, or how comfortable you will feel with your material. You can practice in a room by yourself with only a mirror for company, or in front of a few friends. With a few practice sessions under your belt, giving the actual talk will be much easier.

(See Chapters 1 and 2 for more on planning and researching.)

Organizing

Organizing an oral presentation is easy; the structure can often follow a simple four-part plan:

- Introduction
 - Body
- Closing
- Question and answer period

In each of these sections, a few specialized techniques make the presentation work well for a live audience.

Introduction Strategy

The introduction is the point at which you make the biggest impression on your audience. The first words you say set the tone for the entire talk and create expectations in your listeners. If you're befuddled and disorganized at the start, it will be hard to retrieve the audience's confidence. On the other hand, if you're well organized and clear, that impression will probably dominate throughout your presentation. The following tips will help you sound confident and organized:

Connect The introduction is key to connecting with the audience and breaking the ice a bit. Think ahead about ways you might get your audience's attention. Several questions might give you some ideas: Why is your topic important to your listeners? How will it benefit them? What are your credentials to explain the topic to them? How do your interests and theirs connect? Providing answers to these questions at the beginning of your talk will put the audience at ease and indicate to them that what you say is specifically relevant to them.

Set the Agenda Explain to the audience at the outset what you're going to talk about and how you plan to organize the discussion. If you have organized your talk into three sections, say so. If you plan to cover several key points, predict them up front. Setting listener expectations in this way relaxes the audience and gives them a sense that you know exactly where you're going and they can trust you to take them there. You might also want to suggest at the beginning that you will take questions during your talk, or that you will field questions and comments at the end of your presentation—or both.

Make Eye Contact From the first moment, be sure you look directly at your listeners—all of them, not just one section of the room. Speakers who make frequent eye contact with their audience exude confidence and keep their listeners' attention much more easily. Try not to stare at your notes, raising your head only occasionally to punctuate a point.

Watch for Pitfalls Avoid the lame joke as an ice-breaking technique. Humor is fine if it seems a natural aspect of the presentation and if it really connects with the

audience. But too often speakers feel compelled to tell jokes that seem forced and far removed from the audience. If you can use humor naturally and well, do so. Otherwise, trust your material, not forced levity, to capture listeners' attention.

Presenting the Body

The "meat" of the presentation is the *body*—the middle section where you present your subject matter in a clear fashion, where members of your audience are *listening*, not reading, and therefore do not have the luxury of rereading or reflecting on the material at their own pace. You thus have to present the information in ways that allow listeners to understand it without the benefit of studying it. Here are a few guidelines for presenting the body of your talk effectively:

Emphasize Structure Keep listeners oriented to the organization of your material by using cues: *first, second, third . . . or next, finally . . . or for example, in contrast, consequently . . .* and so forth. These transitional cues give the audience a sense of direction and allow them to see more clearly how the points you make fit together.

Summarize Frequently Every time you shift topics or move to a new component of your presentation, help the listeners follow you by summarizing briefly what you've just said, and predict what's coming next. For example, you might say, "As you can see, then, the problems are threefold: cost, availability, and quality. The next step is to find the best solution. . . ." These summaries act as mental checkpoints for the audience and permit them to focus on your ideas in clear, concise units.

Use Visual Aids Because people comprehend material in a variety of ways, it's important to provide visuals to support the words you're speaking. You will find specific suggestions about how to design visuals for oral presentations later in this chapter.

Relate Material to Audience's Needs As is true with any effective communication, you need to continually illustrate why the information you're presenting is useful for the specific listeners. The more you can tie your points to something the audience is familiar with, the more interested they will be and the more they will remember what you have to say.

Use Simple, Direct Language Remember that the audience is not able to read and reflect on your subject, so you need to use words they can understand quickly and easily. That doesn't mean you should be simplistic in your language, but it does mean that you should use only terms that are concise and clear to the majority of your listeners. Don't use 50-cent words when 25-cent ones will do.

Vary Your Sentences Just as in prose, variety lends drama and creates interest.

Convey Your Interest Vary your tone and volume to show genuine interest in your material and your audience.

Pace Yourself Nervousness about your delivery or intense familiarity with the subject matter may cause you to race through your material at breakneck speed. Slow down. Speak at a pace that allows your listeners to follow your points without the frustration of trying to keep up with you. (It's the rare speaker that moves through a presentation too slowly, but check yourself to make sure you create an effective balance in your delivery between too slow and too fast.) This is one aspect of your talk where practice is essential. If you can practice in front of a trial audience, so much the better.

Watch for Pitfalls Your presentation will become deadly if you don't respect time limits and you drone on for too long. It's essential to keep your presentation to a length that is appropriate for the audience. If you have more to say on your subject, promise to talk with interested people afterward; you can also provide a bibliography or another set of resources for your audience to find more information. Another pitfall to avoid is speaking too softly for the room or looking down at your notes so often that your words get muffled in the podium. Make sure you can be heard by the most distant person in the room and that you make eye contact frequently with your listeners.

Closing Techniques

The closing is the point in your presentation where you have a chance to leave a lasting impression. Debate teams are always given the advice to save their "zingers" for the end because that will impress the audience (and the judges) most. In oral presentations given at companies or conferences, the technique still works. If you want to improve your chances for memorable closings, follow these guidelines:

Restate the Main Points Although summarizing your main points once again may seem redundant to you, it may not seem so to your audience. This is the only time you have to focus *all* of your information for the audience in a way that they can comprehend easily. The earlier summaries you have included in the body of your talk have been only partial.

Outline a Plan for the Next Step How should the audience use the information you've given them? Answering this question emphasizes the usefulness of your material, and it also gives your listeners a sense of direction. They are more likely to remember and act on your ideas if you have suggested ways to do so.

End Strongly and Positively You don't want to sound like a cheerleader, but you do want to finish your presentation with enthusiasm for your material and a strong final statement of its benefits. Be natural; if you suddenly change your tone to blatant marketing language, the audience will feel manipulated. Let the strength of the rest of your presentation work for you here. End firmly and positively without the need for a sales pitch.

Watch for Pitfalls Too many speakers drop the closing altogether. They finish the body of their talk and, with an abrupt "Thank you for your attention," they sit down. Doing so leaves a bad impression on listeners and the speaker loses the opportunity to drive home points forcefully. Make sure you plan your closing to give a sense of forethought, completeness, and professionalism.

After you have organized your presentation into these components—introduction, body, and closing—and feel comfortable with your material, you need to design the presentation and then begin the editing process by preparing whatever cues you need to help with the delivery.

(See Chapter 3 for more on organizing.)

Designing

The design elements of an oral presentation are the visual aids. In today's visually oriented society, people are used to being lured and entertained by sophisticated graphic technology in everything from their TV screens to their computer screens: movies, videos, multimedia presentations, teleconferencing, and so forth. Audiences expect speakers to have visual support for their words and ideas—and graphic elements in an oral presentation have become almost mandatory.

• **Tip:** Remember that you want the audience to listen to you, not study the visual aids. The visuals are there to supplement your words, not the other way around.

Types of Visual Aids

There are two types of visuals used to supplement speeches and presentations: text visuals and graphic visuals. Good presentations contain a combination of both, and simplicity is the key to designing them effectively.

Text Visuals Text visuals consist of words or phrases that help the audience follow the flow of ideas. They can summarize or preview major points or signal major shifts in thought. Many presentations begin with text visuals. Typically, the first is the equivalent of a title page: it announces the subject and the speaker. The second lists the three or four major points that will be covered, providing a road map of what's to come. The remaining ones emphasize the transitions between the main points—somewhat like the headings in a written report. As a rule, your text visuals will be most effective when they contain no more than six lines with a maximum of six words per line. Type them in large, clear type, using uppercase and lowercase letters (not all uppercase) with extra white space between the lines of type.

Graphic Visuals You can use a variety of graphic visuals in an oral presentation the same way you use graphics in a written document: from line, pie, bar, and organization charts to diagrams, maps, drawings, tables, and flowcharts. However, make sure the graphics you use for your talk are simplified versions of those that appear in written work. Eliminate anything that is not absolutely essential, because

the audience needs to focus on the main point of the visual, not the decorative or explanatory material. As in written documents, always label graphics with clear captions, but keep those simple, too.

Figure 17.2 (see pp. 432-433) shows a series of visual aids for a presentation on the benefits of telecommuting. Note the mix of text and graphics and the use of varied type sizes. (Remember in your own presentations to use a mix of type sizes, but be sure the type can be seen from all points in the room, not just from the front row.) See Guidelines: Presenting Visuals for more advice.

Selecting the Right Medium

For speeches and presentations, you have a wide variety of media from which to choose. As technology advances, so too do your choices. Here are some possibilities.

PowerPoint Many computer software packages are available to help you produce effective visuals. The most popular, Microsoft's PowerPoint for Microsoft Word, allows you to design your own visuals for overheads, slides, or computer presentations. Each package also has a predesigned set of templates you may use if you choose not to design your own. Other presentation support software packages are emerging almost daily. (See Guidelines: Presenting with PowerPoint, p. 435.)

Handouts Many presenters include handouts as part of the presentation, even if they are using other visuals as well. The handouts give the audience an individual version of some of the larger visuals that they can refer to while you're speaking, and they also give them something to take away with them. Be sure to include your name and the title of the presentation on each page of the handouts.

GUIDELINES Presenting Visuals

- Limit each visual to one idea.
- Illustrate only the main points, not every detail. Use phrases rather than full sentences in your visuals.
- Use colors in moderation, but use them consistently and for a **purpose**. Use bright colors to attract attention to your main point, but use red sparingly because it overwhelms the other colors.
- Use type fonts **that** have thick, readable characters, and be consistent in their **use**. Don't overcrowd the visual; audiences need to grasp the point of it quickly.
- Be sure all members of the audience can see the **visuals**. Such aids are counterproductive if the people at the back of the room can't clearly see or understand them within a few moments.
- Allow the audience time to read a visual before you begin your explanation.
- Paraphrase the text of the visual; don't read it word for word.
- When you've finished discussing the point that the visual illustrates, remove it from the audience's view.

Figure 17.2

Series of Visual Aids for Oral Presentation

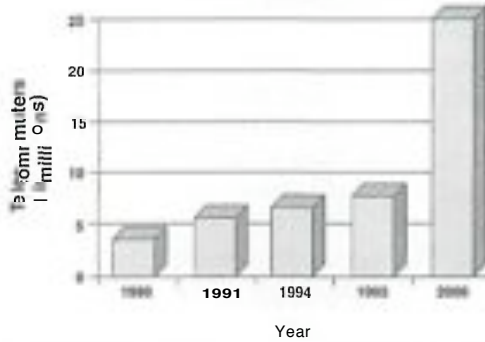
Proposed Telecommuting Policy for Dun & Bradstreet Software

Submitted by:

Stephen J. Straight
Information Designer

March 18, 2004

Telecommuting in U.S.



Why Telecommute?

Advantages for DBS...

- ✓ Lower Real Estate Costs
- ✓ Lower Maintenance Costs
- ✓ Greater Productivity
- ✓ Greater Employee Satisfaction

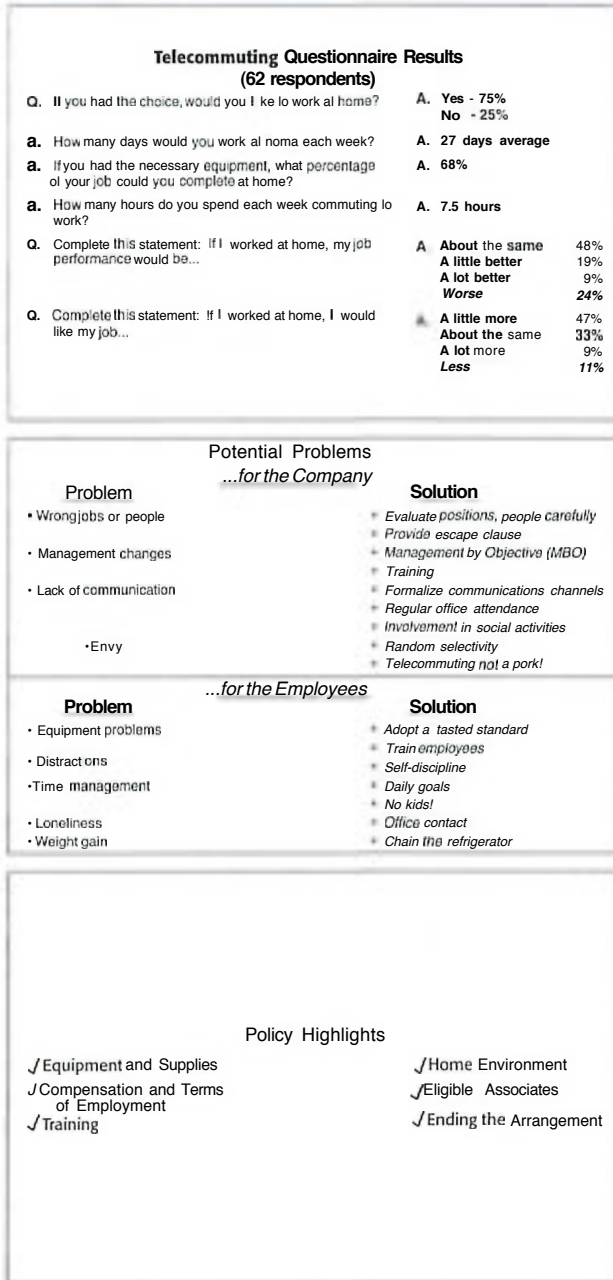
Advantages for Employees...

- ✓ Less Commuting
- ✓ Savings in Food and Clothing
- ✓ Greater Comfort
- ✓ Greater Flexibility

continued

Figure 17.2

Series of Visual Aids for Oral Presentation (continued)



Chalkboards or Whiteboards When you're addressing a small group of people and the talk is informal, using a chalkboard or a whiteboard works well. These media are especially useful for on-the-spot brainstorming or planning. In formal or large presentations, they're inappropriate.

Flip Charts Flip charts—large tablets usually placed on an easel—can be written on and flipped as you speak. Some speakers prepare the charts in advance, while others use the charts as a kind of chalkboard and write on them spontaneously during the talk. Because these charts are usually small, they don't work for large audiences.

Overheads Transparencies displayed by overhead projectors are suitable for both small- and large-group presentations. You don't have to dim the lights much to see them, and you can write additional material directly on them as you speak. Be careful not to turn your back to the audience or to speak to the projector or the screen when you use this medium, and be sure to provide the audience with copies of the overhead transparencies to take away with them. (Most presenters hand out these copies before their talk so the audience may make notes on them.)

Slides Photographic slides in a carousel (operated by remote control) can contain text, graphics, or both. Using this medium creates a professional, polished presentation, although the room must be darkened. Much new software is available that allows you to create slides easily. One liability to this medium is that the equipment must be in good working order. Check it thoroughly before you begin the presentation.

Interactive computers With a special projector, a computer can be turned into a large-screen interactive chalkboard that allows you to create and modify your visual aids during the presentation. If you're discussing financial projections, you can show, by typing in a few numbers, how a change in sales forecasts will affect profits. If you're illustrating mechanical design, you can show how an object is built—and you can even shift the angles of perspective—all with the touch of a few buttons. The venue for your presentation must be able to handle the equipment, and, as in the use of slides, your equipment must be in working order. Too often computer programs "crash" and leave the presenter without any visuals at all.

Other visual aids Videos, audiotapes, built-to-scale models, and so forth can serve as effective illustrations for a variety of specialized presentations.

Whatever medium you choose, when you present visual aids, you want your audience to read and understand them, but you also want them to listen to you. The visuals shouldn't detract from your message by calling undue attention to themselves or being hard to see or hard to decipher.

GUIDELINES Presenting with PowerPoint

- Don't go overboard with music, animation, fade-ins, fade-outs, and so on. Your presentation is an informational vehicle, not an IMAX presentation. Too much distracting movement on the screen can be annoying and can also take the audience's attention away from your main points.
- Don't use photographs or other graphics without text. Like overhead transparencies, each slide must be somewhat self-explanatory. A photo without accompanying text does not have much meaning.
- Don't make your slide presentation too long. People's attention span is short when they have to focus on a screen. In general, keep the slide portion of your presentation to no more than 15 minutes or shorter. You may talk longer, but be sure the projector is turned off after 15 minutes.
- Don't let the slides do the talking. Because the slides are colorful and look impressive, you may be tempted simply to click through them with little comment. Use them to illustrate your points, *not make them for you*.
- Don't multitask. Don't try to speak, click the mouse, troubleshoot computer glitches, trip over wires, and maintain decorum all at once. If possible, set up the computer and projector well in advance and have an assistant click the mouse for you. If you are using a remote mouse, be sure it is charged enough to last the entire presentation.

Designing visual aids for presentations requires forethought about many details—the size of the audience, the room dimensions and acoustics, the seating arrangements, the material you plan to present, and the available equipment. That's why it's important to think about the visuals early in the planning process *so that you have time to practice with the equipment*, making sure your presentation will combine words and visuals smoothly, each supporting the other to make your point impressive and memorable. In today's world, visuals are no longer a luxury—they're a vital link in presenting your ideas to your audience.

(See Chapter 4 for more on designing.)

Editing

r For oral presentations, the editing stage is really a practice stage—the point at which you tinker with the mechanics of delivery, including all the physical aspects of the speech. The first step is to decide what type of notes will allow you to give the most effective talk. The person who can deliver a presentation with no notes whatsoever is rare. Most speakers use an outline, sometimes created by PowerPoint, or note cards as a guide for their prepared thoughts, although many now key their talks off PowerPoint slides themselves.

Using Outlines

If you use an outline, make sure it is simple enough to allow you to follow it without losing your place. Its typeface should be large enough to be read by glancing at it from a distance, and it should be flexible enough to allow you to rearrange it quickly if your audience requests an order you didn't anticipate. Novice speakers sometimes make the mistake of creating an elaborate outline with multiple subcategories and references—only to find themselves lost in its complexity when they step to the podium to speak. A good tip is to put an outline of each section (and subsection) of your talk on a separate page. That way, you can make the type larger and you can rearrange the sections if necessary because the "flow" of the information is easy for the speaker to see at a glance. PowerPoint and other presentation software programs allow you to create a "Notes" outline as you create your slides.

Using Note Cards

The traditional method for cueing speeches is note cards, usually available in two sizes. It's best to use the 4 × 6 inch size instead of the 3 × 5 inch ones, because you can fit more information on them and increase the type size for easy reading. Always label and number your cards so you can readily see what the topic of each card is and where it fits in the overall order (and if you happen to drop your cards, these numbers will enable you to quickly put them back in the proper sequence). Highlighting techniques such as bullets and underlining can also be used to guide your eye quickly to the main points as you stand in front of your audience (see Figure 17.3). When you are speaking, you should find a way to put each card down on the table or podium when you have finished with that material—rather than tucking the cards behind the stack in your hand. If you need to retrieve any cards, you should avoid having to shuffle through the entire stack in your hands.

As Figure 17.3 illustrates, good note cards should be clearly visible and minimalist in their content so that they will function well as cues for the speaker who has practiced sufficiently.

Whether you use outlines or note cards, make sure you practice giving your presentation with them. You may find that you've left more gaps in the material than you're comfortable with or that you can't read the cards or outline well enough in an actual delivery situation, or that you need more practice handling the cards or papers unobtrusively when you're speaking.

Practicing Your Delivery

If you want your presentation to be polished, you need to try it out in draft form several times. Uncover all the rough spots and make yourself so familiar with the material that nerves won't throw you when you're in front of an audience. When you are satisfied that your presentation is in its final form, practice it at least three times, simulating as nearly as possible the conditions of the actual talk. (If you can practice in the room where you will give the presentation, by all means do so.)

Figure 17.3

Note Cards for Oral Presentation

<p>Title: 1</p> <p>Intro:</p> <ul style="list-style-type: none"> • Define <i>subject</i> • State what <i>audience will learn</i> • <i>Connect</i> to audience interests • Give agenda <p style="text-align: right;">Key Visuals: _____</p>	<p>Topic one: 2</p> <ul style="list-style-type: none"> • Overview • <i>Details</i> • Example • <i>Connection</i> to big picture <p style="text-align: right;">Key Visuals: _____</p>
<p>Topic two: 3</p> <ul style="list-style-type: none"> • Overview • <i>Details</i> • <i>Example</i> • <i>Connection</i> to big picture <p style="text-align: right;">Key Visuals: _____</p>	<p>Topic three: 4</p> <ul style="list-style-type: none"> • Overview • <i>Details</i> • Example • <i>Connection</i> to big picture <p style="text-align: right;">Key Visuals: _____</p>
<p>Conclusions & Recommendations: 5</p> <ol style="list-style-type: none"> 1. Conclusion #1 2. Conclusion #2 3. <i>Recommended Actions</i> <ol style="list-style-type: none"> A. _____ B. _____ C. _____ <p style="text-align: right;">Key Visuals: _____</p>	<p>For more information: 6</p> <ul style="list-style-type: none"> • Books • Articles • Electronic sources • People <p style="text-align: right;">Key Visuals: _____</p>

If you plan to use a podium and don't have one to practice with, stack some books on a table and use those as a prop. If you know you'll be seated around a conference table, practice the speech sitting down.

Elements of Delivery

As you practice, you should pay attention to a number of key elements. Understanding—and controlling—each one will guarantee a successful presentation.

Style One of the key reasons for practicing your presentation is to check for style. At several points in the drafting process, take the time to say the information aloud, as you might in the actual presentation. Listen to the words. Do they sound

natural? Are they clear? Are they easy to speak so that you won't stumble over them? Will the words you use connect with the intended audience?


Pace When delivering your presentation, avoid the tendency to speak faster than you normally would. Be sure that your pacing is slow enough to allow listeners to follow you but not so slow that you put them to sleep.

Length It's crucial to keep your presentation to an appropriate time length. Once you're comfortable with the pace of your talk, time it to be sure your delivery will not run too long. If it does, edit it to meet the time requirements.

Movement It's boring to listen to someone standing stock-still behind a podium. If you can move around during your presentation, do so. Most listeners will pay more attention to someone who comes out from behind the podium occasionally to make a point or to use a visual aid. Be careful not to move so much that the audience gets dizzy watching you pace back and forth across the floor; also be aware of involuntary movements, such as fidgeting with your pen, shuffling your note cards, or tapping your foot, which will be distracting to your audience. (And try not to be a speaker who clutches a water glass precariously while making gestures—or takes a drink after every sentence or two, thus suggesting extreme nervousness.)

Tone Your tone of voice is an important part of the presentation, and you need to be sure it is modulated well for the size of the room and the type of talk you're giving. If the room is large and you have no microphone, you will have to project your voice to the back of the room, which means that the pace of your delivery will slow down. If you are using a microphone, you should practice how close to the mike you can be before your voice is too loud or you get static feedback.

Handling of Visual Aids If you are using PowerPoint or other presentation software, be sure to understand how to move backward and forward in the slide show in case you accidentally jump ahead or the audience wants to see a slide again. If you are using an overhead projector, you will need to practice handling the transparencies so that they don't stick together. Slides also can be problematic if they have to be advanced manually or if they somehow get out of order or upside down. It's also tempting for people using visuals displayed on a screen to turn their backs to the audience and talk to the screen. Practice keeping your attention on the listeners and making constant eye contact with them. Anytime you're using electronic equipment (projectors, computers, videos, and so on) there is the potential for something to go wrong. It's a good idea to have visuals in hardcopy as well, so you're not at the mercy of your electronics.

 **Tip:** *Be prepared for equipment failure. Especially if you are working with an electronic presentation, have a backup plan.*

As you check for balance and delivery techniques in your presentation, you may want to remember the advice that debate coaches still give their speakers: "Tell them what you're going to tell them; then tell them; then tell them what you told them." In other words, forecast what you're going to say, say it, and then summarize your points to drive home your ideas. This advice has worked for years and is still valuable today. Keep it in mind as you practice.

(See Chapter 5 for more on editing.)

Handling the Question and Answer Period

After you have finished your presentation, it is customary to ask if the audience has any questions. You may have fielded questions earlier in your talk, but it helps to save some time at the end for people to respond to the entire presentation. If no one has questions, then a simple "thank you" will serve as a nice ending. But if there are questions, you need to know how to handle them.

Take Questions from a Variety of People Don't focus on just one questioner and devote most of your time there. Let as many people as possible speak.

Indicate When You Don't Know the Answers If you are asked a question you can't answer, avoid the temptation to fudge a reply. Instead, simply say that you don't know and turn the question back to the audience. Perhaps someone else will be able to supply the answer. You may want to indicate how the questioners can find out the information. Point them in the right direction. If you can reasonably do so, commit to getting an answer for a questioner at a later time (and keep the commitment).

Remain Even-Tempered Occasionally, you may find audience members responding to you with hostility or goading you to react emotionally. Don't rise to the bait. You will be more impressive if you keep your cool and answer such hecklers with calmness rather than anger. Sometimes humor at your own expense deflects such disruptive comments, but be careful not to direct any humorous remarks at the questioner. Doing so may be interpreted as making fun of the person.

End the Question Period Appropriately Keep in mind that some people like to ask a lot of questions. You need to watch the clock and not let the question period drift to the point where the majority of listeners become restless. You may be cutting into the time of the next speaker, or into the busy schedule of your audience who need to get off to their respective activities.

Watch for Pitfalls It's easy to get sidetracked in a question and answer period and end up discussing topics far afield from your subject. A little digression is fine, but try to stick to your main point. A simple, "That's an interesting topic for another talk" should bring the discussion back on point.

For technical professionals, the ability to express ideas to a group can mean the difference between advancing up the corporate ladder or remaining stuck on the lower rungs. People who have this skill are valuable emissaries for a company's image. They are often the individuals thought of when personnel decisions are made. If you are working solo, presenting your research or projects in person to colleagues and clients becomes even more important because your own image is at stake. Sadly, the notion of the reclusive genius working away in an isolated laboratory, never needing to explain his work to anyone, is the exception in today's business environment where advancement comes to those who can convince others of their value.



Tips for International Communication

In oral presentations, your audience's cultural background strongly influences not only what you say, but how you say it. Specifically, cultural differences affect the *formality, beginnings, pacing, closings, and audience behavior*.

Formality In the United States, the best oral presentations are often those where the speaker seems relaxed yet knowledgeable, where there is a certain level of informality to the talk—a natural, conversational style—that suggests confidence and competence. In other countries, professional presentations are often considered extremely formal and off-the-cuff remarks and behaviors that seem unrehearsed may be unappreciated. Taking an interactive approach is often not appropriate because the audience assumes their role is to listen to a prepared performance, not to participate during the speaker's portion of the talk. Even writing on flip charts or overhead transparencies would indicate to the audience a lack of preparation.

Beginning First impressions are critical to a successful presentation, and knowing how to begin your presentation will make a major difference in the audience's immediate perception of you. In the United States, presenters often begin with a joke or a story to connect to their audience and then get right to the point. But in many cultures, such directness is not appropriate. You should research to learn how to pronounce greetings in the host country's language (What are people's titles and honorifics? What is the accepted order of speaking and the correct deference to others on the speakers' platform or in the room?), to compliment the host's meeting arrangements, to comment on the beauty of the surroundings or the change of seasons, and to refer in an appropriate way to recent events important to the people in the audience. Make sure you research, too, the subjects that are taboo in a culture.

Pacing If you are addressing listeners who do not speak English as their first language, you should speak at a slower pace than you would if you were speaking to native English speakers. In high-context cultures, such as Saudi Arabia, Japan,

and other Asian countries, you should begin with an exchange of greetings and other social amenities that will allow you to build a personal rapport with the audience and gain their trust. These cultures also expect presentations to proceed in small segments with questions and answers after each "chunk." If you plan to deliver your entire speech before stopping for questions, you may be frequently interrupted.

Closings In some countries (such as the United States), it may be appropriate to close a presentation by asking directly for action—a sale, a plan for solving a problem, and so forth. While it is usually correct in most cultures to end by agreeing on what needs to be done next, by exchanging thanks, and honoring the protocol of the situation, some cultures prefer to leave the matter unresolved. The audience members may prefer to discuss things privately before making a commitment or communicating dissatisfaction in the public view. Research the typical patterns for closing presentations before you make a cultural error that will prove embarrassing for you and your audience.

Audience Behavior In the United States, we believe that eye contact is a means of engaging the audience and keeping their attention. But in some cultures—throughout Asia, for example—direct eye contact is considered disrespectful, and you will find audiences avoiding your eyes by staring at the floor or looking in another direction. This behavior is not a sign of inattention or boredom; it is simply a cultural norm. Japanese audiences will nod as the speaker talks to indicate that they understand what is being said, not that they necessarily agree with the remarks. If they do disagree, they may begin talking among themselves as you are speaking. At such points, you should stop and clarify the areas of disagreement before continuing your presentation.

Humor Unless you know the culture extremely well and feel at home in the environment, avoid using humor in your presentation. Humor is often culture-bound and what is funny to you may be insulting or otherwise in poor taste to your audience. A friendly, professional approach is the best way to proceed, omitting any tactics that make you vulnerable to misinterpretation.

For more about cross-cultural communication, see Chapter 7.

Quick Review

Preparing oral presentations requires skill with words, visuals, and technology. If you follow a few simple "rules," the presentation will make a positive impression:

- Determine which type of presentation you are giving: explanatory, descriptive, or persuasive. Though most presentations contain elements of all three, one is usually dominant.

- When planning your presentation, consider purpose, audience, delivery, visuals, and venue.
- Organize your presentation into four sections: (1) introduction, (2) body, (3) closing, and (4) question and answer period.
- When practicing the delivery of a presentation, pay attention to style, pace, length, movement, tone, and handling of the visual aids.
- Always practice delivering the presentation at least three times.
- Choose text visuals (words or phrases that guide readers), graphic visuals (charts, pictures, and so forth), or both.
- When deciding on what visual media to use, consider the size of the audience, the room dimensions and acoustics, the seating arrangements, the material you plan to present, and the available equipment.



Exercise

Develop and deliver a presentation related to your class work or your job. Choose the presentation medium that best complements your topic, audience, delivery venue, and allotted time period. Be sure to practice at least three times and encourage audience feedback on your technique.



Community Action Project

Most organizations develop many presentations during a year—some of them for internal audiences and some for the public. Find an organization in your community that needs help developing a PowerPoint presentation and offer to help them with the design. For example, the YMCA or local library may want to give presentations about the services they have available. Or a citizens group working on a special project may want a presentation to raise community awareness. Listen carefully to the organization's needs and use the planning grid on page 425 to develop a slide presentation that gets their message across clearly and appropriately for their intended audience.

Technology Challenge

Develop an electronic presentation that includes at least one video segment. For a more advanced project, create an interactive online presentation that can be published on the Web. (Many software packages are available for this project: Carbon's "Viewlet," CRE-8 Multimedia, and others.)

Presentation Outline

Keeping Pace: Thoughts on the Future of Information Design

KRISTIN R. WOOLEVER

Digital Equipment Corporation

November 30, 2003

INTRODUCTION:

10 min.

1. *What Don't They Teach You in School?*

Ask for responses from the audience.

(Puts audience at ease, generates a list of their concerns, allows me to begin by listening.)

5 mm.

2. *What Do They Teach You in School?*

Ask for responses from the audience, but focus on the following:

- how to gain a broader perspective
- how to be in touch with new methods and trends
- how theory applies to practice (Gives credence to the academic's perspective. Positions the academy as the place that transcends the

5 mm narrower view of the specialized companies.)

3. *Buzz Words for the Future of Information Design*

(Project this list and ask audience to glance over it quickly—we'll come back to it later.)

audience analysis	dot.coms	quality
benchmarking	e-business	task analysis
concurrent engineering	interactivity	usability
connectivity	ISO 9000	value added
cross-cultural	multimedia	virtual office
cross-functional	project teams	virtual reality

Notes to self

Notes to self

(Overhead keyed to transparencies)

Notes to self

INFORMATION DESIGN: ROLES, GOALS, ENVIRONMENTS

5 mm.

4. *Implications of Role Reversal*

In the multimedia environment of the future, "visual images will take on increased importance. The traditional roles of the written word and the graphic image will be reversed. The image could become the primary vehicle for conveying information, with the written word present only to support that image."—Paul Homer

10 min.

5. GOALS of Information Design?

Ask for suggestions from the audience. Focus on the contradictions inherent in the following two quotations:

"To organize information so users can efficiently learn the product and use the product to accomplish tasks." —The Digital Technical Documentation Handbook

"[Customers want information about using the product, not about the product itself."—Motorola Computer Group

(Overhead)

(Overhead)

(Overhead)

10 min.

6. STATED GOALS of Information Design

The following goals are stated in The Digital Technical Documentation Handbook. Discuss each to get a sense of how the audience understands them.

ACCURACY

CLARITY

APPROPRIATENESS

COMPLETENESS

ACCESSIBILITY

(Overhead)

15 min.

7. STANDARDS of Information Design

"Standards" differ from "goals" and serve an essential purpose in producing quality documentation. Begin by discussing these common standards and ask for input from the audience.

Methodological Standards

Checklist of taste needed to create usable information

Design Standards

Set of absolute requirements to ensure consistent "look and feel"

Design Principles

Specific tenets of good design (based on research)

(Overhead)

5 min.

8. ENVIRONMENTS for Information Design

Even the environments for producing documentation are changing. Discuss the benefits and liabilities of each of the two main environments:

Onsite

Offsite

The "Vision Thing": Specific Applications to DEC

5 min.

9. Buzz Words Redux

Return to list of buzz words and discuss each one in the context of the ROLES, GOALS and ENVIRONMENTS. Ask audience for specific possibilities for implementing these concepts at DEC.

5 min.

10. Questions and Answers

Effective PowerPoint Slides

An Online Reference Guide

A usage study

Cara Wong
WA State University

Slide design by Andrew Wong

Slide 1

Clear title

Use of shading adds interest

Purpose

Calls to the Help Desk per Day

23%

77%

Others

Online Users

Source: Don Perrault-Help Desk

Slide design by Andrew Wong

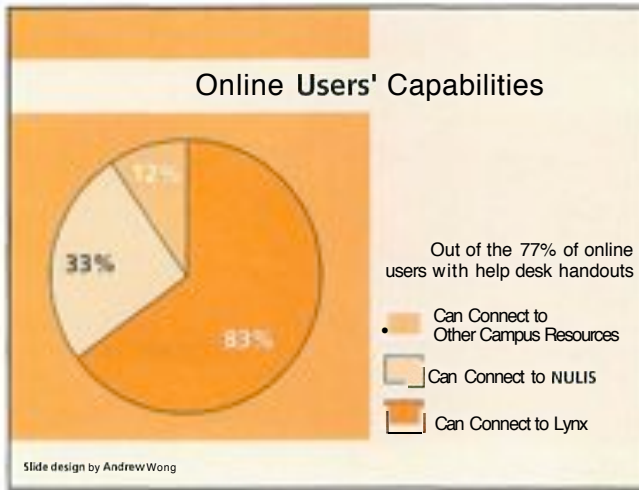
Slide 2

Slide layout pattern repeats

Self-explanatory graphic Includes text

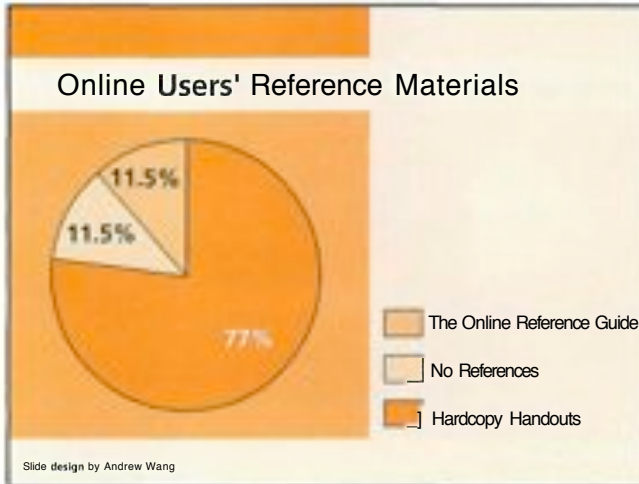
Slide 3

Slides support oral presentation, they do not replace it



Slide 4

Presentation is brief



Online User Calls to the Help Desk per Day



- General Information
- Compatibility Issues
- Modem Problems
- PPP Issues

Source: Don Perrault-Help Desk

Slide design by Andrew Wong

PROFILES IN PRACTICE

Writing with the Reader in Mind

Betsy Maaks

*Technical Writing Specialist
Tellabs Operations, Inc.*

"The most important quality for a good technical writer to possess is ability to understand the audience's **profile**, needs, and goals in using the written materials. Good technical writers always write with the reader's goals in mind."

Betsy Maaks has more than **18** years of experience as a technical communicator. She currently works with product development teams at Tellabs, assisting them in writing and editing manuals. In any technical profession, "grammar, consistency and structure are essential. Technical writing is highly structured, factual, and often boringly repetitive, but it is this consistency in presentation that helps to lead the reader through the complex information."

Betsy also volunteers her time by providing seminars and assisting others in choosing a career based on their interests. She says that the most pervasive obstacle facing many would-be technical writers is the fallacy that "as long as one can write English, one is a good technical writer." She has read many poor examples of technical writing in her career. "Everyone has experienced bad technical **writing—for** example, reading the manuals for the electronic gadgets in one's home. I often try to overcome this negative preconception by educating others on the qualifications of a good technical writer, whose goal is to be an advocate for the user of the materials. We add value to complex products by writing materials that help the novice user understand and use the product or understand the concept quickly and efficiently."

For a person who is choosing a career path in technical communications, Betsy recommends not only possessing analytical ability, great rapport skills, and attention to detail, but also having a passion for communicating abstract and complex technologies clearly. "We really want others to understand the material or effectively use the product about which we are writing. This can be a real challenge, one that is rewarding when we are successful."

GUIDELINES **Resume Writing**

- Begin with your name, address, telephone number, fax number, and e-mail address.
- Include the following major categories: education, experience, professional affiliations.
- Include an objective at the top of the page if you really have a single goal in **your** job search.
- Use white space creatively so your text doesn't appear crowded and dense.
- Avoid careless mistakes.
- Include specific responsibilities you had in your previous jobs and relevant courses you **took** in school.
- Don't misrepresent the truth.
- Keep your resume to no more than two pages.
- Avoid overuse of adjectives.
- **Don't** overpersonalize.
- Don't include a list of references.

Internet Resources for Chapter 18

The Write Jobs

<http://www.writejobs.com>

A network of resources for "creative *professionals*" where one can find **job** opportunities in many areas, including technical writing.

Society for Technical Communication

<http://www.stc.org/>

This is the primary professional organization for technical communicators.

Technical Writing Jobs

<http://www.technicalwriter.computerjobs.com/>

Find thousands of jobs in the area of technical writing in most regions of the country.

The old scouting adage, "Be prepared," is the best advice anyone can give you about finding a job. Although you may hear many stories about other people's successes and failures on the job market, finding the right job is 30 percent luck and 70 percent preparation. Even luck can be given a push in the right direction if you put yourself in as many of the right places at the right times as you possibly can. To do that, you need to know what those places are, when it's appropriate to be there, and how to get there.

Understanding Job Application Protocol

Some job seekers make incorrect assumptions about how the employment process works. They believe that by marching straight into a potential employer's office, they can short-circuit the job search process and have an offer made to them on the spot. Other strategies that may backfire are using brightly colored paper for resumes, including photographs, or resorting to unorthodox techniques (such as sending a videotape of yourself) to get attention. Still another strategy is to use the telephone, fax, or e-mail to maintain constant correspondence with the employer: What's the status of my application? When will you be making your decision? Would you like me to send you more information? And so on. These are not the best practices. Employers appreciate the applicant who follows the generally accepted channels for the job search. Attempts to sidestep the common practices usually make an applicant seem rude, arrogant—or simply naive.

When you're ready to go on the job market, you should understand the general etiquette of employment searches. A potential employer will be impressed by people who are self-confident and courteous, rarely by those who are self-deprecating and shy about their qualifications. On the other hand, applicants who are pushy may get attention, but few job offers. If you want to make a positive impression, you'll need to balance aggressiveness with quiet confidence.

Start Early

One of the first things you need to do when you decide to look for a job is to give yourself enough time for the search and know where to go to get the best information. If you are entering the full-time job market for the first time, it's a good idea to begin the job search process about six months in advance. That allows you time to complete the necessary research, prepare several drafts of your resume, and contact organizations and/or individuals who can help you get started. If you are in an academic environment, a first stop is the career placement office. Discuss with the professionals there your qualifications and your ideas about a career. They can help you evaluate your strengths and weaknesses, and offer advice on appropriate career paths. If you are changing careers and entering a new job market, attending local meetings of professional organizations and societies connected with your new career can be a good place to discuss with like-minded people your potential fit in that job. The education section of the newspaper is another source for you to find specialized programs to help you retrain for new careers. Many colleges and universities have open houses at which you can discuss the requirements of these retraining programs and speak to recent graduates who are working in entry-level positions.

No matter where you start your search, you may want to conduct informational interviews with one or two people currently employed in the technical profession you think you may want to pursue. If possible, arrange to spend a portion of a work

Steps
to

FINDING A JOB

1. Organize the search. Find out what kind of work matches your credentials and your interests, what geographic area you prefer, and where you're going to find good leads.
2. Prepare written application materials: a resume, cover letter, and professional portfolio. These will give employers their first impression of you. Make sure you come across as a careful, conscientious professional with specific qualifications.
3. Respond to job advertisements. You'll find these in newspapers and professional journals, and on job bulletin boards (electronic or otherwise). You may also hear about jobs on radio public service announcements or from colleagues and friends. In some instances, you'll learn of a job opening through indirect channels—you may be at a party or business gathering and run into someone who knows about a job opening for a person with your qualifications. Or you may, on a hunch, send a letter of inquiry to a company you'd love to work for and have them respond positively. But these situations are not ones you should count on. They're at least 70 percent luck and not likely to materialize unless you're already prepared for more traditional methods of seeking a job.
4. Be prepared for interviews. Your goal should be to project a confident image and not only answer questions well but also ask the right questions of the employer.
5. Follow up courteously. Send thank-you notes to your interviewers.

day with the employee so you can actually *see* the workplace, as well as hear about it from the employee's perspective.

Finding a job requires patience and extensive preparation. It's not a situation where you have total control and can assure yourself of success in a few weeks. But you can take some steps to make the process as smooth and as efficient as possible. Use the suggested six-month period to prepare carefully, apply to a targeted set of job openings, and conduct the appropriate follow-up of applications and interviews. (See Steps to ... Finding a Job.)

Organizing the Search

Once you've made the decision to look for employment as a technical professional, the first step is to think carefully about the types of technical jobs available in your field, what job is best for you, where you might like to work, and how you can find the best leads.

Types of Technical Jobs

In most technical fields, jobs are either in management or in hands-on practitioner work, and in most instances, you must "pay your dues" as a practitioner before you can move into management. For example, in an engineering firm, you can opt for the management/executive track, but you must prove yourself first as a junior-level engineer and move through the ranks toward project manager, vice president, or

away—the early stages of your career can be used for exploration—you should keep them in mind as you research the job market.

Another factor to consider when you look for a job is whether you like to be in an office or laboratory or out in the field. Job types vastly differ in environments, and you want to be sure you choose the location where you will be the most happy and productive.

What Job Is Best for You?

This question is a serious one that requires you to do some digging for information and to be honest with yourself about your own likes and dislikes. Although your education has probably prepared you for a particular area of employment, the types of jobs within that area require distinct skills and personality traits. It's a good idea to read journals from the profession to see what opportunities exist and where the future of the profession is headed. In today's rapidly changing world, traditional jobs may not be the best place to settle; perhaps new directions have

► **Tip:** *Remember that informational interviews are not employment interviews. You will make a negative impression if you ask someone to generously give you some time to discuss the field of work and then push for that person to hire you. Such false pretenses will be unappreciated and may cause ill will that can spread to other employers in the field. The job world within most fields is networked—and negative impressions can do damage to you well beyond the specific instance.*

created needs you hadn't thought of. Another strategy is to contact people in the profession to request an informational interview. If they are amenable to the idea, spend some time with them at their offices and find out what it's really like to work in that field.

Once you have considered the various opportunities you might want to pursue, think about your own strengths and weaknesses. Be honest. Will you be happy and successful in a job that interacts with many people, or would you prefer a job where you work alone? Do you like to work with high-tech tools, or are you more interested in marketing strategies? Do you ultimately want to be a manager, or do you want to be an individual contributor? Have you thought about being a freelance consultant? What work environment will make you most comfortable? These questions are central to choosing the right career. Studies have shown that most technical professionals stay in one job for approximately two years before

moving to a different company or moving up in the same company. Remember that you want to choose a job where you can be happy and productive for at least that length of time.

Where Do You Want to Work?

Answering this question requires you to think about the specific work environment and the geographic location of your job. The first step is to think about the work environment. Generally speaking, there are three types of environments for technical professionals: the large corporation, the smaller company (perhaps a start-up business), and the home environment.

- **Large corporations** usually have many technical professionals in each department and have established career paths. You may progress from junior contributor to a senior contributor to principal contributor and ultimately to a project or a department manager. Your job description will be fairly well set and you can expect a great deal of help in terms of training and mentoring. You will probably be assigned to one project for several months and then move on to the next.
- **Small companies** hire one or two technical professionals in each department (sometimes more, but never a large number) whose job it is to do everything connected with designing and delivering technical products. In many of these start-ups, the hierarchy of management is “flat”—that is, everyone pitches in together without paying much attention to the formalities of supervisory

structure and there is greater opportunity to do diverse tasks. While camaraderie is high, late hours and very little mentoring are common characteristics of this kind of work environment.

- **The home environment** appeals to some technical professionals who opt to leave corporate jobs and work as freelance consultants. These people usually have been in full-time jobs for a few years to establish credentials before striking out on their own. As freelancers, they work at home or they combine work at a home office with varying intervals spent at the company currently employing them. This type of life has an appealing degree of freedom, but it also has its price: no job security, no employee benefits (health care, insurance, paid vacation and holidays, retirement packages), and no staff of company lawyers to turn to if liability issues arise. It also requires self-discipline and the ability to set your own rules while still abiding by many different employers' deadlines and requirements.

Another type of employee who works out of the home is the telecommuter. If your company allows such arrangements, you may be able to combine the benefits of working for a corporation while still working in the privacy of your home. Telecommuting requires you to have professional equipment in your home office, and it also comes with the potential for family interruptions and the lack of informal hallway or water cooler conversations with colleagues.

Geographic location is also an important element for most people. If you are able to move anywhere in the world, your job opportunities expand, but you also need to recognize that different locations focus on different types of technical **communication**. If you're interested in computer technology, for example, the Silicon Valley in California or the Boston High Tech Alley may be a good bet. But if you are interested in pure science and research, the Research Triangle area of North **Carolina** might intrigue you. These are just a few of the areas known for their current specialties. And remember that the salary ranges vary from job to job and from location to location as the pay scales reflect the cost of living and the value of particular industries to the local environment. Geographic choices also include lifestyle choices and climate. For example, Seattle and the Pacific Northwest are a striking contrast to New York **City**—**you** must decide which environment suits you and will allow you to be happy and do your best work.

Looking for jobs on the international front requires you to know what U.S. companies have branch offices in which countries or which companies in the United States are subsidiaries of large corporations overseas. If you plan to move to another country and find a job, it pays to know someone who knows someone. It's also a good idea to research the corporate culture of international companies. Often, the way business gets done varies greatly from country to country and you may find yourself in an unexpected and unhappy situation if you don't research what you're in for.

In short, finding a job that suits you means more than looking at the salary figures. Think carefully about where you might find the best fit between you and the job you might want to have.

Where to Find Leads

Successful job seekers no longer think that the only place to look for a job is the classified ad section in the Sunday paper. While this is a good place to get an idea of the types of jobs available, there are many other avenues for finding employment opportunities. You may want to consider the following.

Classified Ads These ads are a good place to start. They let you know the economic health and focuses of certain areas, what the salary ranges are, and what kind of companies are hiring. The downside to such ads is that every job advertised is likely to attract a large number of applicants. Your resume may end up in a pile with hundreds of others.

Job Fairs These fairs can be useful for specific kinds of jobs. Usually job fairs are held for certain interest areas, such as the computer field, the health care field, and so on. People interested in all sorts of jobs within these fields attend the fair, all carrying resumes and interested in talking to potential employers about the opportunities in a general field. It's important to realize that few actual hirings result from these large fairs; instead, they are more informational than transactional. You can make good contacts and you can learn about the field. If you follow up later with a particular hiring manager, you may have success at landing a good job.

Professional Organizations Most types of technical professions have specialized organizations where a great deal of networking occurs. The Society for Technical Communication is the largest international organization for technical communicators. A membership allows you to receive a journal, a newsletter, and access to all of the local chapter functions. Similarly, the American Medical Writers Association provides newsletters and many opportunities to know what jobs are available. The Institute of Electrical and Electronic Engineers (IEEE) is a widely known engineering organization with many subgroups for each engineering field. Almost all of the technical specialties have professional organizations that can put you in touch with the latest happenings in the field and give you access to job bulletin boards and specialized want ads. The benefits you receive from joining one of these organizations are well worth the dues you pay.

Electronic Bulletin Boards The bulletin boards are located on the Internet. These boards post jobs for a variety of specialists and can be accessed easily from your home computer. Some examples are the Usenet newsgroup for women in science and engineering: bionet.women-inbio and info.wisenet; MedSearch for careers in the health professions: www.medsearch.com; and SPIE employment service on the World Wide Web to help people in the scientific and engineering communities find jobs: <http://spieworks.com/employment/>.

Computerized WWW Search Engines Various search engines, such as Careerbuilder (www.careerbuilder.com), allow you to search the World Wide Web by profession and keyword to access jobs published in a variety of media—want ads in newspapers across the country, ads in other electronic forms, and sometimes ads from specialized newsletters. The following sites might also be helpful in your job search:

www.monster.com

hotjobs.yahoo.com

www.dice.com

Academic Institutions Universities and colleges often have leads on the job market. Make an appointment to visit the career counseling services at your college or university and speak to the faculty members who specialize in the kind of work you would like to do. They usually keep current with employment opportunities for their students.

Personal Contacts Knowing the right people is always useful. Let people know you're looking for a job; they may know someone who can help you. Be careful not to be overly aggressive when talking with friends and acquaintances about your job search, but a few well-placed words may result in interesting opportunities.

Internships College internship programs are some of the best introductions to a profession. On an internship, you work in the field and learn firsthand about the types of jobs available. You also meet people who can steer you in the right direction. Ask your instructors about possible internship programs available at your school.

▶ *Tip: If you are working with a recruiting agency, be sure to work with only one. It's embarrassing to have an employer receive the same resume from several agencies—and the resumes will be formatted differently. Instead of looking like an attractive candidate for the position, you may look desperate and somewhat dishonest.*

Recruiting Agencies These are employment agencies that make money by placing people in jobs. Recruiters working for such agencies are known as "headhunters." When a candidate they send for an interview is hired, the company pays the agency a finding fee. There is usually no cost to the candidate. If you plan to use such services, keep in mind that most agencies specialize in working with people who are more experienced than entry-level candidates. There are some exceptions and it's worth a call to the agency to find out their policies.

Choosing References

As you think about who might serve as useful references for you, it may help to know the kinds of questions most often asked when employers contact the people you have listed. Some employers are informal and simply ask the reference for a

general impression of you as a person and of your qualifications for the job. But others have a set list of questions they ask of all references. The lists usually include questions like these:

- How long and in what capacity have you known the applicant?
- Can you name the applicant's major strengths?
- In what areas can the applicant improve?
- Is the applicant a team player? How does the applicant work with people?
- Does the applicant take initiative or wait to be told what to do?
- What kind of a manager would be best for this applicant?
- Is the applicant familiar with the latest technology important for the job?
- Would you hire this applicant if you had the opportunity?

Think about choosing people for your references who can answer these questions well and put you in the most positive light. That means asking people who have supervised you in some capacity—on the job or in the classroom. Don't include friends and relatives. They can be character references only; they can't speak about your job performance capabilities.

Make sure you ask your references for permission to use their names. It reflects poorly on you if potential employers contact references who aren't aware you've listed them as such. Informing your references ahead of time also gives you the opportunity to discuss with them the nature of the job or jobs for which you're applying. They can then be prepared to speak more directly to the employers about how your abilities match the job.

When you have considered all of these elements of the job search, you are ready to target particular types of jobs—or maybe even particular companies—and begin preparing the written materials you'll need to submit your application.

Writing Job Application Letters

Writing an effective cover letter for a job application is easier than most people think. It does require time and thought, but it isn't the mystery that some job seekers deem it to be. A good cover letter does three things: (1) it indicates why the employer should take your application out of the stack and consider it further; (2) it highlights the resume; and (3) it establishes your professionalism. To write a cover letter well, you should consider carefully what the employer is looking for. See Steps to . . . Creating an Effective Application Letter for tips for catching your reader's attention.

➤ **Tip:** *Try to keep the cover letter to one page. When employers receive hundreds of letters for one position, they appreciate it if you focus what you have to say concisely and clearly. Many employers don't ever bother to turn to page two.*

A good cover letter will come to the point quickly without being overly brief or overly long. Remember that most hiring managers do read the

CREATING AN EFFECTIVE APPLICATION LETTER

1. Begin with a clear **statement** of what job you are applying for, how you heard about it, and why you want it. Employers may be hiring for several positions and need to know up front which position you are applying for. Employers also like to know where you saw the job posting or heard about the position—information that tells them about the success of their advertising strategies, as well as about you (what you read, whom you know, where you spend your time). Stating up front why you want this particular job creates a confident tone and establishes you as a thoughtful, serious candidate who wants this job for specific reasons. Even if you are sending out multiple letters, each one should be custom worded for an employer. (See the sample letter on p. 471.)
2. Discuss the specific experience that sets you apart from other candidates. Most applicants for a job will have similar educational backgrounds; unless your education is what really sets you apart, save it for later. Instead, discuss the interesting things about you that make you a special match for this job. Have you had internships in this field? Have you held other related jobs? Do you have related experience or interests that make you especially qualified? Think hard about what makes you different from all the other candidates.
3. Highlight your educational background. Mention the pertinent courses you have taken and the specific projects you have completed that relate to the type of work the employer has available. Remember that most of the other applicants will have similar backgrounds, so you need to describe your education not in terms of a general statement of course work taken, but as a targeted education for this particular job.
4. Find a tone that strikes the right balance between arrogance and desperation. If you are applying for your first job after graduation, sound like a colleague, not a student. Think of yourself as a professional who is qualified for the position and can contribute significantly to the company. But be careful not to go overboard and make statements like "I am sure I am the most qualified candidate for this position" or "My resume will assure you that I can excel at this job." These assertions suggest that you are making value judgments ahead of time; leave those judgments to the employer. You're better off giving simple statements of fact that show you have confidence in the truth: "My resume indicates that I have significant expertise in this field, and I hope to bring this experience to your firm."
5. Avoid empty statements. Leave out comments such as "I am seeking a responsible position in a forward-looking company with a solid reputation for quality." Would anyone be seeking an irresponsible position in a backward-looking company with a reputation for slovenliness? Of course not. Make sure that every sentence of your cover letter makes a real statement that sounds sincere and trustworthy.
6. End on a collegial note with a final action step, if appropriate. Too many cover letters end the same way: "Thank you for your consideration. I look forward to hearing from you." Better to end with specifics about the position and your interest in it, a brief thank you, and perhaps a statement about following up with a phone call or an e-mail if that seems appropriate. You walk a fine line here between being too pushy and being sufficiently aggressive. For instance, a statement such as "I will call you in a few weeks to arrange an interview" is entirely too arrogant because it takes the power away from the employer. On the other hand, a closing such as "I will be in San Jose in early March and will call you beforehand to see if you might be interested in talking with me at that time" sounds confident while leaving the power in the hands of the employer. If you think it's inappropriate to include any action step, close the letter with a simple thank you.

cover letter before reading the resume, and thus the letter is the lens through which they see the resume. In that letter you have the chance to focus employers on the parts of the resume that will most interest them, highlighting those sections and putting the rest into a clear perspective pertinent to the specific job.

Avoid the mistake of making the cover letter no more than a short paragraph introducing the resume. Employers expect to get a sense of your personality in the cover letter, and a quick note doesn't allow you to create a clear sense of who you are.

Writing Resumes

There is no formula for writing good resumes, although you may have heard several of the myths: keep the resume to one page, never write an "objective," never include hobbies, and so forth. The bottom line is that the resume is a design project that reflects every person's individual sense of his or her credentials. Following a standard format you find in a book or using a resume service to produce a resume for you results in a bland document that looks like everyone else's. Robert Half, founder of a well-known financial and data processing recruiting firm, offers this advice:

The problem in having someone else—the author of a book or a person working for a resume mill—prepare a resume for you is that it comes out looking exactly as though someone else has done it. Those carbon copy resumes flood the desks of people who hire. They have almost identical formats, take the same approach, and in too many cases even use the same words. How, I ask, can people find better jobs if they choose to place themselves on the heap of cookie-cutter resumes? Better jobs are found by people who set themselves apart from the pack, and who rise above the mountain of resumes because they've caught the eye of a person who will take them to the next plateau of consideration.*

The purpose of a resume is to give an accurate representation of your accomplishments and credentials—in short, what you can bring to an employer. Writing and designing your resume allows you to do a self-analysis of your qualifications, including your weaknesses and your strengths. Of course, you won't focus on weaknesses in the resume; you'll design it to feature strengths—which means that no two successful resumes can be alike. Nonetheless, see *Guidelines: Writing Effective Resumes* for advice that will still allow you to be as creative as you need to be within these parameters.

Your resume serves as a sample of your writing and design capabilities. Use language that reflects your best writing (not overblown words such as "utilization" or "assisted in the facilitation of"), carefully proofread for any mistakes, and use effective page design techniques to increase readability.

*Robert Half, "Basic Advice on Writing a Winning Resume," *National Business Employment Weekly*, April 22, 1990. Copyright 1990 by DOW JONES & CO INC. Reproduced with permission of DOW JONES & CO INC. in the format textbook via Copyright Clearance Center.

GUIDELINES Writing Effective Resumes

- Always put your name, address, telephone number, fax number, and e-mail address at the top of the first page. Employers need to know how to reach you.
- Always include the following major categories: education, experience, professional affiliations. Depending on the job and your background, you may want to include other categories as well: computer skills, publications, technical expertise, and so on. Organize the resume so that the most impressive part of your background comes first. If experience is your strong suit, lead with that; if education is your strength, lead with that.
- Include an objective at the top of the page if you really have a single goal in your job search. There is much debate about whether to include such a line. Some employers want to see it so they know how focused you are; others feel the cover letter serves the same purpose. Ultimately, it's your decision. But if you do decide to include an objective, make sure it's as focused as it should be. Lines such as "an entry-level position as a technical communicator" aren't worth using. But lines such as "a position allowing me to use my proven editorial and writing abilities, education, and creativity as a software documentation specialist" can work well for you.
- Use white space creatively so your text doesn't appear crowded and dense. The whole idea of a resume is to enable employers to read it easily. Remember that a resume is a writing and design sample, as well as a catalogue of your credentials.
- Avoid careless mistakes. All errors—*typographical*, grammatical, spelling, punctuation—are unforgivable sins in a resume. A single typo may not sink your chances, but it will diminish your credibility. You want to send the message that you pay attention to details and are competent in using the tools of writing.
- Include specific responsibilities you had in your previous jobs and relevant courses you took in school. Vagueness is not something you want in your resume. You may want to say what your duties were, how many people you supervised, the size of the budget you controlled, and so on. In your education section, for each degree you may want to list the courses that will be pertinent to the particular type of work you are seeking.
- Don't misrepresent the truth. While all resumes should focus your experience in ways most suitable for the job you seek, don't cross the line into presenting false information. If you do, you're likely to get caught when the employer checks on your references, and if you do get hired, you may find yourself in situations you can't handle because of lack of experience.
- Keep your resume to no more than two pages. Most employers agree that two-page resumes are best. Trying to keep the resume to one page may create overly dense and crowded prose. On the other hand, most employers won't read more than two pages. Unless you are well advanced in your field or are in a field where long resumes are common (such as academics), keep it to two pages or less.
- Avoid overuse of adjectives. A resume is supposed to be a factual portrait of your accomplishments. Leave the value judgments to the employers; keep adjectives to a bare minimum.
- Don't overpersonalize. A resume need not include any personal information other than your name, address, and phone number. Information about your age, sex, height, weight, and marital status is not appropriate. Include your hobbies only if you think they shed positive light on your career goals.
- Don't include a list of references. Have a list handy to give to an employer if asked, but don't list the references directly on the resume. Always make sure you call these references in advance to ask their permission to use their names and to update them about the jobs for which you're applying.

Types of Resumes

Research says most employers take only seven seconds to read a resume. That means you need to get your message across in a highly efficient and clearly focused manner. To achieve such focus, you need to think about the kind of resume that best fits your credentials and the job for which you're applying. There are three approaches to resume writing, and each works in different circumstances:

- Chronological
- Targeted
- Function oriented

Usually, you should use a **chronological resume** if you have a stable work history and the jobs you have held move in a logical progression toward the position you are now seeking. Present your experience in reverse chronological order so that your most recent employment is featured first.

Use a **targeted resume** to highlight your capabilities in relation to a specific job. This approach works well if your most recent experience is not directly relevant to the job you are seeking and you want to emphasize past experience.

Use a **function-oriented resume** to showcase what you can do, as opposed to where and when you did it. This approach works best when you have limited direct experience and your skills are primarily acquired through study, when you have an inconsistent work history, or when you are changing careers.

Copies of all three formats can be found in the sample documents at the end of this chapter.

Electronic Resumes

Most resumes now are circulated electronically, and many companies and institutions now insist on this. There are four popular methods for sending your material online: as an e-mail attachment, as electronic forms (e-forms), as a Web page, and as a hardcopy resume that employers scan into a database.

E-mail Resumes You **can** send your resume to a potential employer by including it as an attachment to an e-mail. In most instances, you can use ASCII rich text that allows you to include fancy formatting. However, not all computers can read all text files; you need to be sure your text is compatible with the audience's computer. As a test, e-mail a copy of your resume to yourself. Make sure the formatting looks the way you want it to—and make sure the resume doesn't get blocked as spam. If it got caught in your spam filter, chances are it could get stuck in others.

E-forms If you want to post your resume directly to an online job board, you simply fill in the electronic form the database provides. Keep in mind that these

forms require you to use ASCII plain text without the formatting enhancements. Your resume will look much more austere, but its text will be compatible with all computers searching the job board.

► *Tip: Putting a resume on the Internet via a Web page or a job board may allow your personal information—such as your e-mail, phone number, and address—to be accessed by the general public. Be sure the job boards you choose have safeguards against your resume falling into the wrong hands.*

Web Resumes Creating a Web-page resume allows you to include photographs, links to other Websites, and other high-tech design/layout graphics. Web resumes are also compatible with all computers with access to the Internet, although you need the software tools to create the page and you cannot often post Web resumes on online resume databases.

Scannable Resumes A scannable resume is a text that you send in hardcopy for potential employers or an online resume service to scan into a database. The text in these resumes needs to be extremely clear and crisp so that the OCR

(optical character recognition) software that reads the characters can get a clean image. Preparing a scannable resume requires many of the same techniques as preparing regular resumes: you still focus on content, but the format must be more austere. See Guidelines: Formatting a Scannable Resume.

GUIDELINES Formatting a Scannable Resume

The key to an effective scannable resume is simplicity: At every step, keep the document as simple as possible.

- **Paper.** Use white or very light-colored, standard size (8½ x 11) paper, printed on one side only. Never fold or staple the pages. Provide a laser-printed original, if possible.
- **Typefaces.** Use standard typefaces (Helvetica, Times New Roman, Futura, Optima, Univers, Palatino, Arial) in a fairly large size (a minimum of 11-point, and a maximum of 14-point). Don't condense spacing between letters if you are using a desktop publishing program that allows this. Limit line length to 65 characters (including spaces and punctuation). Avoid long sections of italic or bold, and never use fancy effects like shadowing, underlining, or reverse type (white on black). Use bold or all capital letters for section headings, as long as the letters don't touch each other. Don't use parentheses or brackets, even in phone numbers.
- **Graphics.** Avoid using graphics, including simple ones like vertical and horizontal lines and boxes.
- **Format.** Use a single column. Place your name at the top of each page on a line of its own. Place your address, in standard format, below your name on the first page, and put each separate telephone number on a separate line.

► **Tip:** *If you are planning to create a scannable resume, it's a good idea to have two versions: one for the computer to read and one for people to read. The computer version will include a scannable format and detailed information; the hardcopy version may have an enhanced, creative layout. Send the scannable resume electronically, and when you get hits and ultimate job interviews, take the hardcopy version to the interview.*

Keyword Tips In many cases, employers search resumes stored in job databases or posted on the Web by keywords to find the job candidates that best fit the company's needs. To be successful in your job search, you should include specific keywords about your skills so your resume gets more "hits" (a hit is when one of your skills matches the computer search) when the employers electronically search their resume files.

For example, when employers search for specific experience, they type in nouns such as *writer, BS, marketing, Society for Technical Communication, Spanish (language fluency), hydrogeologist, Japan*, and so forth. To accommodate such searches, make sure you describe your experience with concrete words rather than abstract, vague descriptions. Employers can also search for your re-

sume in particular, so you need to be sure your name is in a prominent position.

See Guidelines: Using Keywords in Your Resume when writing the content of your resume to maximize "hits."

Preparing Professional Portfolios

The most impressive job candidates are often those who come to interviews with a carefully organized portfolio, including a set of writing samples. One hiring manager recently explained that the difference between the candidate who arrived with a neat portfolio versus the one who came in with a sheaf of loose samples that were disorganized and constantly tumbling to the floor was pivotal in the hiring decision. If you want to appear organized and professional, one way to do so is to create a professional-looking portfolio to take with you when you interview.

Components of the Portfolio

Similar to resumes, portfolios reflect who you are and should be created without specific formats or rules, but most portfolios have the following general components.

Overall Package Find a leather (or faux leather) notebook large enough to include your samples. The material should be organized inside to feature the samples most appropriate for the job interview at hand. (You may rearrange the material for different job interviews.)

Resume Put your resume first. You may want to put it in a plastic sleeve so it remains protected but can be slipped out when necessary. Be sure to carry additional copies of your resume in case you need to distribute them to several people.

GUIDELINES Using Keywords in Your Resume

- Use enough keywords to define your skills, experience, education, professional affiliations, and so on. Some job seekers have gone so far as to place a large block of keywords at the top of their resume.
- Describe your experience with action words rather than vague descriptions. For example, it's better to use "managed a team of software engineers" than "responsible for managing and training personnel."
- Be concise and truthful.
- Use more than one page if necessary. The computer can easily handle multiple pages; this fact allows you to provide more information than you would if you were sending your resume as a hardcopy.
- Use terms of art and acronyms specific to your industry.
- Increase your list of keywords by including specifics. For example, list the names of software (Microsoft Word, Lotus 1-2-3, and SD on) that you have used.
- Use common headings such as Objective, Experience, Employment, Work History, Positions Held, Appointments, Skills, Summary of Qualifications, Accomplishments, Strengths, Education, Professional Affiliations, Publications, Papers, Licenses, Certifications, Examinations, Honors, Personal, Additional, Miscellaneous, References, and so forth.
- Describe your interpersonal traits and attitude, if you have extra space. Words such as leadership, sense of responsibility, time management, dependability, and so on may increase the number of hits from employers looking for particular characteristics.*

*Adapted from Resumix, Inc., Sunnydale, CA, 1997.

Table of Contents Include a TOC for the major categories and samples within each category. For instance, you may have four general categories (for example: Software Documentation, Editing, Marketing Writing, and Graphic Design) if you are a technical writer, or you may use other categories if you are an engineer (for example: Technical Reports, Proposals, Feasibility Studies, and CadCam Graphics). List those major headings and include the titles of each piece you have included under each heading. No need to include page numbers because this TOC is only to give employers an overview of your material they can see at a glance. (You may need to have several TOCs if you change the order of your material for various job interviews.)

Major Categories Divide your samples into major categories that reflect your depth as well as breadth as a professional. Use a tabbed divider page for each major category heading and include at least two samples in each category.

Some technical professionals add cover sheets to each piece they include in the portfolio listing the title of the piece, the intended audience, and brief comments

about its creation. These aren't necessary, but they do provide employers with a sort of quick context for understanding the particular sample.

Never leave your hardcopy portfolio behind in an interview. Doing so ties up your ability to interview elsewhere and take your portfolio with you. You also run the risk of having the employer either lose your material or spill something on it during its time in the office. If a potential employer wants to keep some of your materials for further review, make sure you have prepared a mini-version of the portfolio to leave with the company. (A simple photocopied version is fine.) It should include your resume and about twenty pages of excerpts from the samples you think best represent your work.

Electronic Portfolios

Many technical communicators are moving away from paper-based portfolios and, instead, are developing electronic portfolios through the Web. As with most things, there are advantages and disadvantages to moving in this direction. With traditional portfolios, tiles, boxes, and binders holding papers, cassettes, pictures, and so forth take up a lot of space and aren't very portable. Web-based "e-portfolios" store information on a computer hard drive, CD, or other electronic means and can be accessed with minimal effort. Photographs, artwork, and writing samples can be scanned, saved, and updated with ease. Adding sound or video can enhance the portfolio as well—and it's a big plus that employers can review your material online before your interview.

One possible disadvantage is that you need to have Web design tools to build the portfolio. Generally, you need a computer with multimedia capabilities, a color flatbed scanner, a digital camera, and multimedia Web design software (such as Dreamweaver, HyperStudio, FrontPage); an image editor (such as PhotoShop or Paint Shop Pro); and Adobe Acrobat to create PDF files. Another note of caution is that technology is prone to breakdown, and you may not be able to access your portfolio when and where you need it. Finally, as with posting your resume on an unprotected job board, publishing your portfolio on the Web allows anyone with an Internet connection to view your material unless you password protect it.

Components of an electronic portfolio should include your resume and samples of your work, as well as explanatory text indicating what the sample is, what tools were used to create the piece, and other relevant information—much the same as the cover pages in a hardcopy portfolio. The difference here is that you should provide the documents in a format that is easily viewed by common software applications (such as.pdf versions readable by Adobe Acrobat). Create separate documents for each sample and use links from Web pages to each.

Interviewing

If you are called for an interview, your credentials have impressed an employer sufficiently to win you a personal look. Usually, hiring managers interview fewer than ten people for any given position, but they may have two rounds of interviews: the

first round to narrow the field to the final candidates, and the last round to choose the person they want to hire. No matter what the system, you can assume that if you make it to the interview stage, your credentials have passed muster and the employer is seriously interested in your application.

Everyone invited to interview is probably qualified for the job. The interview is an opportunity for the employers to see who you are as a person and whether you will work well with their organization. That's why the way you present yourself during the interview is so critical.

You want to present yourself in the best possible light. However, it's important to be yourself, not a false version of who you are in an attempt to impress. In most situations, people can tell if you're putting on an act and are straining to be someone you're not. It may help to realize that the interview has a double purpose: for the employers to get a look at you, *and for you to get a look at them*. Everyone in the room shares a common goal: to make the best match for the job. If you are busy pretending to be someone you're not, the match won't work for you or for the employer. All of the pieces must fit together to make a productive work situation. See Guidelines: Interviewing Successfully.

GUIDELINES Interviewing Successfully

- Do your "homework" about the company so that you can speak knowledgeably. Research annual reports, company marketing materials, Web site, and so forth.
- Dress appropriately. If you've researched the company, you may know whether a three-piece suit or a more casual jacket and tie (or, for women, a suit with a skirt or a pants suit) is more appropriate. Never arrive for an interview dressed casually. Show respect for the employer by dressing up.
- Bring several copies of your resume and at least one copy of your portfolio. Even if the employers have seen the resume, they may need extra copies, and the fact that you have a well-organized professional portfolio will be impressive.
- Arrive a few minutes early. Timeliness in an interview is essential.
- Use firm handshakes and look the interviewer in the eye when you are speaking and listening.
- Don't answer with a simple "yes" or "no." Give details whenever possible, but don't include irrelevant facts or stories.
- Don't make derogatory remarks about your last employer. It's appropriate to explain your reasons for seeking a new job, but give only the necessary information. Otherwise, the new employer may think you are a person easily disgruntled and you may make the same sorts of comments about a new job situation.

continued

Guidelines Interviewing Successfully, continued

- Don't ask about salary, vacations, bonuses, and so forth during the first interview. If the interviewer asks what salary you want, indicate what you have been making or suggest what you know is a standard salary range for the field. Always indicate that you're more interested in opportunity than in salary—even though you plan to negotiate later.
- Be prepared to ask questions about the **job—but** make sure they are questions indicating a lively interest in the position. Employers view questions by the candidate as a positive factor, as long as the candidate is a good, active listener and can answer the interviewers' questions as well as ask them.
- Conduct yourself as if you are determined to get the job. Never close the door on opportunity. Wait until the offer is made to negotiate or make any negative decisions. Make it your goal to be in the ultimate decision seat.

Common Interview Questions

Before you go to an interview, you may want to think about how you might answer some of the most common questions interviewers ask. The questions may not be phrased in exactly these words, but the gist of them will probably be the same:

- What interests you about our company?
- Why are you attracted to this opportunity?
- How do you feel you can best contribute to this company?
- How would you describe yourself as an employee?
- What are your career goals for the next five years?
- What is the writing sample you are most proud of? Why?
- What do you view as your strengths?
- What do you view as your weaknesses?
- Why are you leaving your present employer?
- How would you describe your most recent job performance evaluation?
- What is your salary history?

If you are prepared with good answers to these questions, you will appear confident and poised. The ultimate hiring decision, then, will be based on facts and not on reactions to your nervousness or inability to think quickly on the spot to field the questions asked.

Following Up

A key to any positive impression is courtesy, and the job search process is no exception. Within a day after you have interviewed, show your enthusiasm for the job and your courtesy by sending a thank-you note to the primary person who

interviewed you. In the note, thank the person for the time and consideration and mention some specifics that impressed you about the company. End with a positive spin on the experience and without the cliché "I hope to hear from you soon." A phrase such as "I'm impressed with the opportunities the position offers, and I hope to be able to work with you" strikes the right note of confidence. But each situation is different and requires your creativity in composing the right ending.

If you don't hear anything from the employer in a few weeks, it's appropriate to call to inquire about your application's status. Flooding the communication lines with inquiries before that time doesn't make a good impression. But again, every situation is different and you will have to exercise good judgment about how often

to be in touch.

When you are in the fortunate position of having another offer in hand, you have a good reason to call the employers where your application is still pending and give them a chance to make a counteroffer. In these situations, it isn't necessary to indicate the exact details of your offer (such as salary and other benefits), but it is wise to give the specific company's name and to suggest that you are still interested in exploring the possibilities for working at the pending company. Usually, you can get a firm answer within a week—don't string out the process for more than that time period. Doing so may lose you both jobs and sully your reputation as well.

Getting the job that's right for you takes more than sending out a few letters and signing up with the college placement office. The job search requires research, planning, and careful organization. But if you are prepared, no matter what curves the job world throws at you, you will know that you have a substantial chance of finding the job that matches your qualifications. The 70 percent that is preparedness will be taken care of; the other 30 percent that is luck has also been given a big nudge in the right direction.



Tips for International Communication

Increasingly, corporations are opening branch offices in other countries or are partnering with companies abroad. With that trend comes the opportunity for you to apply for jobs overseas in cultures quite different from your own. If you work for a multinational corporation with headquarters in this country, you may have an advantage in finding work in one of its international locations. You may also have the added benefit of the cultural orientation these companies often provide before your taking the post abroad. But whether or not you have these advantages, it's important to realize that cultural protocols for the job search differ from country to country. Before you apply for a job, research the customs for each of the following parts of the employment process.

Application Letters Like other correspondence in different countries, effective job application letters depend on the cultural expectations of that location. How you ask to be considered for a job depends on whether it is customary to begin with *you* (stating your desires up front), or *the employer* (praising the company where you wish to work).

Resumes What you feature in your resume creates the primary impression the employers have of you. In some cultures, your depth of experience in certain areas makes you a good candidate for a job. But in others, your willingness to explore new challenges is key. For example, Minoru Morita, senior managing director at Sony Corporation in Japan, says, "We believe that having continuous success in the same area makes you believe too much in your own power, and harms your creativity."*

Interviewing Interviewing in other cultures requires an understanding of that culture's customs. What works in the United States may backfire in the high-context cultures of Japan or China, for example. In those cultures, the interviewee should emphasize modesty and politeness rather than aggressiveness or pride. But if you emphasize modesty in a low-context culture such as Germany or the UK, the employer may not believe you are capable of doing the job required. Before you interview, talk to some professionals in the field and get a good sense of what interpersonal dynamics are expected in an interview situation. Spending some time in the country before the interview is another way to help you become more accustomed to the culture and its expectations.

Keep in mind, too, that interviews in other countries are not governed by U.S. employment laws or practices. For example, while interviewers in the United States are not allowed to ask about marital status, age, or disability, interviewers abroad can ask about these personal areas. As a result, interviews often focus on your family as well as your ability to do a job.

Dress How to "dress for success" in one culture may differ markedly from culture to culture. Before you show up for the interview wearing a bright red power tie or a suit in other dramatic hues, be sure the colors won't offend the employer and that such bold hues are the best way to make a personal statement. Perhaps more muted tones would work better.

Interpersonal Behavior In Japan, it is considered rude to pull a business card from your pocket and place it on the desk in front of someone. Instead, take the card from your briefcase with both hands and offer it to the employer with a slight nod of the head indicating respect. Similarly, other cultures have unique customs

*Brenton Schlender, "How Sony Keeps the Magic Going." *Fortune*, February 24, 1992, pp. 76-84.

that you must honor to win the approval of the hiring managers. If you don't know how to behave in the interview, you certainly won't make a good impression on the job.

For more about cross-cultural communication, see Chapter 7.

Quick Review

Employers appreciate applicants who follow the generally accepted channels for finding a job. Attempts to sidestep the common practices usually make the applicant seem rude, arrogant—or simply naive. Job application protocol is as follows:

- Organize the search so you're clear about the kind of work you want to do, the geographic location that best suits you, and where you might find the best job leads.
- Prepare written application materials: your resume, a cover letter, and a professional portfolio of material that showcases your abilities and relevant experience.
- Choose references carefully and be sure to ask their permission; it may also help to discuss with them the nature of the job or jobs for which you are applying.
- Respond to job advertisements and follow other leads appropriate to your technical field.
- Be prepared for interviews—don't arrive "cold."
- Follow up your interview with a courteous thank-you note; if you haven't heard back from the employer within a few weeks, it's appropriate to call to inquire about the application's status.
- When searching for a job in another country, research the cultural protocols for application letters, interviews, dress, and interpersonal behavior.

Exercises

1. Prepare a resume targeted for a particular kind of job. Then, prepare either a second resume that is to be distributed to a broader set of employers or one that is targeted to a different type of job.
2. Write two different cover letters to accompany each of the resumes prepared in the previous exercise. Remember that the purpose of a cover letter is to highlight the resume and to indicate to the hiring manager that you have the interest, skills, and intelligence to fit the job opening—and that you would be a good colleague in the workplace.
3. If you have written several documents that represent good writing in your chosen field, collect them into a writing portfolio that showcases your professional writing abilities and experience. Follow the format suggested in this chapter or design your own format.



Community Action Project

Most cities have agencies that help find jobs for people who are either disadvantaged in some way or otherwise have little experience on the job market. If you have such an agency in your area, volunteer to work with the clients to develop resumes that will highlight their skills and give them greater opportunities for employment.



Technology Challenge

Develop an electronic portfolio of work that represents you well to potential employers. Include photos and graphics material as well as text.

Job Application Letter

David Gregorian
1 Billings Park
Newton, MA 02158
(617) 527-9093

3 June 2007

Frann Bennis, Executive Director
Alaska Marine Conservation Council
Anchorage, AK 99879

Dear Ms. Bennis:

In response to your recent advertisement in *Environmental Career Opportunities*, seeking a Biodiversity Campaign Coordinator, I offer you my intimate familiarity with environmental law and marine ecology, as well as an unrivaled dedication to our natural resources. Alaska's marine resources have been exploited and undervalued for far too long. I would be eager to work with the AMCC to coordinate a marine biodiversity campaign; my resume is attached.

Prior to attending Northeastern University School of Law, I was the zoologist/information manager with the Delaware Natural Heritage Inventory, which documents and disseminates information concerning the State's rare and endangered species. In my dual role, I identified and investigated rare species occurrences, and served as the environmental reviewer of government and private projects. I also coordinated the State's Marine Mammal Response Team and was the Curator of Mammals at the Delaware Museum of Natural History. My specialties are avian ecology and wildlife toxicology, and I have written extensively on these topics.

I became familiar with the AMCC when I externed at the Sierra Club Legal Defense Fund in Juneau; we represented the AMCC in its challenge to the new NMFS incidental take regulations. At the Center for International Environmental Law, I worked exclusively on a handbook for the implementation of the Biodiversity Convention in marine ecosystems. Northeastern University's Cooperative Legal Education Program permits students to complete a traditional first year of academic study and then alternate each quarter between academic classes and full-time work as legal externs. The practical experience I have gained is invaluable.

Please feel free to contact me if you have any questions or need additional information. I will call within the next few weeks to check on the status of my application. Thank you for your time and consideration.

Very truly yours,

David tyieyoniatt

Clear statement of desired job and where David learned of it

Reason for wanting the job

Reference to resume

Education mentioned

Specifics that set David apart from other candidates

David's familiarity with the organization

Specific related experience

Confident tone—not arrogant

Action step and thank you at the end

Table of Contents for Technical Writing Portfolio

Amanda M. Barker
Portfolio of Technical and Professional Writing

TOC first

Table of Contents

Subheadings identify major categories of work

Technical Marketing

- Technical Marketing Materials for Inmagic/Lycos, Intranet Spidering Products:
 - White Paper: "Making Your Information Work for You: Intranet Spidering Technology"
 - Technical Q & A: "Questions and Answers About Intranet Spidering"
 - Product Brochure: "Lycos and Inmagic Intranet Spidering Products"
- Product Data Sheet: "Inmagic DB/Text ODBC Driver"
- Technical Report: "Analysis of the Literature Fulfillment and Management Processes at Inmagic, Inc."

Strongest work appears in first section

Instructional Design

- Materials for Workshop: Writing More Effective, Creative High-Tech Marketing Copy:
 - Course Outline and Lesson Plan
 - Instructor Guide/Student Guide
- Web Site: Materials and Resources for Technical Writing and Business Writing Courses

At least two samples in each category section

Academic Papers

- "The First Sophists and the the Ethics of Technical Copywriting"
- "The Business Communication Classroom: Bridging the Gap Between Freshman Composition and Workplace Writing"
- Informational Discourse: "An Introduction to the World of Coffee"
- Expository Discourse: "An Explanation of the Fundamentals of Feng Shui"

Miscellaneous

- Editing Project: Draft of Undergraduate Thesis "The Elimination of Periodic Parity Vectors for the $3x + 1$ Map on the Gaussian Integers"
- Business Plan for Amanda Barker Communications

Thank You Letter

Pat O'Connell
51 Washington Avenue
Morristown, NJ 07960

June 12, 2007

Ruth Stein
Human Resources Manager
Rocket Solutions Corporation
4 Technology Park
Morristown, NJ 07960

Dear Ms. Stein:

Thank you for the opportunity to interview for the Web designer's position at Rocket Solutions last Tuesday. Your insights into Rocket's target clients and possibilities for electronic marketing excited me about the opportunities for creative design work within your company.

I am especially interested in what you call "the R-team approach" to product development. The opportunity to collaborate with such an energetic, team-spirited group of people as I met during the interview convinces me that I want to be a part of your company. If I can provide you with any additional information to help you in your decision, I will be glad to do so.

Thank you for your time and thoughtful consideration. I hope to hear from you soon.

Sincerely,

Pat O'Connell

Pat O'Connell

Specific mention of date and position

Specific comment about the company's attraction

More reasons indicating enthusiasm

Courteous closing

Chronological Resume

Courtney Robbins

18 Cheshire Place

London W3

Work phone: (044-1) 651-3340

Home phone: (044-1) 234-0992

E-mail: Super@Phatcom

WORK EXPERIENCE

Dodson Engineering, Etd., London, U.K.

Regional Manager

2000–Present

- Managed hydrogeologic investigation of **hazardous** waste sites
- Supervised field personnel performing geophysical surveys, aquifer testing, and environmental sampling
- Directed and managed large-scale United Kingdom environmental programs, such as the Abandoned Sites Programs. Hazardous Waste Management Program, and the Emergency Response Program

Envirotech, Incorporated, Buffalo, N.Y.

Director, Hazardous Materials Management Division

1995–2000

- Managed the Abandoned Sites Program
- Coordinated Superfund activities with the state
- Supervised the **underground** tank permitting and release programs

Project Manager, Phase II Investigations

1992–1995

- Evaluated test borings
- Installed monitoring wells
- Collected soil and groundwater samples
- Tested aquifer conditions

EDUCATION

M.S. in Geology, University of Connecticut

1992

B.S. in Geology, Norwich University

1990

Targeted Resume

Nicholas Howell
220 West E Street
Washington, DC 20009
Work phone: (202) 998-7236
Home phone: (202) 727-9476
E-mail: Nick@Capitol.net
<http://www.cs.uml.edurnhowell>

OBJECTIVE INFORMATION DEVELOPER

CAPABILITIES

- Develop and publish international WWW pages
- Create marketing, PR materials, reports, and other documents as needed
- Write and edit monthly technology newsletter for distribution in U.S. and Japan
- Handle high-pressure situations and deadlines
- Specialize in clear concise technical writing in English for a Japanese audience

ACHIEVEMENTS

- Maintained business relationships with high-level, international technology experts
- Supervised staff including three junior writers, an office manager, and an intern
- Trained new writers
- Established training manuals and techniques

COMPUTER EXPERIENCE

Hardware	IBM-compatible PCs, Apple Macs, SparcServer 470
Operating Systems	Windows, MS-DOS, UNIX, MacOS
Internet	HTML, Netscape, Mosaic, Lynx, FTP, Telnet
Spreadsheets	Excel, Lotus 1-2-3, Quattro Pro
Word Processing	Word (Mac and PC), WordPerfect
Desktop Publishing	Aldus Pagemaker, Quark Express
Drawing	Micrografx Designer, MacDraw III, MacDraft, AutoCAD
Languages	Visual Basic, COBOL, C++

WORK HISTORY

2003-Present	Essex Technologies Publications Coordinator
2000-2003	MICROTECH Research, Inc. Writer/Assistant Editor

EDUCATION

- State University of New York, Albany, M.S. in Communications
- Hood College, B.A. in English

References and professional writing portfolio available on request

Function-Oriented Resume

TERRY WALTERS
1605 Cedar Grove
Belmont, NC 28012
Work phone: (704) 441-8787
Home phone: (704) 246-9876
E-mail: TLVV@aol.com

Communication/Management

- Responsible for project interviews, staffing, and maintaining of in-house accounts
- Supervised all levels of technical personnel and projects for major clients such as Pratt & Whitney
- Evaluated personnel, conducted training programs, established wage incentives
- Directed and supervised technical personnel for completion of design proposal
- Consulted sales staff in developing proposals for customers
- Worked on solving manufacturing and assembly problems

Public Relations

- Handled engineering problems in public relations with U.S. and Canadian clients, including **ExxonMobil** and Molson Brewery
- Maintained engineering liaison with other companies
- Designed an integrated filler-closing system for customers
- Represented employer at customer's plant for start-up, troubleshooting, debugging, evaluation

Design/Development

- Developed new designs or modifications for closing machines, ham press, cheese block wrapper, as well as other can-packing equipment
- » Recognized by employer as expert on 24 models of closing machines

EMPLOYMENT HISTORY

1992–Present	Consolidated Sheet Metal Company Design Engineer
1981-1992	Designers & Consultants Project Supervisor

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General Internet Grammar Resources

Dave's ESL Café

<http://www.eslcafe.com>

This is one of the oldest and most respected ESL sites for both students and instructors.

The Purdue Writing Center: OWL

<http://www.owl.english.purdue.edu/handouts/esl/index.html>

This widely admired site provides excellent resources for second language learners, as well as guidance overall on writing, grammar, usage, and style.

PROFILES IN PRACTICE

**Shelley
Grieve-Zerkel**

Owner

Grieve Communications

Researching People

Shelley Grieve-Zerkel has a novel approach to her career. "It's my entire goal to write myself out of a job," she says. She produces online help for a major chemical database organization. With effective writing, the database will need fewer help screens.

It's not a simple task. "A lot of the work had [originally] been done by programmers, who tended to work on text as an afterthought," Grieve-Zerkel learned. "Sometimes you have to get past developers to meet the needs of the customers." Because her work goes into each software release, Grieve-Zerkel must get information about the product as it evolves—not after it's finished. "Timing is critical," she says. Although she could telecommute, Grieve-Zerkel believes that personal presence is key. "Being in the queue soon enough, attending project meetings, and being on-site is invaluable."

Existing documents, competitors' products, Internet sites, electronic billboards, requirements documents, and memos about new features are good information sources. But Grieve-Zerkel's most important sources are usually technical developers themselves.

She communicates well with technical personnel. "Take a programming course, do things to up your credibility," Grieve-Zerkel advises. "People are more willing to talk to you if they perceive you as knowledgeable." She learned to read software code, where developers often write notes to themselves—called comment lines—that are a wellspring of information not found elsewhere. "Eventually," she says, "you'd better end up a product expert."

It's unlikely that Shelley Grieve-Zerkel will truly write herself out of a job. Demand for effective technical communication remains high. Gone are the days, though, when a writer began research after the fact. "Documentation does not lag," she says about today's environment. "Get in the process early."

A Quick Guide to Language Issues

At career seminars given at countless high schools across the country, speakers offer students advice about the future. The vice president of construction at a large utility company always begins with this statement: "One of the most important things you can learn in school is to be able to express yourself well in writing. If you can communicate well, you can be successful in any field. Engineering is no exception."

This chapter identifies some language issues that commonly create problems for writers and speakers whose native language is not English. The second part of the chapter offers a glossary of usage helpful to everyone who writes or speaks in English.

ESL (English as a Second Language) Considerations

The following are areas of grammar that often cause difficulty for technical professionals whose first language is not English. This list is by no means exhaustive, but it does include a number of common problems.

Abbreviations and Acronyms

Abbreviations are a shortened form of a word: *in.* for inches, *Inc.* for incorporated. Because they are shortened, most abbreviations often have a period after them, although that rule is ignored in many cases. Another important characteristic of abbreviations is that very few of them take an "s" to indicate plural: for example, *10 in.* means *10 inches*.

Acronyms are words formed by using the first letters of a group of words: *NASA* for National Aeronautic and Space Administration, *ROM* for "read only memory." Rarely do acronyms contain periods.

Abbreviations and acronyms can be distracting to readers because they are different from the normal flow of words. However, if your audience is familiar with them, using them can make reading more efficient. If you are concerned that readers may not recognize the abbreviation, use its full name the first time you use it and place the abbreviation in parentheses after it.

Capitalization

Capitalization should not be used for emphasis (use underlining, italics, or bold for that). Use capital letters in the following instances:

- Names of people, races, cities, regions, counties, states, nations, languages, and other proper names.

Among Muslims, Ramadan commemorates the first revelation of the Koran. In the Middle East and elsewhere, this season is observed by many people.

- Points of the compass only when they refer to well-established regions, but not when they refer to a direction of travel.

The South is becoming a major technology belt. This summer, we should drive south to explore it.

- Titles of offices when the title precedes the name of the officeholder but not when the title appears alone. The exception to this rule in the United States is the President of the United States.

Professor Terry Caballero joined the project team. She had been a professor at the university for 12 years.

- Academic subjects only when they are part of a specific course title or when they are the name of a language.

The class found Chemistry 208 to be a difficult course.

- Days of the week, months, special days, and holidays but not for names of the seasons.

On Thursday, November 27, they celebrated Thanksgiving in the United States but the day of thanksgiving in Canada is in October.

- Religions, religious groups, historical events, periods of history, and historical documents.

The Great Depression in the United States was precipitated by the stock market crash of 1929.

Roman Catholicism and Protestantism are major religions in the Western Hemisphere.

- Organization names as well as their products and services.

Apple Corporation introduced its Macintosh to compete with IBM's PC.

- References to numbered or lettered items (figures, tables, chapters, parts, volumes, rooms, buildings, and so on).

To learn more about this process, see Chapter 21.

- Earth, sun, moon, universe when they are discussed with other celestial bodies or systems.

The Sun is 14 km from the Earth.

- Most acronyms, although a few (such as AC and DC) are not.

The "brain" of the computer is the central processing unit (CPU).

Commonly Misspelled Words

The following is a list of words commonly misspelled by technical professionals. Learn to recognize their correct spelling.

accidentally	environment	manageable	retrieve
accommodate	exaggerate	necessary	separate
acquire	exceed	noticeable	similar
alignment	exhaust	occasionally	temperature
all right	feasibility	occurrence	thorough
a lot	immediately	parallel	transferred
auxiliary	irrelevant	permissible	unnecessary
benefited	judgment	personnel	usable
ceiling	knowledgeable	precede	vacuum
changeable	laboratory	precedent	whether
commission	license	proceed	
dependent	likelihood	receive	
dissatisfied	lose	referred	
desirable	maintenance	reservoir	

Placement of Adverbs and Adjectives

Adverbs and adjectives are words that modify (describe) other parts of speech. Adverbs describe verbs, adjectives, or other adverbs and tell how, when, where, or to what extent: *slowly* heat; the circuit is *often* overloaded. Adjectives modify nouns or pronouns and tell which one, what quality, or how many: the *overloaded* circuit; the *highest* frequency. It's important to know not only when to use these parts of speech but where to place them.

Adverbs modifying verbs usually appear before the verb or between a helping or auxiliary verb and the main verb:

AWKWARD	NO single process <u>has reduced economicallly</u> full tire to powder.
REVISED	NO single process <u>has economicallhi reduced</u> a full tire to powder.

Adverbs should not be placed between a verb and its direct object:

AWKWARD The technician cut carefully the top of the tank.

REVISED The technician carefully cut the top of the tank.

Adverbs of frequency always follow the verb *to be*:

AWKWARD The robotic arm often is rotating.

REVISED The robotic arm is often rotating.

Cumulative adjectives before a noun would observe the following distinct order (remember that a string of more than three adjectives before a noun is rare): (1) evaluative word, (2) size or shape, (3) age, (4) color, (5) nationality, (6) material, (7) noun used as an adjective, (8) noun.

► **Tip:** *The indefinite article a is used before a consonant sound (a barrel, a wire, a project), while an is used before a vowel sound (an electric saw, an airplane, an isotope). Indefinite articles (a or an) are used with singular count nouns whose specific identity is not known: a computer, a drill, an electric saw.*

sporty, large, new, silver, European, chrome-plated,
concealed car

Articles

Articles are of two types: 'definite' (*the*) and 'indefinite' (*a, an*) and their function is to signal that a "count" or a "noncount" noun is about to appear. The noun may follow the article immediately, or modifiers may intervene. In English, a *count noun* is something that can be counted: *barrels, wires, projects, test tubes*. A *noncount noun* is something that cannot be counted: *water, air, ethics, pride, electricity*.

Do not use indefinite articles with noncount nouns: Incorrect would be: a water, an ethics, a electricity. The definite article (*the*) is used with nouns whose specific identity is known:

the computer on my desk

the drill you used yesterday

the electric saw in the shop

Pronoun Reference

In addition to the problem of ambiguous pronoun reference discussed on page 470, two other problems may arise:

- Gender reference

Pronouns must agree with the gender of the person they refer to.

Bob posted the results of his study.

If the gender is unknown, it is not appropriate to always use the masculine pronoun. Instead, use *his or her* or consider switching to the plural for both the pronoun and the referenced noun.

INCORRECT The principal investigator must post the results of their study.

CORRECT The principal investigator must post the results of his or her study.

CORRECT Principal investigators must post the results of *their* studies.

- Singular/plural reference

Pronouns should agree with the number of the noun or nouns they refer to. In other words, if the noun is plural, the pronoun should be plural and if the noun is singular, the pronoun should be singular.

INCORRECT These days, a biotechnology professional has their pick of jobs.

CORRECT These days, biotechnology professionals have their pick of jobs.

CORRECT These days, a biotechnology professional has his or her pick of jobs.

However, some pronouns present difficulties because they are singular but are often thought of as plural. Here is a list of such pronouns:

Every, everyone, someone, no one, even/body, somebody, nobody, each

INCORRECT Everyone brought their lunch.

CORRECT Everyone brought his or her lunch.

Another problem is the collective noun as pronoun reference. If the noun is used as a single entity, the pronoun (and verb!) should be singular. But if the noun means the individual members of an entity, then the pronoun (and verb) should be plural:

INCORRECT Volkswagen introduced their new SUV.

CORRECT Volkswagen introduced its new SUV.

INCORRECT The Teamsters Union donated its holiday bonuses to a worthy cause.

CORRECT The Teamsters Union donated their holiday bonuses to a worthy cause.

Gerunds and Infinitives

A *gerund* is the *-ing* form of a verb used as a noun:

Running the machine is hard work.

An *infinitive* is the base form of a verb (*to* + the verb: *to run*) and can be used as a noun, an adjective, or an adverb:

To run the machine is hard work.

Gerunds and infinitives may follow certain verbs but not others, and sometimes the use of a gerund or infinitive with the same verb changes the meaning of the verb. Here are rules for using gerunds and infinitives with verbs.

Use either a gerund or an infinitive with these verbs: *begin, continue, hate, hesitate, intend, like, love, prefer, pretend, start*.

To begin the process is difficult.

Beginning the process is difficult.

The meaning changes when using the gerund and infinitive with these verbs: *forget, remember, stop, try*.

The field technician forgot to measure. [She made the error of not measuring.]

The field technician forgot measuring. [She no longer understood the process of measuring.]

Use a gerund, not an infinitive, after these verbs:

admit	escape	quit
adore	finish	recall
appreciate	imagine	recollect
avoid	keep	resent
deny	mind	resist
detest	miss	risk
discuss	postpone	suggest
dislike	practice	tolerate
enjoy	put off	understand

INCORRECT He finished to drill.

REVISED He finished drilling.

Use an infinitive, not a gerund, after these verbs:

agree	have	promise
ask	hope	refuse
assent	manage	say
beg	mean	wait
claim	offer	want
decide	plan	wish
expect	pretend	

INCORRECT I decided coming.

REVISED I decided to come.

Idioms

Idioms are expressions that do not follow the standard grammatical rules but are commonly accepted: *for example, put up with, get away with, plan on doing*. Idiomatic combinations of verbs and adjectives and prepositions can be confusing:

part *from* a person, part *with* a possession

wait *for* a person or a bus, wait *on* a customer

Because these expressions follow no easily specified rules, they must be memorized. The best source for idioms is a good ESL dictionary, such as *Longman Dictionary of Contemporary English*.

Prepositions

Prepositions that indicate time and place can be difficult for non-native speakers of English. For instance, *at*, *on*, and *in* have distinctive uses: *at* precedes clock time (*at 1:30 p.m.*); *in* precedes a month, year, or century [*in the twenty-first century*]; *on* precedes a day or date (*on September 10*). As with idioms, these and other common prepositions showing time and place need to be memorized.

Two-Word Verbs

Some verbs consist of two words: the verb itself and a *particle*—a preposition or an adverb that affects the meaning of the verb. These two-word verbs are often quite different in meaning from the individual words that make them up. For example:

Look up the meaning in the dictionary-

Look over the engineer's report.

Examples of two-word verbs that may not be separated by any other intervening words are:

catch on	keep on	speak up
come across	look into	stay away
get along	play around	stay up
give in	run into	take care of
go over	run out of	mm up at
grow up		

Most two-word verbs that take direct objects may be separated by the object (turn the flame down):

bring up	give back	make up
call off	hand in	point out
call up	hand out	put away-
drop off	help out	put back
fill out	leave out	put off
fill up	look over	take out
give away	look up	take over
throw out	turn down	turn up
try on	turn on	wrap up
try out		

Present Perfect Verb Tense

The *present perfect tense* of a verb is the present tense of the verb plus the present tense of the helping verb *to have*. Use the present perfect tense for three purposes:

- * When referring to events completed in the past but at nonspecific times:

EXAMPLE She has run the test.

Use the simple past if the time is specific:

EXAMPLE She ran the test at 4:00.

- When describing actions that were repeated several or many times in the unspecified past:

EXAMPLE She has run the tests several times over the last few days.

- When describing actions that began in the past and continue up to the present:

EXAMPLE She has been running the tests since last Tuesday.

Glossary of Usage

The following words or phrases are commonly misused. They are easy to correct if you're aware of them.

affect, effect: *Affect* is usually a verb that means "to influence" (except in psychology where it is a noun indicating a person's outward manner). *Effect* can be a verb meaning "to cause"; it can also be a noun, meaning "a result." For example: A high tariff will affect our exports. I want to effect a settlement. For every effect, there is a cause.

- alright:** There is no such word. The correct spelling is *all right*.
- altogether, all together:** *Altogether* means "wholly, totally"; *all together* means "everybody together" or "all at the same time."
- among, between:** *Among* is used when there are more than two people or objects: *We are among friends*. *Between* is used when there are two people or objects: *This information is between you and me*. (Note that "between" is a preposition whose object must be "me," not "I")
- appropriate:** As a verb, *appropriate* means "to set apart for a special purpose." Do not use it to mean "to take."
- balance:** Does not mean "remainder," except in a financial sense.
- beside, besides:** *Beside* means "by the side of." *Besides* means "in addition to," or "moreover."
- biannual, biennial:** *Biannual* means twice a year; *biennial* means every two years.
- capacity:** Does not mean "ability." *He has the capacity for the job* is incorrect. *The storeroom has the capacity to hold all the equipment* is correct.
- common, mutual:** *Common* means "belonging to two or more people"; *mutual* means "reciprocal" or "interchangeable."
- compare to, compare with:** *Compare to* indicates rivalry; *compare with* indicates likenesses or differences between objects: *Compared to the sun, the earth is small, but some of the other planets compare favorably in size with the sun*.
- complement, compliment:** A *complement* is "that which completes"; a *compliment* is "an expression of favor or flattery."
- comprise, composed of:** *Comprise* means "to include or contain." The whole comprises the parts; the parts do not comprise the whole and the whole is not comprised of the parts. Don't say "comprised of." *Composed of* means "to be made up of." For example, *The experiment comprises eight steps* is correct, as is *The experiment is composed of eight steps*. Note: *The experiment is comprised of eight steps* is incorrect.
- continual, continuous:** *Continual* means "repeatedly." *Continuous* means "without interruption."
- data:** *Data* is the plural of *datum*. Say "the data are...."
- definitely, definitively:** *Definitely* means "with assurance." *Definitively* means "conclusively, with exactness."
- different:** Do not say *different than*; say *different from*.
- disinterested:** Means "impartial, without self-interest"; it does not mean "uninterested."
- due to:** The primary meaning is *owed to*, as in *He paid the bill due to Pennzoil Company*. Avoid using it to mean *because*.
- element, factor, phase:** *Element* means a principal part; *factor* means an agency that contributes to a result; *phase* means one stage in the development of something. Do not use them interchangeably.
- expect:** Does not mean "suppose," "imagine," "suspect." *I expect we'll be hearing from you* is incorrect; *I expect to go to California next week* is correct.

farther, further: Use *farther* to indicate greater distance; use *further* to indicate "in addition to," or "moreover." *She can run farther than a mile.* Or: *She has further information on this subject.*

fewer, less: Use *fewer* with reference to number; use *less* with reference to quality or amount. For example, say *There were fewer people than we expected* **not** *There were less people than we expected.*

firstly, secondly, and so on: Use *first, second, third,* and so on.

individual: Does not mean "person." "He is a careful individual" is incorrect.

infer, imply: *Infer* means "to derive from induction"; *imply* means "to insinuate." Thus, *you can infer that from her speech,* but *the speaker implied that in her presentation.*

lay, lie: *Lie* means "to recline"; *lay* means "to put down." The principal parts of these verbs are not interchangeable:

lie, lay, lain

lay, laid, laid

like, **as:** *Like* should not introduce a subject and verb. For example, *He acted like he had never seen the project before* is incorrect. *He acted as if he had never seen the project before* is correct.

most, almost: *Most* is the superlative of *much, many.* Do not use it to mean "almost." For example, it's incorrect to say, *We went there most every day.*

observance, observation: *Observance* means "performance of rites"; *observation* means "the act of observing."

oral, verbal: *Oral* means "by mouth" or "spoken"; *verbal* means "by word" or written.

percent, percentage: *Percent* should be used only after a specific numeral; *percentage* should be used to indicate a specified quantity. For example, "8 percent" but a "percentage of the people."

principal, principle: *Principal* means "the chief person or thing" and can also be used as an adjective meaning "chief"; a *principle* is "a fundamental rule."

reaction: Do not use as a synonym for *response, opinion,* or *attitude.* *His reaction to the report was negative* is incorrect. *He had a physical reaction to the medication* is correct.

reason is because: Use "that" instead of "because" or delete "reason is." *The reason the system failed is that . . .* or *The system failed because. . .*

satisfied: Does not mean "convinced" or "sure." For example, *I am satisfied the report will go out on Tuesday* is incorrect. *I am sure the report will go out on Tuesday* is correct.

since: Use only in the context of time; it does not mean "because."

stationary, stationery: *Stationary* means "not moving"; *stationery* is writing paper.

unique: Unique means "sole," "unequaled"; it does not mean "odd," "rare," "unusual."

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