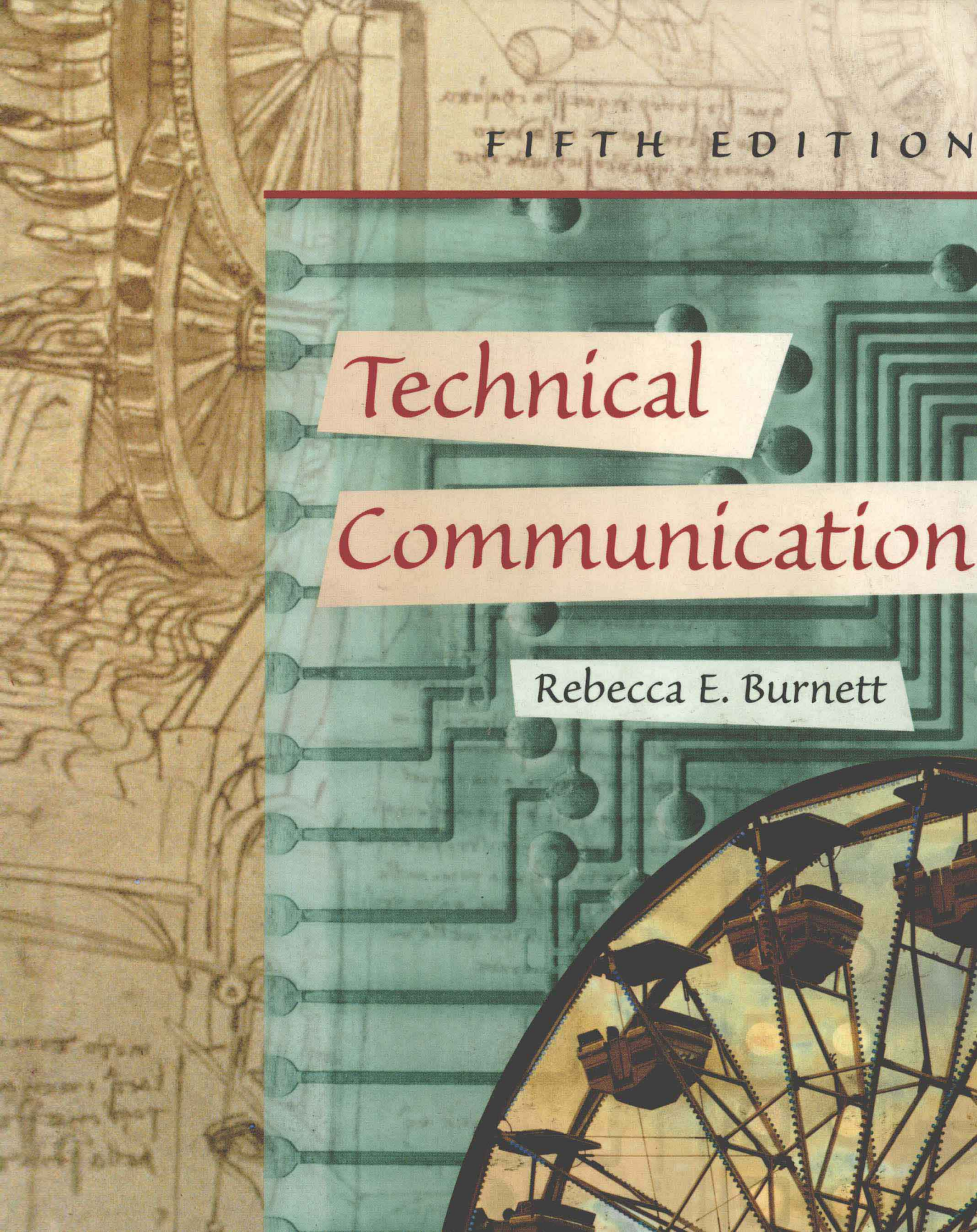


FIFTH EDITION

# Technical Communication

Rebecca E. Burnett



F I F T H   E D I T I O N

# **Technical Communication**

<i>Publisher</i>	Earl McPeck
<i>Acquisitions Editor</i>	Julie McBurney
<i>Market Strategist</i>	John Meyers
<i>Developmental Editor</i>	Joseph W. Loftin III
<i>Project Manager</i>	Andrea Archer

Cover credit: Leonardo da Vinci, Design for Machinery. Art Resource, NY. Ferris wheel: Digital Imagery © copyright 2000 PhotoDisc, Inc.

ISBN: 0-15-506448-7

Library of Congress Catalog Card Number: 00-106794

Copyright © 2001 by Harcourt, Inc.

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording, or any information storage and retrieval system, without permission in writing from the publisher.

Requests for permission to make copies of any part of the work should be mailed to: Permissions Department, Harcourt, Inc., 6277 Sea Harbor Drive, Orlando, Florida 32887-6777.

Copyrights and acknowledgments begin on page 797, which constitutes a continuation of the copyright page.

*Address for Domestic Orders*

Harcourt College Publishers, 6277 Sea Harbor Drive, Orlando, FL 32887-6777  
800-782-4479

*Address for International Orders*

International Customer Service

Harcourt College Publishers, 6277 Sea Harbor Drive, Orlando, FL 32887-6777  
407-345-3800  
(fax) 407-345-4060  
(e-mail) [hbintl@harcourtbrace.com](mailto:hbintl@harcourtbrace.com)

*Address for Editorial Correspondence*

Harcourt College Publishers, 301 Commerce Street, Suite 3700, Fort Worth, TX 76102

*Web Site Address*

<http://www.harcourtcollege.com>

Harcourt College Publishers will provide complimentary supplements or supplement packages to those adopters qualified under our adoption policy. Please contact your sales representative to learn how you qualify. If as an adopter or potential user you receive supplements you do not need, please return them to your sales representative or send them to:

Attn: Returns Department, Troy Warehouse, 465 South Lincoln Drive, Troy, MO 63379.

Printed in the United States of America

1 2 3 4 5 6 7 8 9 039 9 8 7 6 5 4 3 2

Harcourt College Publishers



# Preface

---

## To Each Student

*Technical Communication* has a clear goal: to help you learn to communicate technical information—whether oral, visual, or written—to an audience. As you read this book and create technical documents and presentations, you'll learn to make decisions about elements that affect the effectiveness of your communication: context, purpose, audience, organization, and design.

**What You Can Expect.** In using this textbook, you will find several of its features particularly helpful:

- Every chapter begins with a Chapter in Brief that introduces the key concepts you'll read about and concludes with End-of-Chapter Recommendations for Technical Communicators that summarize actions you can take.
- The examples—many created by workplace professionals, others created by students in technical communication classes—illustrate points in the discussion and provide you with models of effective technical communication.
- Marginal questions throughout each chapter help you focus on issues and problems that you'll have to deal with in the workplace.
- Each chapter includes an Ethics Sidebar that focuses on some complex issue that provokes controversy, an issue that you are likely to need to consider in the workplace.
- Annotated drafts and the resulting revisions offer examples of the process of drafting and revising technical documents.
- The numerous figures provide you with helpful explanations and guidelines to use when completing your own documents.
- Several of the chapters include a Practicum, each written by a workplace professional. The Practicums provide you with windows into workplace scenarios and invite you to solve complex problems.



- The Individual and Collaborative Assignments at the end of each chapter give you a chance to practice what you've learned by engaging in problem solving and writing, sometimes by yourself, but often in a group.
- Intertexts—special sections between chapters—deal with a range of important topics in technical communication, such as researching topics on the Web, considering ethics, avoiding sexism, and understanding cross-cultural communication.
- The Usage Handbook at the end of the textbook is especially useful if you need to settle a question about some point of grammar, confirm the conventional use of punctuation or capitalization, decide on effective sentence structure, or make decisions about ways to document information. The sentence and paragraph exercises in the Usage Handbook come from actual technical documents.
- Web and technology examples show the importance of electronic communication in the workplace. You will benefit from developing skills in both print and electronic formats.

**What You'll Learn.** While accuracy is arguably the most critical aspect of any technical document, visual, or presentation, technical accuracy alone is not enough. Here are some of the things you can expect to learn from using this book:

- How to approach communication problems found in complex workplace environments.
- How to use strategies that help you become a more effective reader of technical documents.
- How to prepare more effective presentations, visuals, and documents by understanding the context in which communication occurs as well as knowing your purpose, the constraints of the situation, the needs of your readers, and strategies for organizing and presenting information.
- How to size up your audiences and develop strategies for adjusting material to different audiences to help you plan and prepare more effective presentations, visuals, and documents.
- How to design print and electronic visuals and documents for a powerful impact on your audience, including how to use color effectively.
- How to be an effective collaborator in the workplace.
- How to take advantage of the power of computer tools.
- How to test different kinds of documents and then use the results of testing as you revise and edit these documents.

**Why Leonardo da Vinci?** As you skim through this book, you'll notice that the cover and the part dividers feature Leonardo da Vinci's mechanical drawings.

I use them because they are precise, detailed, functional, and focused. I hope your oral, visual, and written technical communication is equally accurate and engaging.

**How You Can Help.** I have made changes in each edition of this book based on recommendations from students. I also have incorporated new student examples. If you have suggestions about changes I should consider, please let me know. If you have created exemplary documents and visuals I might use in the next edition, please send me copies.

Rebecca E. Burnett, Ph.D.  
c/o Harcourt College Publishers  
301 Commerce Street, Suite 3700  
Fort Worth, TX 76102

## To Colleagues Teaching Technical Communication

In writing *Technical Communication*, I have tried to bring together the best of workplace practice, current theory and research, and classroom pedagogy.

**What's Distinctive in This Text?** In this fifth edition, I have continued the emphasis on a rhetorical, problem-solving approach to technical communication. Students learn to make decisions about rhetorical elements such as context, purpose, audience, organization, and design as they engage in the complex process of communicating technical information—whether in oral, visual, or written form.

I hope that students who use this text learn that effective technical communication contains elements of both creativity and craft, a point I make by the continued use of Leonardo da Vinci's drawings throughout *Technical Communication*. In the earlier editions I have noted that, like Leonardo da Vinci's mechanical drawings, technical communication should be precise, detailed, functional, and focused. That's not all it should be; it's the least it should be.

**What's the Same?** You'll find that this fifth edition of *Technical Communication* maintains the strengths of the previous editions while incorporating important new developments in technical communication.

The traditional concerns of technical communication—techniques such as definitions, descriptions, and processes; and forms such as correspondence, instructions, reports, and proposals—are always related to rhetorical elements as well as to strategies for testing, revising, and editing documents. Beyond these concerns, however, the text continues to include detailed information about collaboration as well as design and visuals.

The Intertexts—those special sections between chapters—continue to give students opportunities to learn about a range of important topics in technical communication such as researching topics on the Web, considering ethics, avoiding sexism, and understanding cross-cultural communication.

Two sections in each chapter—Chapter in Brief, which introduces the key concepts, and End-of-Chapter Recommendations for Technical Communicators, which summarize actions students can take—provide strong pedagogical support for students as they preview and review critical information.

**What's New in This Edition?** The improvements in this edition range from an entirely new chapter (created by conflating two chapters from the previous edition) to new Intertexts, from increased discussion throughout the text about both computers and intercultural communication to the addition of extensive information and examples of the use of color in technical documents.

- Increased information about computers is included throughout the text such as workplace applications of multimedia and Web research.

- Appropriate and inappropriate uses of color are discussed in relation to paper documents, oral presentations, and online documents. This edition also includes a full-color chapter that discusses carefully selected full-color technical visuals that use color effectively.
- Differences between print and online reading are discussed.
- Because the Intertexts are designed to encourage (and even provoke) students to think about issues associated with current critical topics in technical communication, this edition includes a number of new Intertexts—ones about Web searches, intellectual property, RFPs, and corporate gossip.
- New annotated examples from a variety of disciplines and professions reflect the complex nature of technical communication.
- Each chapter includes new marginal questions designed to stimulate higher-level thinking skills in students and to encourage them to connect material in the text to their own experiences.
- Each chapter includes a new ethics sidebar that focuses on some complex issue that provokes controversy, an issue that professionals are likely to need to consider in the workplace.
- Half of the chapters include a new feature—Practicums. The Practicums, all written by workplace professionals, provide students with windows into workplace scenarios and invite them to solve complex communication problems.
- Finally, the expanded Usage Handbook includes detailed information about documenting electronic sources.

**How Are Students Addressed?** This even more readable, teachable edition talks directly to students, offering them clear, practical advice based on current theory and practice. The elegant, usable design of this edition enables students to use the text's pages as models. The discussions and the classroom-tested exercises and assignments—both individual and collaborative—help students become better communicators, ones who can recognize the rhetorical, situational nature of communication and can manage processes and strategies to solve communication problems. The text stresses the integrated, recursive nature of producing effective print and electronic documents, encouraging writers to think of invention and revision as ongoing processes, to think of visuals as ways to present information, to think of language as having the power to shape and influence the readers' perceptions.

**What Critical Concerns Are Addressed?** The text is effective with traditional and nontraditional students as well as with professionals in a variety of settings. I have tried to strike a balance between theory and pedagogy and



between classroom and workplace needs. This balance is demonstrated in ten critical concerns:

*Rhetorical base.* The text uses rhetorical factors—for example, constraints of the situation, needs of the readers, purposes of writers, conventions of genre, complexity and organization of the subject—to guide writers through the process of producing documents. This analysis of factors such as context, audience, writers, and subject establishes a context for presenting information verbally and visually.

*Writing for readers.* *Technical Communication* provides in-depth coverage of audience analysis. The text moves from a theoretical to a practical level by providing suggestions for adjusting material to different audiences. The concern with audience analysis and the adjustment of material to different audiences continues throughout the text.

*Visuals and document design.* *Technical Communication* is unique in that it identifies and illustrates the rhetorical base of visual material and establishes parallels between visual and verbal presentations. The text also explores the role of color in technical documents and emphasizes the impact of document design on audience reactions.

*Collaboration.* The text not only presents a chapter that focuses on collaboration, but the end of each chapter includes collaborative activities and exercises. Throughout the text, students are reminded that the workplace is a collaborative environment and that documents are not produced or used in isolation.

*Testing, revising, and editing.* Creating an effective document should include document testing (e.g., text-based, expert-based, and user-based). The results of document testing can be used as the basis for revising and editing a document.

*Process and product.* *Technical Communication* shows how technical communicators are involved in a complex process to create a product. The text discusses ways to approach a writing problem, explains options available to writers, offers suggestions about logical organization, and illustrates appropriate language use.

*Emphasis on technology.* Because technical communication takes place in a rapidly changing electronic environment, this text discusses the impact of technology both on the writing process and on the resulting document. Students will find extensive discussion of technology in the chapters as well as the Intertexts.

*Examples.* Early in the text, students are introduced to examples of exemplary documents. Then, throughout *Technical Communication*, annotated examples by students and workplace professionals illustrate the key points and serve as models—from professions as varied as agriculture,

astronomy, electronics, forestry, manufacturing, metallurgy, music, pediatrics, and robotics to name a few.

*Style. Technical Communication* is a reader-based text; it directly addresses students and workplace professionals in a straightforward style that is appealing and accessible.

*Apparatus and computer support.* The addition of marginal questions offers students ample opportunities to discuss ideas and apply the practices advocated in *Technical Communication*. The *Practicums* give students the opportunity to complete actual workplace tasks. The *Individual and Collaborative Assignments* encourage problem solving and writing that students will need for classroom as well as professional success. In addition, the sentence and paragraph exercises in the Usage Handbook provide practice with materials from actual technical documents.

**What Support Materials Are Available?** Teachers have a range of support materials accompanying this edition of *Technical Communication*.

Anyone who teaches in a computer lab—from a few classes to the entire term—will appreciate the more than 25 supplementary activities, exercises, and assignments developed by David Clark and Mark Zachry and now available on the text's Web site. These activities will enrich any class, whether in a conventional class or a computer lab. You can access the Web site through the Harcourt Web site at [www.harcourtcollege.com](http://www.harcourtcollege.com).

Teachers will find *Case Studies in Technical Communication*, developed by Andrea Breemer Frantz, an especially important addition to the support materials for *Technical Communication*. This book was developed to work as a supplement or as a stand-alone volume. The carefully researched and engaging cases give students the opportunity to negotiate complex workplace contexts as they prepare documents and presentations.

The *Instructor's Resource Manual* (IRM) includes a series of essays written especially to accompany this text—useful for new instructors as well as experienced ones—that discuss various issues central to teaching technical communication. In addition, the IRM includes practical, classroom-tested suggestions, quizzes, supplemental materials, and a series of masters for handouts and transparencies. The IRM is available free to all adopters of this new edition of *Technical Communication*. (To request the IRM, call 1-800-237-2665.)

I have made changes in each edition based on the recommendations of colleagues from colleges and universities around the country. If you have suggestions about changes I should consider, please let me know. If you have exemplary documents and visuals that would help readers of the next edition, please send me copies. I value your feedback.

Rebecca E. Burnett, Ph.D.  
c/o Harcourt College Publishers  
301 Commerce Street, Suite 3700  
Fort Worth, TX 76102

## Acknowledgments

*Technical Communication* would not exist without the personal and professional support of family, friends, and colleagues.

In preparing this edition, I have been thankful every single day for the skillful and thorough researchers who assisted me in preparing this revision: Irene Faass recommended ways to strengthen the Individual and Collaborative Assignments and suggested many of the new marginal questions; Matt Turner researched and drafted the very engaging ethics sidebars; Peggy Pollock provided computer examples and overall insights about technology as well as updated print documentation; Julie Zeleznik recommended relevant new Inter-texts, provided information about posters and portfolios, and helped revise the Instructor's Resource Manual. Their assistance has been critical to this revision.

William Jeffries continues in his unwavering support and serves as an invaluable critical reviewer and voice of reason. I also appreciate the fruitful suggestions and contributions provided by friends, colleagues, students, and workplace professionals: David Clark, Patty Harms, Ken Jolls, Clay Spinuzzi, Don Stanford, and Judith Stanford. Their experiences and observations have shaped many places in this revision. Muriel McGrann keeps an eye out for good examples. As always, my family provides the confidence and support to make the revision possible.

I especially appreciate the workplace professionals who created Practicums for this revised edition: Arricka Brouwer from TelDocInc; Christopher Burnett from Big Creek Forestry; Elizabeth Herman from Wellmark; Kari Krumpel from Lockheed-Martin; Walden Miller from Vidiom; Kate Molitor from Weisner Associates; Janet Renze from Boeing; Daryl Seay from Engineering Associates; and Melissa Waltman from Iowa Public Television.

I also want to thank friends and colleagues at Iowa State University who see the wisdom in balancing theory, research, workplace practice, and pedagogy. Their curiosity, dedication, and insight are a constant inspiration to me. My undergraduate and graduate students at Iowa State University and technical professionals in workplace seminars have also been important to this edition; many seminar participants offered specific and helpful suggestions that have strengthened this edition. Doug Schaapveld, Jill Bigley, and Larry Chan have been especially helpful in recommending computer documentation.

The contributions by the following people to the fourth edition have been substantially retained: Susan Booker, Kaelin Chappelle, David Clark, Andrea Breemer Frantz, Woody Hart, William Jeffries, Lee-Ann Kastman, Elenor Long, Muriel McGrann, Ron Myers, Tom Myers, Mike Peery, Clay Spinuzzi, Don Stanford, Judith Stanford, Gary Tarcy, Lee Tesdell, Christianna White, Dorothy Winchester, Mark Zachry, and Stephanie Zeluck as well as friends, colleagues, and students at Iowa State University.

The contributions by the following people to the third edition have been substantially retained: Reva Daniel, Michael Hassett, William Jeffries, Muriel McGrann, Cindy Myers, and Christianna White as well as colleagues and students at Iowa State University.

The contributions by the following people to the second edition have been substantially retained: Philippa Benson, William Jeffries, and Barbara Sitko as well as my friends, colleagues, and students at Carnegie Mellon University.

The contributions by the following people to the first edition have been substantially retained: Geraldine Branca, Christopher Burnett, Bernard DiNatale, Arline Dupras, Elizabeth Foster, Nancy Irish, Elizabeth Carros Keroack, Marcia Greenman Lebeau, Muriel McGrann, Stephen Meidell, Leon Sommers, and Judith Dupras Stanford as well as students at Northern Essex Community College, Merrimack College, and the University of Massachusetts at Lowell.

Reviewers' detailed and practical suggestions were, of course, instrumental in revisions for this edition. I appreciate the helpful suggestions of many, many colleagues from colleges and universities around the country who reviewed the text for this revision.

Elena Dolhberg at Wadsworth Publishing Company was instrumental and supportive in the beginning stages of this revision, started when the text was still published by Wadsworth.

The team members for *Technical Communication* at my new publisher, Harcourt, have been extraordinary in their commitment: Julie McBurney provided excellent editorial direction; Joe Loftin aided in the complex process for this revision with intelligence, patience, expertise, and humor—for which I am immensely grateful; Martha Beyerlein and Andrea Archer have managed the production process with remarkable efficiency; and Cheri Throop has handled the complex task of permissions with thoroughness. Elm Street Publishing Services provided copyediting that saved me from embarrassing errors, further refined an already sophisticated, appealing, and usable design, and used the art of da Vinci to create a cover and part dividers that reflect the spirit of the text. For all, I am immensely thankful.

Rebecca E. Burnett  
Iowa State University  
Ames, IA



# *Contents in Brief*

---

## **PART I Understanding the Communicator's Work 1**

- 1 *Considering Communication* 3
- 2 *Writing: Processes and Production* 31
- 3 *Writing for Readers* 61
- 4 *Reading Technical Documents* 99
- 5 *Collaboration in Workplace Communication* 131

## **PART II Developing the Communicator's Tools 161**

- 6 *Locating and Recording Information* 163
- 7 *Organization of Information* 207
- 8 *Information Design* 245
- 9 *Using Visual Forms* 273

## **PART III Understanding the Communicator's Strategies 325**

- 10 *Creating Definitions* 327
- 11 *Creating Technical Descriptions* 365
- 12 *Creating Process Explanations* 397
- 13 *Ensuring Usability: Testing, Revising, and Editing* 425

## **PART IV Completing Documents 485**

- 14 *Correspondence* 487
- 15 *Instructions* 527
- 16 *Proposals* 571
- 17 *Reports* 603

## **PART V Creating a Professional Image 657**

- 18 *Oral Presentations* 659
- 19 *Addressing Career Concerns* 693

*Usage Handbook UH1*





# *Contents in Detail*

---

## **PART I Understanding the Communicator's Work 1**

---

### **1 Considering Communication 3**

Importance of Effective Communication 5

Defining Technical Communication 6

Contexts for Constructing Meaning 8

Texts That Communicate 11

Communicators 13

*Technical Communicators and Technical Experts 18*

*Constraints That Communicators Face 18*

End-of-Chapter Recommendations for Technical Communicators 21

Individual and Collaborative Assignments 23

**INTERTEXT:** Technical Writers Are in Demand: Do You Have  
the Right Stuff? 27

### **2 Writing: Processes and Production 31**

Inventing and Exploring 34

Planning and Organizing 36

*Project Planning 36*

*Document Planning 37*

Drafting 40

Revising 42

*Using Data from Authorities 43*

*Presenting Facts Without Drawing Inferences 43*

*Drawing Inferences 44*

*Establishing Causal Relationships 45*

Editing 47

Differences Between Writing Processes 48

End-of-Chapter Recommendations for Technical Communicators 50

Individual and Collaborative Assignments 52

**INTERTEXT:** Care and Feeding of the Organizational Grapevine 54

<b>3</b>	<b>Writing for Readers</b>	<b>61</b>
	Identifying Purposes	63
	Identifying Readers	64
	Analyzing Readers	66
	<i>Context</i>	68
	<i>Attitudes and Motivations</i>	70
	<i>Education</i>	71
	<i>Professional Experience</i>	71
	<i>Reading Level</i>	71
	<i>Organizational Role</i>	75
	Adjusting to Readers	76
	<i>Differences in Expertise</i>	76
	<i>Differences in Roles and Stances</i>	78
	<i>Readers Adjusting</i>	80
	End-of-Chapter Recommendations for Technical Communicators	83
	<b>PRACTICUM:</b> Iowa Public Television (IPTV)	84
	Individual and Collaborative Assignments	91
	<b>INTERTEXT:</b> Baby Blues	97
<b>4</b>	<b>Reading Technical Documents</b>	<b>99</b>
	Identifying Purposes	101
	Reading–Writing Relationships	102
	Strategies for Effective Reading	103
	<i>Identify Structure</i>	105
	<i>Distinguish Main Points</i>	110
	<i>Draw Inferences</i>	110
	<i>Generate Questions</i>	113
	<i>Monitor and Adapt Reading Strategies</i>	115
	End-of-Chapter Recommendations for Technical Communicators	124
	Individual and Collaborative Assignments	125
	<b>INTERTEXT:</b> Sold on the Simplicity of Web Sites:	
	Companies Are Getting Back to Basics with Web Designs	
	That Enable Users to Find What They Need	128
<b>5</b>	<b>Collaboration in Workplace Communication</b>	<b>131</b>
	Reasons for Collaboration	133
	<i>Subject</i>	134
	<i>Process</i>	134
	<i>Product</i>	135
	<i>Interpersonal Benefits</i>	135

Types of Collaboration	135
<i>Co-Authoring</i>	136
<i>Consulting with Colleagues</i>	137
<i>Contributing to Team Projects</i>	137
Being a Good Collaborator	138
<i>Be Engaged and Cooperative</i>	138
<i>Listen</i>	139
<i>Conform to Conversation Conventions</i>	139
<i>Ask Questions</i>	140
<i>Share</i>	141
<i>Use Technology Effectively</i>	142
<i>Reflect</i>	142
Negotiating Conflicts	144
<i>Affective Conflicts</i>	144
<i>Procedural Conflicts</i>	145
<i>Substantive Conflicts</i>	146
<i>Cultural Differences and Expectations</i>	150
End-of-Chapter Recommendations for Technical Communicators	151
Individual and Collaborative Assignments	153
<b>INTERTEXT: The Rage for Global Teams</b>	158

## **PART II Developing the Communicator's Tools 161**

---

### **6 Locating and Recording Information 163**

Locating Primary and Secondary Sources	166
Personal Observations and Close Reading	168
<i>Personal Observations</i>	169
<i>Close Reading</i>	170
Calculations	170
Samples and Specimens	171
Empirical Investigations	171
Internal Records	172
Interviews and Letters of Inquiry	172
<i>Developing Questions</i>	173
<i>Asking Questions</i>	173
Surveys and Polls	176
Library Resources	180
<i>Research Librarians and Their References</i>	180
<i>Reference Resources</i>	182

<i>Online Catalog</i>	183
<i>Indexes</i>	183
Electronic Resources	186
<i>Computerized Databases</i>	186
<i>Web Research</i>	187
Government Documents and Offices	190
Recording Data	191
<i>Field Journals</i>	191
<i>Lab Notebooks</i>	192
<i>Note Cards</i>	192
<i>Outlines</i>	193
<i>Tracings, Photographs, Drawings, Maps, Videotapes, Films</i>	193
<i>Audiorecordings</i>	194
End-of-Chapter Recommendations for Technical Communicators	194
Individual and Collaborative Assignments	196
<b>INTERTEXT:</b> Internet Power Searching:	
Finding Pearls in a Zillion Grains of Sand	198

## 7   **Organization of Information   207**

Outlining	209
Organizing Information	213
<i>Parts/Whole Organization</i>	215
<i>Chronological Order</i>	216
<i>Spatial Order</i>	217
<i>Ascending/Descending Order</i>	218
<i>Comparison/Contrast</i>	220
<i>Cause and Effect</i>	222
<i>Using Organization</i>	225
End-of-Chapter Recommendations for Technical Communicators	227
<b>PRACTICUM:</b> <i>Engineering Associates at Work</i>	228
Individual and Collaborative Assignments	234
<b>INTERTEXT:</b> How an Author Can Avoid the Pitfalls	
of Practical Ethics	237

## 8   **Information Design   245**

Chunking and Labeling Information	248
<i>White Space to Chunk Information</i>	250
<i>Headings to Label Chunked Information</i>	252
Arranging Related Chunks of Verbal and Visual Information	253
<i>Using Design Conventions</i>	253
<i>Avoiding Problems in Arranging Information</i>	254