CHAPTER 9

Ensuring Usability

Objectives and Outcomes

This chapter will help you accomplish these outcomes:

- Characterize usability and understand the crucial role that its principles play in allowing people to accomplish tasks
- Understand factors that characterize usability and usability testing
- Differentiate and use text-based testing, expert-based testing, and user-based testing
- Identify, plan, and conduct various types of usability tests based on user and task analyses
- Define accessibility and understand the relationship between accessibility and usability

Think about the last time you used directions to assemble or use a piece of equipment. Were the directions clear, well organized, and helpful? Now consider the last time you encountered new computer software or used a Web site to accomplish a task. Did the design of the software or Web site help or hinder your ability to complete your task? Documents and interfaces that are difficult to understand or use or that make your experience unpleasant indicate poor usability. To be *usable,* communication — including documents, software interfaces, Web sites, and other media — must successfully meet the needs of the people using them in complex situations.

Although ensuring usability is an important step in creating documents, designing Web sites, and developing software interfaces, it too often receives inadequate attention or may even be overlooked during product development. Time constraints, tight budgets, and lack of expertise in usability often limit usability testing of print and online texts. In the long run, however, attending to usability throughout the design and development processes saves time and money. Good usability reduces costs incurred through fixing problems later, reduces the need for user support, and increases customer satisfaction. Within a company, high usability also reduces costs by increasing employee productivity.

WEBLINK

Usability is a complex and critical topic in technical communication. For a link to many valuable, even essential, usability sites, go to www.english.wadsworth.com/burnett6e.

CLICK ON WEBLINK

CLICK on Chapter 9/usability sites

This chapter begins with a discussion of principles that guide usability and then defines usability testing, identifies various types of usability testing, and considers their importance. The majority of the chapter focuses on conducting usability tests and reporting the results. The final section discusses accessibility, which is an important corollary of usability.

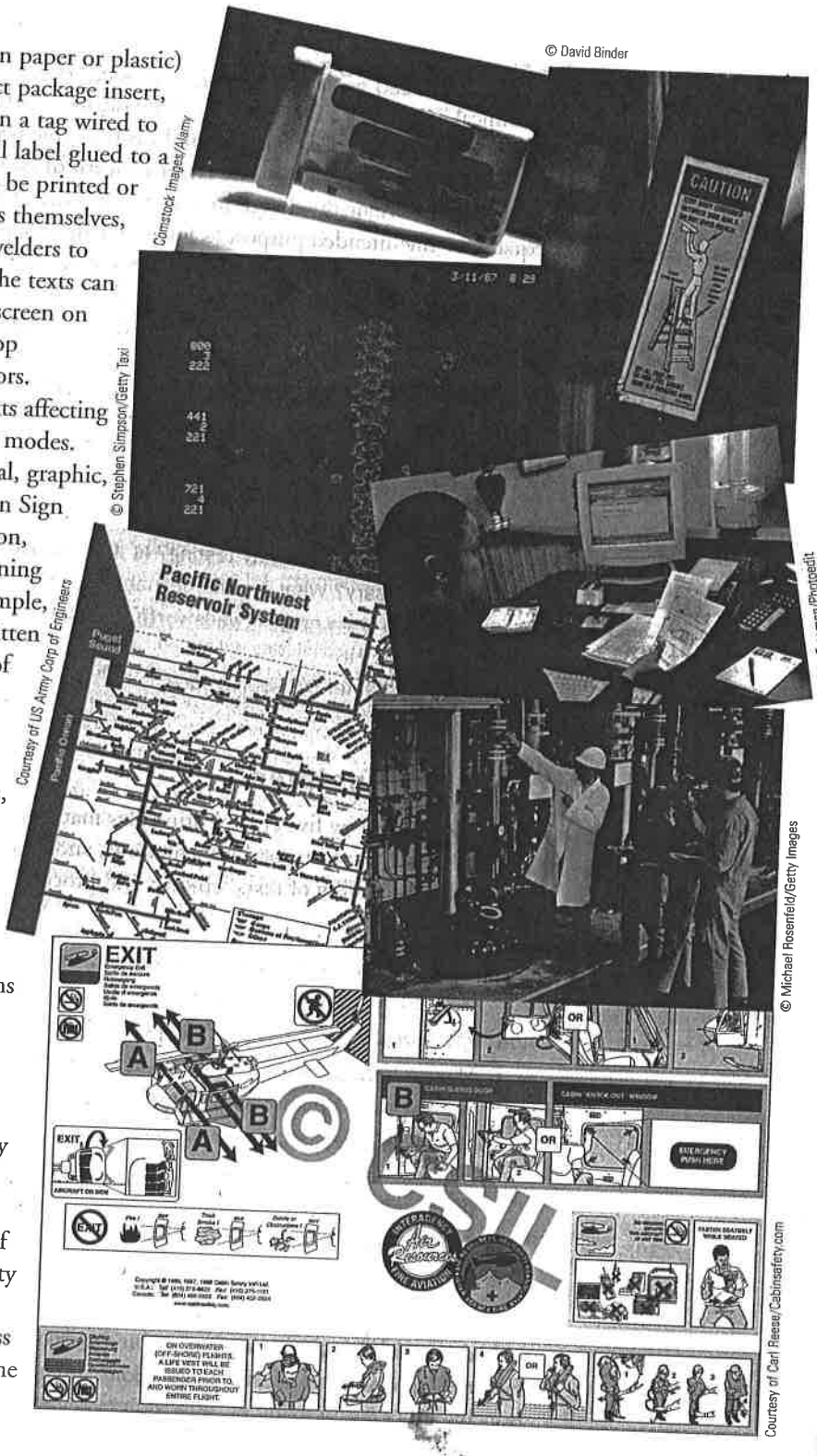
Characterizing Usability

The goal of usability is to place user concerns, rather than text features, at the center of the design and development processes. Usability responds to the needs, goals, skills, and contexts of people who are completing a process or using a product.

This chapter focuses on the way that texts interact with users to affect usability. Texts affecting usability may be displayed in various *materialities* and, thus, necessarily expand the meaning of the term "text." For example, the texts

can be printed (usually on paper or plastic) in a manual, on a product package insert, on the packaging itself, on a tag wired to the product, or on a small label glued to a product. Or the texts can be printed or embossed on the products themselves, from face protectors for welders to hypodermic needles. Or the texts can be displayed on an LCD screen on devices ranging from laptop computers to SIDs monitors.

Equally important, texts affecting usability appear in various modes. They may be written, visual, graphic, oral, signed (as in American Sign Language), or a combination, further expanding the meaning of the term "text." For example, texts may be entirely in written language, which is typical of many technical reports and proposals. Texts may be a combination of written language and visual displays, typical in specification sheets. Texts may be largely visual and graphic, such as many Web sites. Texts may be entirely graphic, such as airline evacuation instructions for international audiences. Texts may be entirely oral, which is typical of a considerable amount of workplace training. Texts may be oral and signed, such as a presentation to an audience that includes hearing and deaf people. Texts affecting usability may take any or all of these forms, regardless of the process that users are completing or the product they are using.



Definition of Usability

How is usability defined in your discipline or profession? Why is usability important in your discipline or profession?

In technical communication, *usability* is the degree to which texts, regardless of their materiality or mode, effectively and easily enable people to accomplish their goals. Usability is one aspect of the larger concern of usefulness. Usefulness also encompasses *utility*, or the degree to which a product and related texts are adequate for the intended purpose. Thoughout this chapter, you will see that usability, usefulness, and utility are interdependent. As researcher Barbara Mirel suggests about software interfaces, "Ease of use involves being able to work the program efficiently and easily; usefulness involves being able to use the program to do one's work in context effectively and meaningfully. Stripping usefulness from ease of use and focusing primarily on the latter is an incomplete recipe for usability or user-centeredness."[1] The same can be said of all types of communication.

WEBLINK

What's the truth behind usability testing? Is it expensive? Time consuming? Stifling? Unnecessary? What are the definable benefits? To differentiate fact from fiction, go to **www.english.wadsworth.com/burnett6e** for links.

CLICK ON WEBLINK

CLICK on Chapter 9/usability facts

Critical Principles

Usability is guided by five critical principles that can be applied to many types of print and electronic texts, oral presentations, and visuals. These principles apply equally to the usability of texts, objects, and processes with which people interact.[2]

- ***Learnability.*** How easily can people learn to use the text and the product? How quickly can they become productive using them?
- ***Efficiency.*** How productive are people using the text and the product?
- ***Memorability.*** How well do people remember how to use the text and the product from one use to the next?
- ***Error Recovery.*** How many errors do people make using the text and the product? How serious are the errors and how quickly can users correct them?
- ***Satisfaction.*** How satisfied are people with the performance of the text and the product? Do they enjoy using them?

These five principles can be used to assess the usability of different types of texts that technical communicators and technical professionals typically develop. Figure 9.1 provides representative questions you can ask when you use these principles to assess usability of software interfaces, Web sites, and print information.

FIGURE 9.1 Representative Questions for Applying Usability Principles to Different Genres

Usability Principle	Interfaces and Web Sites	Print Information
Learnability	■ How quickly can users begin using the software to accomplish tasks? ■ Must users sift through a manual to find information about using the software, or is the interface intuitive?	■ Do textual cues help readers determine the key terms they need to learn? ■ Does the sequence of information simplify the task of learning it?
Efficiency	■ How are menu items on a software interface organized? ■ Are menus and links on a Web site labeled in a way that enables users to readily determine what content is available? ■ How many "clicks" are required on a Web site for users to access the information and services they need?	■ How quickly can readers find information using an index or table of contents? ■ Do headings help readers use the text? ■ What elements of the design (e.g., tabs, screened sidebars, index) help readers use the text?
Memorability	■ Can users remember the calculation for completing a complex task in Excel? PowerPoint? PhotoShop? Flash? ■ Can users easily remember keystroke shortcuts rather than using menus?	■ Are safety warnings clustered at the beginning of the manual or placed with the appropriate steps? ■ Are instructions written so that readers can remember steps?
Error Recovery	■ If users make a mistake, how easily can they fix it? ■ If users click to the wrong place on a Web site, how easily can they find their way back?	■ If readers lose their place in the text, how easily can they find it again? ■ Does the format assist readers in avoiding errors while performing a task?
Satisfaction	■ What will prompt users to return to a Web site? ■ Do users report that their needs are effectively met by a Web site or a software interface?	■ What will prompt readers to return to a text? ■ Do readers report that their needs are effectively met by a text?

Interpreting the effectiveness of each principle is highly situational; it is influenced by the genre and media, by the type and complexity of the text, and by the users' prior knowledge, experience, needs, and expectations. Consider the complexity of assessing learnability. For example, most people learn to use an

automatic teller machine (ATM) fairly quickly and then learn to use other ATMs even more quickly because the task is simple, the instructions are short, the sequence of steps is usually intuitive, and the process is very similar from one situation to the next. What determines learnability in this situation? A simple measure could be that a person could make a withdrawal from virtually any ATM, whether in the United States or in another country.

Select any one of the other usability principles and explain how it might be interpreted in various situations, both simple and complex and with both print and electronic documents.

However, people typically take much longer to learn more complex tasks such as manipulating digital images. When faced with a new software for manipulating digital images, they may be faster than the first time they ever tried this type of software, but they probably won't be speedy. The task is complex, the instructions are usually long, the sequence of steps is not necessarily intuitive, and the process is usually idiosyncratic from one situation to the next. What determines learnability in this situation? Unlike using an ATM, using software for manipulating digital images is a complex process, so measuring its learnability is more complex.

Characterizing Usability Testing

Iterative is an adjective that means "repetitious."

- *In computer programming,* iterative *describes a sequence of instructions that can be performed multiple times. One pass is called an* iteration. *If the sequence is executed repeatedly, it is called a* loop.
- *In software development,* iterative *describes heuristic planning and development processes; an application is developed in small sections called* iterations. *Each iteration is reviewed and critiqued by the software team and potential end-users.*
- *In usability testing,* iterative *describes the cycle of testing, rewriting, and retesting.*

Now that you have a basic understanding of usability principles and the complexity of measuring them, this section focuses on defining usability testing, identifying the types of such testing, and considering the importance of *iterative* testing.

Definition of Usability Testing

As you've learned, usability is the degree to which texts (regardless of their materiality or mode) effectively and easily enable people to accomplish their goals. *Usability testing* is a structured process that gathers information about specific use from people similar to the intended users. This user-centered approach to testing allows people involved in all aspects of design and development to assess usability by observing people interacting with products and texts. Usability testing provides a realistic context (whether in natural workplace settings or in testing labs) for measuring learnability, efficiency, memorability, error recovery, and user satisfaction.

Purposes. Usability testing has both immediate and long-term purposes. The immediate purpose is to identify problems prior to the release of a text so the problems can be fixed. A long-term purpose is to maintain a historical record of test results and benchmarks that can be referenced during development. This is particularly helpful for future editions of documents, for the development of additional materials, or for new versions of Web sites or interfaces.

In usability testing, test administrators elicit feedback from subject matter experts, design and development professionals, and either actual users or testers

who represent various user groups. With effective planning, implementation, and evaluation, usability testing provides specific and useful information about how well texts meet usability principles. Choices of testing procedures and selection of test participants provide information about the ways in which users think, believe, feel, and perform:

- ***Cognition.*** How are users thinking about the text?
- ***Perception.*** How do users understand the text? Envision results of use?
- ***Affect.*** What are users' attitudes toward the text and the process they're engaged in?
- ***Performance and behavior.*** What do users actually do with the text (and, of course, with the product)? How do they try to solve problems? What do they do when faced with a problem?[3]

Quality Standards. Usability testing is one method of ensuring high-quality texts. When a text is not usable, various kinds of minor, moderate, or severe problems result. Minor problems probably irritate users, but they do not actually delay the completion of the task. Moderate usability problems actually hinder completion of the task, but users usually can develop workarounds. However, severe usability problems prevent the completion of the task or "result in catastrophic loss of data or time."[4]

Many types of communication benefit from careful testing: Web sites, software interfaces, online help and user manuals, form letters, advertising copy, product descriptions, spec sheets, and standard sections of proposals (such as the boilerplate sections about an organization). Usability testing should not be limited to the language sections of communication; other components should be tested as well, including visuals and the overall design. Your goal is to determine the effectiveness of communication quality for the intended audience.

WEBLINK

The International Organization for Standardization (ISO) defines usability as "the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use."[5] ISO 9241, *Guidance on Usability*, is one of several ISO standards that are central to quality and usability. For a link to sites dealing with ISO and usability, go to www.english.wadsworth.com/burnett6e.

CLICK ON WEBLINK

CLICK on Chapter 9/ISO and usability

Limitations

Testing results are only as good as the tests; they can be accurate but not necessarily representative. Usability tests, whether conducted in usability labs or in

work sites, can't be conducted on every potential user and in every likely situation, so when you're designing a test, you need to consider these limitations:

- ***Test participants.*** The usefulness of test results depends in part on choosing test participants who reflect the needs and attitudes of the actual end users.
- ***Test situation.*** Testing doesn't guarantee a communication's usefulness. In order to be generalizable beyond the specific situation, tests need to be carefully designed to reflect a variety of situations in which the communication will be used.
- ***Test techniques.*** Test techniques must be appropriate at various stages of text development. Different stages require different procedures. For example, user testing does not replace evaluations such as expert or technical reviews; it supplements them. Your goal should be to design appropriate testing for each stage of development.
- ***Testing procedures.*** Testing procedures can also affect results. However, with effective planning, implementation, and evaluation, testing can provide more specific and useful information than other forms of feedback (such as postpublication satisfaction surveys).

Test validity is the extent to which tests measure what they claim to measure.[6] Test reliability *is the extent to which results on tests are repeatable and yield consistent scores.*[7] *Valid tests are always reliable, but reliable tests are not necessarily valid. In what ways might weak reliability or weak validity of usability tests distort the results and lessen their usefulness?*

Benefits

Everyone involved in the design and development of technical communication — writers, designers, technical experts, managers, designers, editors, prepress technicians, print/production managers — agrees that testing takes time. The

Courtesy of Siemens

Testing in Siemens' ICM Usability Lab.[8] One of the benefits of testing is eliminating expensive design changes at late stages of development. This is one of the reasons that many companies have a usability lab. The test participant in this photo is in the Siemens' ICM Usability Lab, testing a cell phone to determine how easy it is to operate. Other typical users test the menus and keys on cell phones and cordless phone in all stages of development to determine their ergonomic comfort. In various scenarios, users in the lab might use the phones themselves, print directions, or access online help.

benefits, though, are undeniable, because a well-planned usability testing program can provide invaluable information for revising and editing communication. Successful testing looks for unrecognized problems so that they can be eliminated; testing communication for flaws you've already identified wastes time and energy.

Does usability really matter? To read some success stories about the benefits of usability, go to www.english.wadsworth.com/burnett6e for links.
CLICK ON WEBLINK
CLICK on Chapter 9/usability benefits

WWW
WEBLINK

Types of Usability Testing

Organizations must make testing part of their process development and production schedules, or it simply will not get done. As the value of testing becomes more widely recognized, more organizations are employing some kind of testing. In the long run, testing during development and revision is much more cost effective than dealing with the results of poor communication. Testing throughout the development process increases the chances that serious usability problems can be avoided. Waiting until the project is completed to do some kind of testing usually means that no time will exist to incorporate necessary changes.

Three broad categories of testing — text-based, expert-based, and user-based testing — are distinguished by the ways the information is collected and by the nature of the feedback. Each type of test provides a different kind of feedback that can be used to improve communication quality. When you have access to information from several kinds of testing, you can suggest changes to improve the functionality as well as the technical and textual accuracy of communication. Perhaps more important, you can make communication more accessible, comprehensible, and usable for your intended audience.

What important information about usability might you miss if you just asked users to recall the path they took in moving through a series of steps to activate online banking? To sort materials into recycling bins? To store hazardous products according to OSHA guidelines?

When you decide to conduct a usability test, you can choose from quite a number of tests. The links at www.english.wadsworth.com/burnett6e provide specific information about tests you can administer, ranging from card sorting and focus groups to surveys and user profiles, from think-aloud protocols to observations of task performance.
CLICK ON WEBLINK
CLICK on Chapter 9/test choices

WWW
WEBLINK

Most kinds of testing can be *structured* (that is, planned to include specific questions and tasks) or *unstructured* (that is, asking for feedback without specific

questions or tasks). And most kinds of testing can take place in an actual workplace or in a usability lab.

Text-Based Testing

People doing text-base testing examine a range of local-level language, visual, and design features and then draw conclusions about changes that are necessary to improve the text's accessibility and comprehensibility. Text-based testing can incorporate a variety of guidelines and checklists, readability tests, and computer programs to assess structural and stylistic features (for example, types of sentences or active versus passive voice). It can also incorporate analyses of the visuals and the design, including comparisons between two (or more) design alternatives. Figure 9.2 identifies the general functions, benefits, and limitations of four common types of text-based testing.

Several simple text-based tests for consistency can be performed at any time in the development process on selected pages or individual documents using word-processing software such as Microsoft Word®. After checking the spelling and grammar in a text, Microsoft Word displays two types of readability test scores of your text: Flesch reading ease and grade-level ratings.

- ***The Flesch Reading Ease*** score claims to indicate how easy the text is to read. It rates chunks of text on a 100-point scale; the higher the score, the easier the text is presumed to be. Standard documents aim for a score of approximately 60 to 70. Lower scores indicate that the text might be more difficult.
- ***The Flesch-Kincaid Grade Level*** score rates text on a U.S. grade-school level. For example, a score of 8.0 means that an eighth-grader should be able to understand the document. Standard documents aim for a score of approximately 7.0 to 8.0. However, the purpose(s) and audience(s) must be considered in determining the grade level.

Imagine a technically accurate text that is assessed as having a Flesch-Kincaid score of 8.0, but the lab technicians (all with two-year or four-year college degrees) consistently make errors in implementing the new process. What factors in the text might contribute to the problem even though the reading level says "eighth-grade"?

Unfortunately, readability tests are not a useful measure of the difficulty that actual users will have reading the information. Why? These readability scores are based on various ratios between word length and sentence length. While these scores do little to reflect the actual difficulty of the text because they omit consideration of critical factors such as content complexity, use of explanatory examples, use of visuals, and document design, these scores can be useful to determine the relative difficulty and the internal consistency of text. For example, if you're testing pages for a Web site and some pages score 80 in the Flesch test and others score 30, the range of scores indicates inconsistency in the writing across the site. Consistency is an issue that should be resolved before the site is tested with actual users.

Text-based tests are useful for identifying specific errors and for establishing the presence or absence of common textual, visual, and design features. Quick and inexpensive, text-based testing reminds writers and designers about things they need to check. However, such tests do have drawbacks:

FIGURE 9.2 Text-Based Testing

Test Types	Phases in Development				Functions	Benefits	Limitations
	Early	Middle	Late	Post Release			
Document Design Review	✔	✔			Assesses consistency, correctness, and conventions of design	Provides data for revision; can be formal or informal	Reviewers need to know generic and disciplinary conventions of design
Comparison Test	✔	✔	✔	✔	Compares design alternatives for the overall text	Provides data for decision making; can be formal or informal, quantitative or qualitative	Best results are achieved when substantively different alternatives are used
Visual Review		✔	✔	✔	Assesses consistency, correctness, and conventions of visuals	Provides data for revision; can be formal or informal	Reviewers need to know generic and disciplinary conventions of visuals
Editorial Review		✔	✔	✔	Assesses consistency, correctness, and conventions of language	Provides data for revision; can be formal or informal	Reviewers need to know generic and disciplinary conventions of language

- They provide generalized information without criteria for assessing how effectively a feature has been used.
- They ignore contextual factors.
- They do not assess the technical accuracy of a text.
- They do not indicate how actual users will respond to a text.

Can you think of any circumstances in which text-based testing alone would be sufficient?

Despite the obvious limitations, text-based testing can help assess a whole range of factors related to language, visuals, and design, such as adherence to language conventions, consistent terminology, sentence structure, documentation, verbal and visual coherence, adherence to visual conventions, and consistent

design features. Since writers and designers have a difficult time seeing their own errors, this kind of testing can be very helpful.

Why isn't technical accuracy sufficient for a text?

Expert-Based Testing

Expert-based testing includes several kinds of reviews: technical reviews by subject-matter experts, substantive editorial reviews, and design reviews. Expert-based testing is particularly useful for assessing technical accuracy and also for selecting supporting evidence and for identifying the level of detail for the intended audience. Recent workplace research supports the practice of using several kinds of experts in testing. Figure 9.3 identifies the general functions, benefits, and limitations of two common types of expert-based testing.

What kinds of texts do you think should be reviewed and tested by experts in several areas? What areas might benefit from expert testing in addition to those in identified in Figure 9.3?

"Expert" does not just mean technical subject-matter expert (SME). For example, consider the expert testing conducted for a user manual accompanying impendance spectroscopy software for a multinational market. The manual benefited from review by three kinds of experts: experts in engineering, in information design, and in nonnative readers of English.[9]

FIGURE 9.3 Expert-Based Testing

Test Types	Phases in Development				Functions	Benefits	Limitations
	Early	Middle	Late	Post Release			
Expert Review	✔	✔	✔	✔	Reviews various components such as design accessibility, international audiences, and legality	Provides expert feedback to developers about factors such as design, readability, legal compliance, and safety	Provides expert perspective without necessarily understanding what users need
Technical Review	✔	✔	✔	✔	Reviews text or presentation for accuracy as well as adherence to professional standards	Provides detailed feedback about accuracy of content and compliance with professional standards	Provides peer perspective without necessarily understanding what users need

Many large companies and agencies have formal review boards that read every publication that goes out of the company, both to ensure technical accuracy as well as to ensure that writers are not unintentionally revealing proprietary information (that is, guarded or secret information such as production processes). Such committees are also sometimes charged with ensuring that texts adhere to the organization's policies and practices regarding publication, which might include anything from checking the correct bibliographic format to assuring that the texts are coherent.

Formal review is a process that is mandated by some organizations. It is a sequence or cycle that texts go through to be assessed for consistency and appeal in format and design. Documents may move back and forth between writer, editor, designer, and SME and then back two or three times, or perhaps a dozen or more times. Similarly, a text may cycle back and forth between experts, for example, the SME and a graphic designer. In many organizations, texts cycle through a review-revise-review sequence several times, with different reviewers at different levels in the organization who identify problems in textual and technical accuracy.

Informal expert-based testing doesn't follow such a rigid process. Rather, informal expert-based testing generally means stopping by the office of a colleague and saying, "Sandy, I'd appreciate it if you had the time to read through this to check *X*." You fill in the *X*, asking for a review of technical content, logic of your argument, organization of information, and so on. As you develop a significant text or presentation, you may see that it receives dozens of these informal reviews by various kinds of experts.

Although experts can examine both specific and overall features of a text, they cannot predict how actual users will respond, largely because they know so much more than the intended users. However, feedback from experts is important because they can identify areas that need improvement in accuracy, completeness, coherence, consistency, and appeal for the verbal and visual aspects of a text. Revising and editing are much easier when you have expert feedback.

Experts know an immense amount about their area of specialization, certainly much more than average users. Why can't they assume the role of users and identify problems in a text?

User-Based Testing

Because text-based testing and expert-based testing aren't always sufficient predictors of usability, user-based testing elicits information directly from users. Revisions based on user feedback is so important that the U.S. government urges federal departments and agencies to user-test their documents. Figure 9.4 identifies the general functions, benefits, and limitations of five common types of user-based testing.

Information collected from users as they read and use a text is called *concurrent testing*. Information collected from users after they have finished using a text is called *retrospective testing*. Generally, writers have their choice of two kinds of concurrent testing.

Concurrent Testing. One of the most effective kinds of concurrent testing involves creating brief, realistic scenarios to which users can respond. Scenarios are

FIGURE 9.4 User-Based Testing

Test Types [All can be either *concurrent* or *retrospective.*]	Phases in Development: Early	Middle	Late	Post Release	Functions	Benefits	Limitations
Exploratory Test	✔				Assesses user assumptions, needs, skills, goals, concepts	Provides user feedback about conceptual design	Deals with abstractions; may require high level of user/tester contact
Assessment Test	✔	✔			Assesses implementation of conceptual model	Provides data about lower-level skills in time to modify design and content; focuses on user performance; easy to implement	May require high level of user/tester contact
Validation Test		✔	✔		Assesses usability; evaluates the ways components in the product or process work together	Provides data about the text for revision; provides data to benchmark future documents	Requires retesting of the changes at the last minute
Beta Test			✔		Provides limited review of initial published version of document	Provides feedback from actual users about a product in limited release	Customer already has the product; may influence their future attitude toward the company and product
User Feedback				✔	Provides postpublication review	Provides feedback that may help solve problems in later versions; provides feedback to strengthen future documents; adds information about customer base	Customer already has the product; difficult, costly, and inconvenient to fix problems; involves resources in customer service that might be spent in product development or marketing

what usability researcher Ginny Redish calls an "intersection of user analysis, task analysis, [and] context (environment) analysis" that capture a story of who, what, why, and how.[10] For example, imagine that an online airline reservation system is testing whether a new site design is accurate, fast, and hassle-free for users. Based on profiles of typical users, notes from observing other users, and conversations with individual users about situations they encounter, the test designer creates this scenario:

> Amelia James, a 26-year-old engineer who lives in Jackson, Mississippi, is considering a job offer in Houston. The company has asked her to come to Houston for an on-site interview next week. While the company will pay for her travel expenses, she has been asked to provide an airline itinerary, arriving Wednesday evening or very early Thursday morning and leaving Friday evening. Amelia prefers nonstop flights. She has less than 15 minutes before her next meeting to find the information and e-mail it to the company in Houston so the Human Resources Department can purchase the ticket she prefers.

Or imagine that a professional association offers its members the choice of receiving its quarterly publication in print or electronic format. The association wants to assess the accuracy and ease of completing an online form for switching to the online journal. The test designer creates a scenario based on file information about members, observation notes from previous testing, and conversations with individual members:

> You're busy and have little storage space in your office, so you've decided to shift from a print to an electronic journal for one of your primary professional organizations. You want to be able to receive upcoming publications electronically as well as access back issues electronically. You also want to be able to forward citations about interesting articles with your comments to colleagues and to bookmark articles you want to refer to again. You want the site to keep track of what you've already accessed. Complete the form provided by the association.

What do you see as the benefits and disadvantages of conducting tests in a natural workplace setting or in a usability testing lab?

Concurrent testing often involves watching users' behaviors as they perform a task (in a scenario or not). Whether in a natural workplace setting or in a usability testing lab, as you observe the users, you can identify places where they have difficulty interpreting or completing the information. For example, you can observe the amount of time or apparent ease or difficulty they have in locating information or performing individual tasks or sequences of tasks. You can keep notes on any number of factors, from the number and type of errors they make to their attitudes while using the document.

Another kind of concurrent testing asks users to read and think aloud — that is, not only to read aloud but also to say aloud all their comments, reactions, and opinions. Users' comments are tape-recorded as they read a document, browse a Web site, or use a software interface. By reviewing the tape, you can identify specific places where information is confusing or tasks are difficult for users.

Why is user testing often considered the most important kind of usability testing?

If you conduct user-based testing with several individuals, you will begin to see patterns of problems signaling areas in the text that need revising and editing or features of design and navigation that need improvement. As few as five to eight test participants gives you usable data for revision. Concurrent testing takes time, requires trained testers, and involves costs that are not incurred in text-based and expert-based testing. But the advantage is that writers, designers, and developers receive critical feedback directly from actual users.

During retrospective testing, why would some test participants make up what they think they probably did while completing a task rather than saying, "I don't remember"?

Retrospective Testing. Retrospective testing includes such methods as questionnaires, interviews, focus groups, and audience feedback cards. Although retrospective testing does provide information from actual users, it should be used cautiously because readers' memories are not necessarily accurate, and the information they provide is often vague. Despite the challenges of retrospective testing, it provides invaluable information. Using this feedback, you can revise and edit communication so that it is more accessible, comprehensible, and usable for the intended audience.

Conducting Usability Testing

In order for testing to ensure usability, you must carefully plan tests and incorporate them at various stages of the project. This section suggests preliminary steps for conducting testing. These generic steps will need to be modified to fit specific situations.

Creating a Usability Testing Plan

Before starting the testing process, define the broad goals and scope of your testing plan and determine what types of usability tests will best meet your goals, when they should be conducted, and how the results will be reported and used. Consider the following issues as you plan your testing.

1. ***Goals.*** Establish the goals for your testing. What do you want to find out? Ways to reduce time on task? To increase accuracy? To reduce calls to the helpline?
2. ***Criticality.*** Assess the importance of the text you plan to test and decide what kind of testing feedback you need. For example, Web sites and user manuals require text-based, expert-based, and user-based testing. However, this degree of testing would be excessive for a document such as a monthly progress report.
3. ***Constraints.*** Identify the constraints that you have to work with. They typically include available expertise (someone to conduct and interpret the tests), available test participants, time, and budget.

4. ***Schedule.*** Build the time for testing into the project schedule, and provide for that testing in the project's budget. Establish a schedule that, if at all possible, includes testing of different kinds as an ongoing part of the project.
5. ***Involvement.*** Explain the purpose and procedures of usability testing to all key personnel on the project so that they understand the goals and cooperate with the testing.
6. ***Timing.*** Test products and texts at various points in the development cycle, including the initial stages. Feedback on early design is essential for test results to become part of the design process.
7. ***Goodness of fit.*** Test procedures should elicit data that is appropriate and relevant to your specific goals. You may, for instance, need to test separately for information retrieval and for reading.
8. ***Ease of use.*** Test procedures must be easy for test participants to understand and for testers to facilitate.
9. ***Usable form.*** Manage the production of test data so that usable results are achieved.
10. ***Updating.*** Determine how the test results will be used as part of the development and revision process.[11]

Which of these issues will be most challenging for you? Which will be the easiest?

Many organizations expect a testing plan to be presented and approved as part of a project. Which of these issues would you choose to address in a testing plan in your discipline or field?

Are you ready to develop a test plan? To learn more about usability tools and strategies that you'll find useful, go to **www.english.wadsworth.com/burnett6e** for several links.
CLICK ON WEBLINK
CLICK on Chapter 9/usability tools

WEBLINK

A well-planned program of testing for a complex document, Web site, or software interface generally incorporates text-based, expert-based, and user-based testing at various points in the project cycle. When user-based testing is part of the design and development process, decisions about usability are based on observed use and problems rather than drawn from untested speculation. In other words, instead of working from guesses (even educated guesses) about how a product works with actual users (e.g., "When the users perform a particular task under certain circumstances, the result is probably going to be this."), user-based testing helps product developers get answers to practical questions about the ways in which the product will function ("What happens when the users do this?"). User-based testing can answer questions at various stages during iterative development while changes can be made relatively easily.

Testing processes vary considerably, depending on the kind of test you're conducting; the following steps are typical, although their specific form differs from situation to situation:

Give examples of how the complexity and time requirements of these steps will change in different situations.

- Analyze the users and tasks for which you are preparing communication.
- Locate representative test participants.
- Develop strategies for inquiry.
- Identify and prepare a test location and test materials.
- Explain the test procedures to participants.
- Conduct the tests.
- Report test results so the information can be used to improve design.

Analyzing Users and Tasks

When you design documents, Web sites, and software interfaces, you often focus attention on content, design preferences, and perceptions of the task or activity that the communication is meant to facilitate. This focus may mean you don't adequately account for the needs of actual users, the demands of their particular situations, and the tasks and limitations of the users in those situations.

Three major components affect the effectiveness of communication: the people, the activity, and the context. Testing helps you focus on users and their tasks so you can better deal with important usability issues. For example, when you develop a Web site, you probably have in mind a target audience of people who are most likely to use your site. Since you can't know about everyone who will visit your site, focus your analysis on your perception of your intended audience or representatives of actual users.

User Analysis. Many users have significantly different skills, attitudes, expectations, and experiences than the writers and designers. What do you need to know about your users, and how do you find out? Usability experts Joann Hackos and Janice Redish, in *User and Task Analysis for Interface Design,* recommend that writers and designers investigate the ways that users think about what they do ("jobs, tasks, tools, mental models") and "how they differ individually (personal, physical, and cultural characteristics, as well as motivation)."[12] When analyzing your users, consider the user characteristics listed in Figure 9.5.

The questions in Figure 9.5 are representative, not inclusive. What additional questions can you add?

Try to answer as many of the questions in Figure 9.5 as possible about your intended audiences. Use the information to write brief user profiles that you can use to guide your design and development. To address the many different needs and situations for which you develop communication, you need to recognize that usability is determined by how well the text works for users who want to accomplish specific tasks.

FIGURE 9.5 Characteristics for User Analysis[13]

Learning styles	■ Do Web site users read help files and manuals, or do they prefer to experiment when they use software? ■ Do Web site users use menus, site maps, or search functions when they encounter a new site?
Physical differences	■ Do users have visual, hearing, or motor disabilities, color blindness, or other characteristics that will affect their perception, interpretation, and use of the information?
Language and culture	■ How do users from different cultures respond to different metaphors, concepts, or organizational structures? ■ Does your information need to be provided in several languages?
Reading preferences and abilities	■ Do users read material on computer screens? Scan it? Print it out? ■ Do they prefer large print? Illustrations?
Motivation	■ How motivated are users to use your information? Motivated users might be more tolerant of design flaws than users who are less motivated.
Attitudes toward the type of communication you're preparing	■ Is the communication positive or negative? ■ How will target audiences react to the communication you're preparing?
Environment in which the communication is used	■ Will your audiences use your communication at work, at home, at school, or in a public location?
Users' job titles and job responsibilities	■ Do your audiences include managers? Professionals? Craftspeople? Students? ■ Do they often use the type of communication you're preparing?
Extent, purpose, and comfort using the type of communication	■ How do your audiences perceive their level of expertise? Do they consider themselves to be novices? Experts?
Types of tasks performed using the communication	■ What tasks will your audiences use your communication to accomplish?
Levels of knowledge provided in the communication	■ What do users already know about the information? About the task?
Types of training users have received in using the type of communication	■ Have users been trained to use similar communication? Will training be provided? How much additional help or documentation will you need to provide?
Users' mental models of communication	■ How do the audiences conceptualize the tasks that your communication is designed to facilitate? ■ What metaphors do they comprehend? Use?
Users' vocabulary	■ What terms do users recognize for various tasks and products?
Tools available for using the communication	■ What technology — for example, modem speeds, screen sizes, browsers, etc. — is available to the users?

Task Analysis. Once you have completed a preliminary user analysis, select representative users who fit the profile of your target audiences and begin assessing the tasks in which they are involved. Whether you are writing a technical manual or designing a Web site, understanding the tasks people will accomplish with your communication is a critical part of assessing and improving usability. Several strategies are available for gathering information about workplace tasks:

1. Interview users about their tasks and, if possible, observe them working. Ask them to show you what they typically do and what they do most frequently.
2. Prepare a list of important and frequent tasks people do with the type of communication you're developing. Note the important tasks that your communication should support.
3. Focus on the most important tasks in detail. Several aspects of tasks are particularly important:
   - ***Task Steps.*** What individual actions are required to complete the task? Do some users use shortcuts? Conflate steps? What variations in steps and methods are possible?
   - ***Resources.*** What tools do users need to complete the tasks (documents, computers, databases, search tools)? What information do they need? What processes do they use?
   - ***Constraints.*** What limits, such as time or knowledge, affect the task?
   - ***Task Environment.*** Where is the task performed — an office, retail store, factory? Does the communication need to be portable? What aspects of the environment, for example, noise or interruptions, affect task performance?
   - ***Problems.*** What problems are common? How can they be avoided? If problems occur, what information can best be given to help the users resolve the problem?
   - ***Frustrations.*** What aspects of the task or task environment irritate users? What aspects of the type of communication you're preparing confuses users?

Once you understand the audience for your communication and the tasks in which they're involved, you'll be better able to prepare tests and identify test subjects.

Implementing the Test Plan

Once your plan has been completed and you have carefully analyzed your users and their tasks, you're ready to implement the plan. This involves selecting test participants, developing and then piloting your test questions or scenarios, preparing the setting and materials, introducing the procedures to the test participants, and conducting the tests themselves.

Locate Representative Test Participants. Locate and schedule participants for your test. If you have completed user and task analyses, your user profile should identify test participants who are representative of the intended users. Successful user-based testing doesn't require the participation of large numbers of people. In fact, according to usability expert Jakob Nielsen, you can identify 80 percent of usability problems by testing your site with five to eight people.[14] Make sure, though, that your test participants have various levels of experience with the type of communication you are developing.

Why should you not have all novice users or all expert users?

Develop Strategies and Pilot Test for Inquiry. Develop a list of questions, scenarios, and key points that you want to explore during testing. For example, you may ask users to participate in a think-aloud protocol in which they respond orally to questions such as these, about a Web site:

- Describe the first items you notice on the page.
- Identify which elements on a page are actionable/clickable.
- Explain what you expect to find behind this link.
- Given the situation of *X*, show what steps you'd take to resolve it.
- Please describe your experience when trying to complete *X* task.

Before testing with participants, "test the test" with a trial or pilot run of the test procedures with other people in your class, department, or company. Pilot tests can help you identify any adjustments that you need to make to the test before testing with participants.

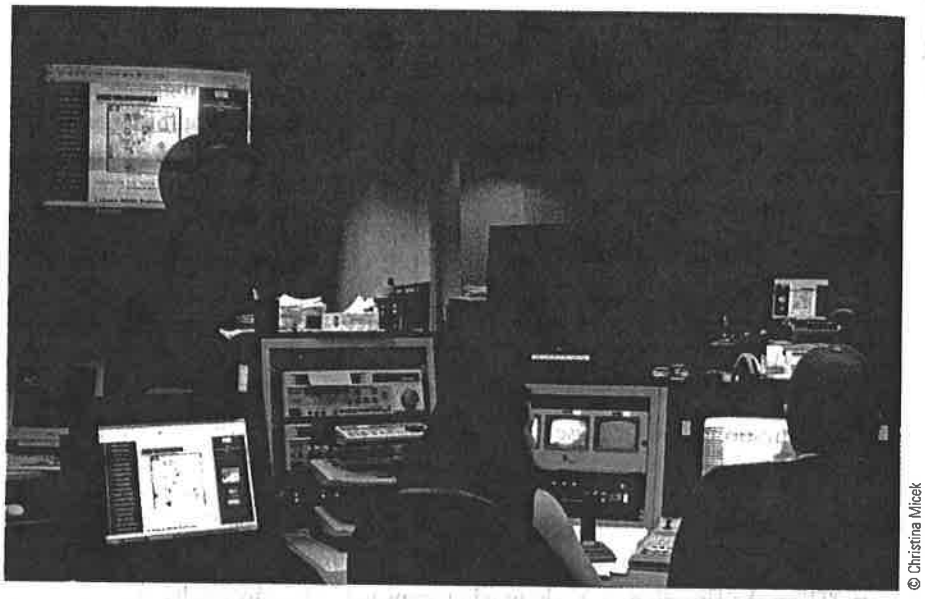
Conducting pilot tests adds time, effort, and expense to a project. What do you lose when you skip them?

Identify and Prepare a Test Location and Materials. Find an appropriate place to conduct tests that is free from serious distractions or interruptions (no one works in complete silence, so a little background noise will not interfere with your test) and keep the setting of the evaluation informal and comfortable. Make sure the space you choose is large enough to accommodate both test participants and test administrators without making anyone uncomfortable.

Regardless of where the test is held, prepare and inspect the room the day prior to the test. Organize all the required supplies, including copies of documents you're testing; pencils, pens, and forms for recording test activities; computers and software if applicable; tables, chairs, and sufficient lighting. Prior to your test procedure, make sure that everything is working properly.

Explain the Test Procedures to Participants. You should consider the value of writing an introductory script summarizing the test purposes and procedures that can be explained by a test administrator or read individually by the participants. A script ensures that each participant hears or reads the same introductory information about what a usability test is, how it works, and what can be done to help you get the best information.

When you are administering a usability test, are you more comfortable using a script, a full outline, notes, or your own good memory? What are advantages and disadvantages of each?



© Christina Micek

Observation Room in IBM Lotus Usability Testing Lab.[15] This corporate usability testing lab provides a room for the test participants and one for the text administrators to observe the participants.The 42-inch monitor in the observation room shows two inputs: each user's computer screen and each user's face. The large monitor enables test administrators to see exactly what the user is clicking on. The audio speakers are strategically placed so test administrators can hear what the user is saying.

Test administrators should put participants at ease, so before testing starts, tell participants the following information:

- Please be honest in your responses. I didn't design the [document, Web site, interface, manual . . .] you are testing, so your comments won't hurt my feelings.
- The test is meant to evaluate the text's performance, not yours. We expect you to encounter some problems, but if the text were perfect, we wouldn't need to test it.
- Do things just as you would if you were at home or at work. (Participants may try too hard to complete tasks to please the test administrator. For example, make sure they don't spend more time reading instructions than they normally would.)

Remind participants that they are helping you by testing the text, helping you to identify places that need to be revised in some way — reworded, defined, more fully explained, or illustrated. And remember to thank them.

© Christina Micek

sting lab
serve the
user's
tors to see
o test

g starts, tell

, Web site,
art my

'e expect
wouldn't

ticipants
r. For
ons than

ng you to
d, more

Conduct the Tests. While the duration of user-based tests depends on the complexity of the communication you're testing, individual tests generally range from about 20 to 90 minutes. Test administrators should avoid asking questions too quickly and should give test participants sufficient time to frame their responses. User feedback is usually more useful when the test is run like a conversation rather than an interview. However, test administrators should focus on the user's perspective and refrain from giving their opinions about the features of the communication being tested.

Why are writers and designers typically bad choices to act as test administrators for their own work?

During the tests, record test results by taking notes, by audio or video taping, or both. Note-taking and taping both have benefits and limitations. If you choose to take notes, you can determine in advance how you will record information and you can focus on specific aspects of the testing. On the other hand, note-taking requires you to divide your attention between observing the participants' activities and writing down their reactions and comments as well as your own observtions. Recording frees you to focus on the user, but yields a considerable amount of "unfiltered" data from which you'll need to take notes later.

What are you likely to choose as ways to record information during testing? Why?

Test administrators who keep these additional tips in mind will generally obtain more useful data:

- Ask participants for clarifications when necessary, but avoid leading questions. If you're not sure about a participant's response, paraphrase what you think the user is saying and ask if your interpretation is correct. For instance, you might ask, "Just to clarify, I think I hear you saying that following the directions on page 10 was difficult because you're not told what results to expect. Is that accurate?"
- If participants become confused or frustrated, request that they move on to the next task or question. Determine whether the participant can complete the task in a reasonable amount of time under typical conditions. Make sure to remind participants that their performance is not "wrong."
- When participants identify problems, document them clearly. Ask participants what they would recommend to eliminate the problem. Also, record information about aspects of the communication that users find particularly effective or satisfying.
- When most participants notice the same deficiency or encounter the same problem repeatedly, note the pattern and eliminate the question or task from the test. Once the presence of a problem is clear, you don't need to continue testing that aspect of the communication.
- Pay attention to participants' actions, facial expressions, and body language. What users do during a test is as important as what they say. Nonverbal communication also conveys significant information. You may be able to discern when participants are confused, frustrated, satisfied, or confident.

Arrange practice testing sessions with classmates or colleagues to try out these suggestions as you test drafts of your own documents.

During the test itself, be flexible and depart from your planned questions when necessary. If users testing a text or Web site bring up issues that you didn't anticipate, encourage them to talk about what they notice.

Reporting Test Results

When you follow a testing plan that includes text-based, expert-based, and user-based testing, you will collect quite a bit of raw data to review, organize, and report. Your first task will be to review your data from each test to identify key quotes, recurring comments, and interesting findings. Then determine which findings are most critical.

Organize critical findings, using categories that will be helpful in determining revision priorities and goals. For example, you might organize your findings by the assessment criteria presented in Chapter 1 of this text: accessibility, comprehensibility, and usability. Or you might focus on types of usability areas such as learnability, efficiency, memorability, error recovery, and user satisfaction.

You may also need to determine ways to quantify some results. Decisions about quantification should be decided prior to administering the test, because the way you decide to evaluate the tests may affect the type of test tasks and questions you include. Consider these possibilities:

- ***Time*** — how long test participants take to complete tasks
- ***Error rate*** — how many errors occur during various tasks
- ***Number of similar comments*** — how often different test participants note the same usability issues

User satisfaction is more difficult to quantify. However, you might ask questions about user satisfaction with various aspects of the communication using a Likert scale.

Once key findings are identified and prioritized, prepare a test report. Clearly identify your test procedures, participants, and findings. Also provide analyses of your findings that help you and others make judgments about what changes should be made to the communication you tested. Your goal for the written report is to prepare a useful and readable document for the designers and often for clients, not just a compilation of data without conclusions.

Well-written testing reports are easy and interesting to read. Figure 9.6 presents an excerpt from a testing report that describes usability tests conducted by the National Cancer Institute (NCI) on two Web-based booklets that they created for patients. Notice that the report provides readers with background information about goals, materials, test participants, and methodology before presenting results and recommendations. By conducting tests with a variety of users, including patients and clinicians, the developers were able to identify and report on specific usability problems with the booklets.

FIGURE 9.6 Excerpt from National Cancer Institute Web Testing Report[16]

Goals of the Usability Tests

We wanted to find out more about issues that may make an online booklet more usable:

- Will users have more success using a "detailed" table of contents (a set of links showing primary and secondary headings) or a "minimal" table of contents (a set of links showing only primary headings)?
- What makes a heading informative enough to help users find the information they are looking for?
- Do anchor links (links at the top of a page that take users to information further down that page) help users?
- Will users scroll through long pages of text? Can they easily find what they are looking for by scrolling?
- How much of a booklet do users want to print at one time?
- How much explanatory text is needed to go with icons that indicate other ways of getting a booklet? Icons include "print," "pdf," and "order" (for a paper copy).

Clear identification of testing goals phrased as questions

What Was Tested

We tested two online booklets: *Chemotherapy and You* and *Facing Forward: Life After Cancer Treatment*. Primary audiences for the booklets include patients, their family, and friends. The secondary audience is the health care professionals who provide the booklets to the patients.

Both online booklets are written at the eighth-grade reading level.

Chemotherapy and You has information on what to expect during chemotherapy and what patients can do to take care of themselves before and after treatment. *Facing Forward: Life After Cancer Treatment* addresses issues faced by patients who have completed treatment.

Specification of online documents being tested: titles, primary and secondary audiences, content

Who Participated in the Usability Tests

Fourteen participants tested the booklets:

- 9 clinical nurses
- 1 clinical assistant
- 2 cancer patients
- 2 family members of cancer patients

Identification of the test participants: number, role, general sense of prior knowledge

Most clinicians were very Web savvy. The patients and their family members were not as Web savvy.

Methodology Used

Each participant used the two online booklets for about an hour spending one half-hour on each booklet. During this time they:

- Answered questions on who they think the booklets are for, what they think the booklets are about, and what they would do with them
- Used each online booklet to search for specific information.
- Answered questions about their impressions of the online booklets
- Answered questions specifically about the format of the icons in the booklets, the format they prefer, and reasons for their preference.

Process used to test each online document

Figures 9.7 and 9.8 show two of the recommendations included in the report — what the NCI report calls "Lessons Learned." Each separate "lesson" includes the same categories of information: a recommendation, an explanation of that recommendation, a suggestion about how to implement it, and a visual example and text summary of the problem. This deductive organization of each subsection makes understanding the argument easy: the point is made in the recommendation; the rest of each subsection provides support. The evidence is credible, in large part because readers are presented with an annotated screen capture that illustrates the problem. As a result of the organization and the evidence, the recommendations are easy to accept.

FIGURE 9.7 **Excerpt from National Cancer Institute Web Site Redesign: Classification Problem[17]**

Summary of recommendation #4a to increase usability of the navigation

Explanation of reason for recommendation, based on testing results

Suggested way to accomplish recommendation

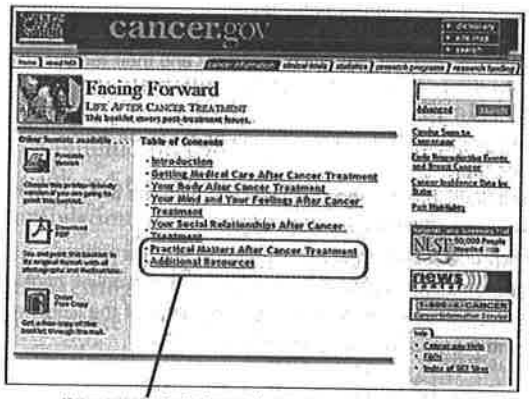
Illustration of the navigation problem of the site itself.

4. Organize information in a way that users understand, and then write descriptive headings.

Comment: When chunking information, consider the logical placement of information from the users' perspective. For example, in *Facing Forward* while 'Practical Matters After Cancer Treatment' might have seemed like a reasonable place to have information on support organizations for cancer patients, participants in our usability tests did not expect it there. An overwhelming number of participants thought they would find support organizations under 'Additional Resources.'

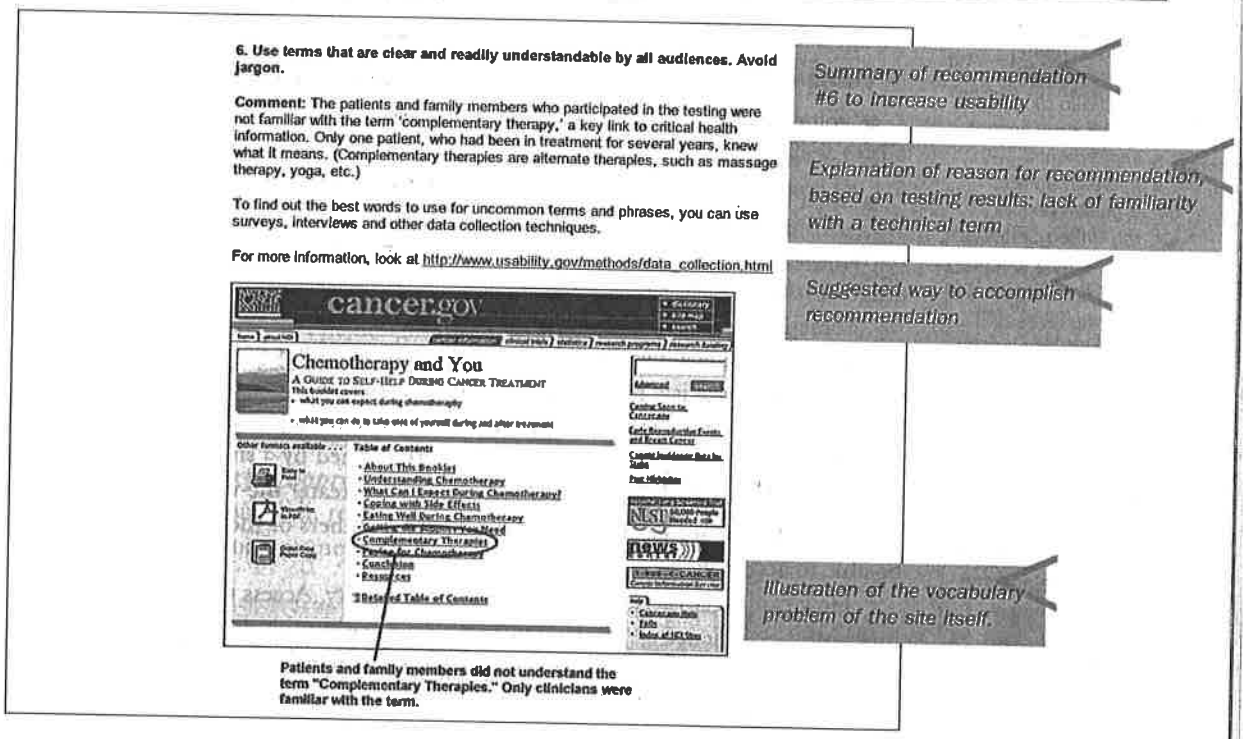
Once the information is chunked appropriately, write headings that are descriptive of the information. On the Web, page headings become links out of context on a previous page – like the table of contents of a printed booklet. Therefore, headings should clearly explain to users what page they are about to link to.

Example 4a



Users expected to find support groups for cancer patients under "Additional Resources." It is under "Practical Matters After Cancer Treatment."

FIGURE 9.8 **Excerpt from National Cancer Institute Web Site Redesign: Vocabulary Problem[16]**



Ensuring Accessibility

As part of improving usability, designers of communication, whether print or electronic documents, oral presentations, or visuals of various kinds, should also consider *accessibility,* an important aspect of usability that focuses on providing access to information and services, especially to people who have disabilities. Despite the growth of the Internet and advancements in computer hardware and software, barriers to information and to technologies used to communicate exist for many people. Technical communicators and technical professionals should promote access to information and services for all people. In thinking about audiences for all types of documents, presentations, and visuals, consider differences in users' vision, hearing, dexterity, cognition, and other learning and perception areas as well as limitations in their economic, educational, and physical environments.

Do you know someone in the United States who has a disability that affects communication?

- *Nearly 3 million people in the United States have speech impairments.*
- *Approximately 3 million people in the United States are color blind.*
- *Over 8 million people in the United States have visual impairments.*
- *Approximately 22 million people in the United States are deaf or hard of hearing.*
- *More than 40 million people in the United States are affected by dyslexia.*[19]

Mobility

- difficulty reaching equipment
- difficulty manipulating physical objects or parts

Vision

- color blindness
- low vision
- total blindness

Hearing

- selective hearing loss
- total deafness

Cognition

- memory disabilities
- perception disabilities (e.g., dyslexia)
- problem-solving disabilities
- conceptualization disabilities

Barriers to communication are created when designers don't consider the full range of users' abilities.

Sometimes you design and write for very specific audiences with whom you are familiar, such as safety engineers using a tutorial about hazardous waste disposal or pharmacists reading about possible complications with a new medication. However, much of the time, you write for a broad audience, one that is so diversified that it doesn't have an identity defined by a singular purpose, education, ability, or technological expertise. The greater the variability in the audience, the greater the likelihood that some members of the audience will not be able to access the information.

How can users vary? Purpose. Education. Ability. Access to technology. How much of the audience in the United States have various kinds of impairments that affect their ability to access information? 1 million people? 5 million? 20 million? Check the marginal annotation for demographic data.

WEBLINK

Many agencies, businesses, and organizations provide accessible information for various audiences. For a link to examples, go to www.english.wadsworth.com/burnett6e.

CLICK ON WEBLINK

CLICK on Chapter 9/accessible information

Principles of Accessibility

In an effort to address the differences and reduce barriers to communication, a group of architects, product designers, and environmental design researchers has identified seven principles for evaluating existing designs, guiding the design process, and educating both designers and consumers about the characteristics of accessibility, in products themselves and in the environments in which they're used. These researchers and advocates have collaboratively established universal design principles to guide a wide range of design disciplines, including communication. Some of these principles overlap the

general principles of usability, although not all the principles are applicable in all instances:

- ***Equitable use.*** The design is useful and marketable to people with diverse abilities.
- ***Flexibility in use.*** The design accommodates a wide range of individual preferences and abilities.
- ***Simple and intuitive use.*** The design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.
- ***Perceptible information.*** The design communicates necessary information effectively to users, regardless of ambient conditions or the user's sensory abilities.
- ***Tolerance for error.*** The design minimizes hazards and the adverse consequences of accidental or unintended actions.
- ***Low physical effort.*** The design can be used efficiently and comfortably and with a minimum of fatigue.
- ***Size and space for approach and use.*** Appropriate size and space are provided for approach, reach, manipulation, and use, regardless of user's body size, posture, or mobility.[20]

In what ways do universal design principles overlap with usability principles?

Identify a text or a piece of software that you have used recently that violates one or more of these universal design principles. How might the application of one or more of the principles make the particular text or software more accessible?

To learn more about universal design principles, go to **www.english.wadsworth.com/burnett6e** for interesting links.
CLICK ON WEBLINK
CLICK on Chapter 9/universal design

WEBLINK

Accessibility and Electronic Communication

With people's increasing reliance on computers and the Internet for information and services, hardware, software, Web sites, and Web-based applications pose challenges for designers because of the diversity of the audiences. For example, to design Web sites that are usable by and accessible to the largest number of potential users, designers need to understand accessibility concepts in a number of areas including hardware, software, and design principles.

Eliminating biased or stigmatizing language is always important. Some organizations offer guidelines for unbiased language. To learn ways to avoid using biased language, go to **www.english.wadsworth.com/burnett6e** for a link.
CLICK ON WEBLINK
CLICK on Chapter 9/unbiased language

WEBLINK

FIGURE 9.9 Technology Affects Accessibility[21]

Disability	Technology Aids Access
Mobility	Special-purpose hardware and software — such as on-screen keyboards, eyegaze keyboards, and sip-and-puff switches systems — provide alternate ways of creating keystrokes for people with severely limited dexterity.
	Voice recognition is used both by people with some physical disabilities or temporary injuries to hands and forearms as well as by users interested in greater convenience. It's also an input method in some voice browsers.
	Extended keyboard and mouse capabilities provide extended keyboard, mouse, and sound access. For example, the "sticky key" function solves the problem of having to press two or more keys at once (like performing CRTL-ALT-DEL). One key at a time does the job.
	Alternative keyboards and alternative mice allow people with limited or no ability to use their hands to perform keyboard activities.
	Word prediction software predicts the word a person is typing and the next word based on word frequency and context. This software, which may include spell checking, speech synthesis, and hot keys for frequently used words, is useful for slow typists, probe or pen users, and for people with visual disabilities or dyslexia.
Vision	Scanning reading systems allow printed information to be scanned into a system and read to a person using a speech synthesizer.
	Screen readers, used by people who are blind or have learning disabilities, interpret what is displayed on a screen and direct it either to speech synthesis for audio output or to a refreshable braille reader for tactile output.
	Screen magnifiers, used primarily by individuals with low vision, magnify a portion of the screen for easier viewing. Some screen magnifiers offer two views of the screen: one magnified and one default size for navigation.
	Dynamic or refreshable braille involves a mechanical display that raises and lowers dots to allow any braille words to be displayed. Some braille printers allow simple graphics to be drawn.
Hearing	Visual notification — rather than sound notification — allows people who are deaf or hard of hearing to receive a warning about a computer error.
	Real-time chat capabilities are possible with assistive technology that helps people who are deaf or hard of hearing to participate in real-time online chats.
Cognition	WYNN software reads, spells, and defines electronic text aloud so that people with dyslexia or other reading challenges can perform day-to-day work more easily. People can simultaneously view the text and hear it read aloud, thus taking advantage of both aural and visual input.

While accessibility can be restricted because of physical or cognitive barriers, technology provides a remarkable variety of tools to help overcome such barriers. Figure 9.9 summarizes technology that helps address problems with mobility, vision, hearing, and cognition. While technology is powerful and effective, it may be expensive, incompatible with existing hardware and software, too complex to use easily, infrequently accompanied by easy-to-use and thoroughly tested instructions, and insufficiently supported by knowledgeable technicians and usable online help.

Why are accessibility principles so important to Web-based products? Technical communicators are increasingly involved in the design of Web sites and Web-based applications, as you'll read in the ethics sidebar below; thus, they must be aware of all aspects of usability, including accessibility. In addition, recent regulations pertaining to disability and information technologies require that certain Web sites, software, and other communication products meet accessibility standards. Most important, meeting the needs of people who use information technologies is ethically responsible as well as practical and profitable.

Designing accessible, usable online help for blind and low-vision users of text-based readers is important and challenging. This article provides very helpful suggestions that are clearly explained and illustrated. For a link to the article, go to www.english.wadsworth.com/burnett6e.

CLICK ON WEBLINK

CLICK on Chapter 9/low vision

WEBLINK

ETHICS SIDEBAR

"What You Say!"

"All Your Base Are Belong to Us!" is an enigmatic phrase that has become a phenomenon on the Web,[22] which is littered with sites that tell its story. It comes from the strange Japanese-to-English translation of the introduction to Sega Genesis' 1989 arcade game *Zero Wing*, part of the story of a hapless flight crew facing off against a villainous enemy called "Cats." In 2101, war was beginning:

Captain: What happen?
Mechanic: Somebody set up us the bomb.
Operator: We get signal.
Captain: What!

What arguments could you make to colleagues who say these things:

- *"I had three years of Spanish in high school, so I can probably translate this product description; it's not very long."*
- *"Let's just use a machine translation."*
- *"It's an American product. Let's keep it in English."*
- *"I think Gemma in Public Relations has a degree in French literature from the Sorbonne. Let's ask her to translate these instructions about biohazardous waste disposal into French for the Haitian facilities workers."*
- *"Translation is simply too expensive; let them read it in English."*

Operator: Main screen turn on.

Captain: It's You!

Cats: How are you gentlemen! All your base are belong to us. You are on the way to destruction.

Captain: What you say!

Cats: You have no chance to survive make your time. HA HA HA HA . . .

Captain: Take off every 'zig'! You know what you doing. Move 'zig'. For great justice.[23]

Would you know how to take off your 'zig'?

Of course, poor translations from English to other languages occur as well. For instance, Coca-Cola first introduced its brand-name drink in China with a translated name that means "bite the wax tadpole." Coca-Cola corrected the unfortunate mistake, renaming the drink with a word that roughly translates to English as "happiness in the mouth." Liz Elting of Transperfect Translations notes that, "One of the biggest failures of a product was for the Chevy Nova in Latin American countries. 'No va' in Spanish means 'no go,' not a good name brand for a car."[24]

The results of bad translations may be funny, and they can be costly from a marketing perspective, but imagine poorly translated information on package insert with prescription medicine; the unusable results could be disastrous.

And what happens if no translation is provided at all? According to Andrea Perera of the *Philadelphia Inquirer,* "Nearly 30 percent of people surveyed in three major metropolitan areas in [2003] guessed at the proper dosage of their drugs because they weren't sure what their prescription said. More than half of the Spanish-speaking participants said they found it 'impossible' to fully understand their prescriptions because of language difficulties."[25] Pharmacies throughout the United States are seeking ways to rectify the problem by translating prescription directions into various languages.

When technical translations are poor or nonexistent, products become unusable and even dangerous. What should you do if you need to have a text translated?

- Don't rely on computer-generated translations, which can be particularly poor.
- Do hire a reputable translator with a track record who is fluent in both the original language and the target language of the translation.
- Make sure the translator is conversant with the subject matter. The translator's understanding of technical terms in areas such as medicine, law, and engineering is critical as well.
- Don't depend on literal, word-for-word translation to convey information. Good translations reflect cultural contexts and norms as well as correct lexical and grammatical aspects of text.
- Don't skimp on translation costs. The real costs in terms of usability will be higher in the long run.

Understandable text — in any language — is a usability issue.

Accessibility and Government Regulations

"Accessibility" often refers to the Americans with Disabilities Act. In the case of technical communication, this means Section 508 of the statute, which requires that the electronic and information technology of federal agencies, vendors, and contractors be accessible to people with disabilities, including employees and members of the public.

As a result of this far-reaching federal act, government agencies have been reducing these barriers so that their Web sites are accessible to broad audiences. Many of them have statements that announce their efforts, such as the one in Figure 9.10, which provides recourse to users who believe that the site is not accessible to them.

What example of compliance with accessibility do you see on your campus or workplace, both in the physical environment and in the electronic environment?

Creating accessible Web sites is boring? Expensive? Too difficult? Unnecessary? Too many people have the wrong idea about what Web accessibility means. To differentiate fact from fiction, go to **www.english.wadsworth.com/burnett6e** for a link.

CLICK ON WEBLINK

CLICK on Chapter 9/accessibility myths

WEBLINK

FIGURE 9.10 Public Statement of Accessibility[26]

Glenn Research Center

Home • Search • Subject • Organization • Project • Facilities • Resources • People

NASA Web Accessibility Statement

The Web page you just visited has been reviewed to be accessible to individuals with disabilities in accordance with provisions of Section 508 of the Workforce Investment Act and the Rehabilitation Act. If you experience problems accessing this information please contact the Web site curator directly. If your initial request is not acknowledged within five business days, contact the Discrimination Complaints Program Manager at 216-433-2323, or write to the Office of Equal Opportunity Programs, NASA Glenn Research Center, Mail stop 500-311, Cleveland OH 44135.

ACCESSIBILITY AND ATTITUDE

Accessibility in the workplace has to do with building access as well as with screen resolution and font size. But it also has to do with attitude and the way you communicate that attitude.

When you prepare communication for others, one of the most important responsibilities you have is to represent the needs and concerns of the people in your audience. Another is to recognize how language can either exclude and stigmatize people or include and empower them.

Read the following scenarios and consider how language can be as much a barrier to full participation as other factors in the workplace environment. As you read them and formulate a position, decide how you would behave in each situation.

SCENARIO 1

You use a wheelchair to get around. Your friend is visiting you in your home and invites you to go out to her favorite restaurant for lunch. You accept the invitation but say, "I assume the restaurant is accessible."

The friend then decides to call to make a reservation, using your speakerphone so you can listen in. The friend begins by saying, "I want to make a reservation for lunch but I also need to find out if your establishment has handicapped facilities since my friend, who is a victim of polio, is wheelchair-bound."

The manager of the restaurant responds, "Oh yes, we comply with all of the handicapped requirements. We have handicapped parking, a new wooden handicapped ramp at the back door and a newly remodeled restroom with grab bars. It has a handicap sink with a sloped mirror. We are proud to serve our friends with special needs."

© Jean Dobb

Your reaction

You are disappointed that your friend decided to make the call in your behalf, especially now that you know how the conversation went. You resent the demeaning tone of the conversation on both ends of the phone.

Both your friend and the manager of the restaurant used the term "handicapped." You know the connotations of the word "handicap," which has its origin from beggars who put their caps in their hands on street corners. You take offense at the term, especially when it is used in a condescending manner to describe you. You do not like your friend's reference to you as a "victim" of polio. You are also not "bound" to your wheelchair; it is simply a device you use to get from place to place.

As for the restaurant manager, you question why everything, including parking, restrooms, sinks and mirrors need to be described as "handicapped." What is so special about being given access to a building and a restroom? You also do not understand why the ramp is at the back door. Why should you have to have a separate, stigmatizing experience to enter the building, and why did they choose to install a wooden ramp? You also question why they selected a special sink with a sloped mirror. Special sinks are unnecessary and expensive and sloped mirrors do not work well for standing people. An open counter with a mirror that extends down to the top of the counter works well for everyone, regardless of a person's height or standing or seating position. You believe that the choice of a "special fixture with a sloped mirror" reflects an attitude of the owner/manager, who apparently thinks of accessibility accommodations as providing extras, rather than serving everyone on an equal basis.

You do not feel "handicapped" by old or poorly remodeled buildings nearly as much as by people's attitudes.

SCENARIO 2

You use a wheelchair to get around. Your friend is visiting you in your home and invites you to go out to her favorite restaurant for lunch. You accept the invitation but say, "I assume the restaurant is accessible."

The friend asks you if you think it is a good idea to call the restaurant to find out if reservations are needed and to make sure the restaurant is accessible. You agree that it is a good idea. Your friend asks you if you would like to make the call. You say that you would like to make the call.

When the owner/manager answers, you begin by asking if there is a wait. You also ask if the restaurant is accessible. The manager responds, "Our restaurant is fully accessible. Do you have any specific questions for me regarding access?" You answer, "I use a wheelchair. Will I have any difficulty getting in, getting seated, or using the restroom?" The manager says "No, I don't believe so, but if you do experience any problems with our building, our service, or our menu items, I welcome your suggestions on how we can make improvements."

Arrion Vengo/Superstock

Your reaction

You appreciate your friend's invitation to lunch and the concern about the restaurant being accessible. You appreciate your friend asking you if you would like to make the call, instead of the friend assuming that the call needs to be done for you. You appreciate the restaurant owner/manager's candid responses and the fact that you were given the opportunity to make suggestions for improvements to the building, services, and menu.

Most of all, you appreciate being treated with respect by both your friend and the restaurant owner/manager without any patronizing terms being used in the conversation.

The barriers people face can be as specific as the lack of access to the front door of a building or the content of a Web site or as general as attitudes expressed through communication. When you imagine yourself in the position of others in the workplace, you can begin to assess the ways that barriers interfere with people's autonomy and participation in workplace tasks and activities. In your communications with and for others, identify and eliminate as many barriers as possible.

Dr. Arvid E. Osterberg is a professor of architecture at Iowa State University where he teaches and conducts research in the areas of safety, accessibility, historic preservation, and design. He also conducts building assessments and does consulting on safety and accessibility issues. He is coauthor (with Donna J. Kain) of *Access for Everyone: A Guide to Accessibility with References* to ADAAG.

Individual and Collaborative Assignments

1. **Evaluate a software application.** Write a review of a software application you've recently used. Evaluate the usability of the software. Prepare this review for publication in a local Society for Technical Communication (STC) newsletter so that other technical communicators and professionals who might use this software will have access to your assessment.
2. **Plan usability testing.** Select a print or Web document that you are working on that would benefit from usability testing. Prepare a usability test plan, drawing on the questions in Figure 9.5 to help you focus on the critical issues. Write the test plan as a memo to your instructor or to the client for the project.
3. **Conduct usability testing.** Select a print or Web document that you are working on that would benefit from usability testing. Prepare a testing report that includes these three parts:
   (a) Your best shot before usability testing — that is, what you consider the very best you can do in preparing the document.
   (b) The usability testing results. You must include at least one kind each of text-based, expert-based, and user-based testing. Identify the tests you selected and justification for the selection, the test results, and your analysis/interpretation of the results.
   (c) The revision of your best-shot document based on the testing results and your analysis/explanation of the changes.
4. **Assess and redesign a Web site.** Go to http://uaweb.arizona.edu/resources/makeovers/demo.shtml to study two versions of the same Web site, one inaccessible and the second one revised to be compliant with section 508.
   (a) Carefully read the features that made the old site inaccessible. Then review the revision.
   (b) Select a site to analyze that you believe is inaccessible for a portion of the intended audience. List the problems (as in the example above) and write specific recommendations for revision.
5. Do all Web sites need to be accessible to people with vision impairments? Yes, if it's a federal Web site or a site provided under contract to a federal agency. Should other sites be accessible? Yes, if they want to reach the broadest audience. To learn more about access guidelines developed by the Web Accessibility Initiative of the World Wide Web Consortium, go to these Web sites:

   http://usability.gov/accessibility/index.html#understanding

   http://usability.gov/accessibility/508.html

(Alternatively, go to **www.english.wadsworth.com/burnett6e** and then Chapter 9/accessibility for direct links.) After you have reviewed the information, prepare a presentation that could be used in a workplace workshop introducing accessibility.

Chapter 9 Endnotes

1 Mirel, B. (2002.) Advancing a vision of usability. In B. Mirel & R. Spilka (Eds.), *Reshaping technical communication: New directions and challenges for the 21st century* (pp. 167–189). Mahwah, NJ: Lawrence Erlbaum.

2 Adapted from Nielsen, J. (1993) *Usability 101* [electronic version]. Boston: Academic Press. Retrieved December 10, 2003, from http://www.useit.com/alertbox/20030825.html

3 Adapted from Nielsen, J. (1993) *Usability 101* [electronic version]. Boston: Academic Press. Retrieved December 10, 2003, from http://www.useit.com/alertbox/20030825.html

4 Artim, J. M. (n.d.). *Usability problem severity ratings.* Retrieved December 10, 2003, from http://www.primaryview.org/CommonDefinitions/Severity.html

5 *Usability Partners. (n.d.). ISO standards.* Retrieved December 18, 2003, from http://www.usabilitypartners.se/usability/standards.shtml

6 Brown, J. D. (2000). What is construct validity? *Shiken: JALT Testing & Evaluation SIG Newsletter, 4*(2): 7–10. Retrieved January 2, 2004, from http://www.jalt.org/test/bro_8.htm

7 Neill, J., Campbell, H., & Dalby, S. (2003, August 4). *Essentials of a good psychological test.* Retrieved January 2, 2004, from http://www.wilderdom.com/personality/L3-2EssentialsGoodPsychologicalTest.html

8 Siemens. (n.d.). *Testing in Siemens' ICM usability lab.* Retrieved January 2, 2004, from http://www.siemens-mobile.com/cds/frontdoor/0,2241,hq_en_0_3911_rArNrNrNrN_img%253A1124297,00.html

9 For further information, see Molitor, K. (1995). *How participants' expertise influenced expert testing of a technical user manual.* Unpublished master's thesis, Iowa State University, Ames, Iowa.

10 Redish, G. (2001). *Storytelling: The power of scenarios.* Retrieved January 3, 2004, from http://www.redish.net/content/handouts.html

11 Schumacher, G., & Waller, R. (1985) Testing design alternatives: A comparison of procedures. In T. Duffy & R. Waller (Eds.), *Designing usable texts* (pp. 377–403). Orlando, FL: Academic Press.

12 Hackos, J. T., & Redish, J. C. (1998). *User and task analysis for interface design* (p. 35). New York: Wiley.

13 Hackos, J. T., & Redish, J. C. (1998). *User and task analysis for interface design* (p. 35). New York: Wiley.

14 Nielsen, J. (1998). *Cost of user testing a website.* Retrieved October 10, 2003, from http://www.useit.com/alertbox/980503.html

15 IBM. (n.d.). *Usability.* Retrieved December 10, 2003, from http://www-10.lotus.com/ldd/use.nsf/308c971706adfdef8525640500696fa8/b89473efab094bbe852565e50070168f?OpenDocument

16 National Cancer Institute, Office of Communications. (n.d.). *Designing educational booklets for the web.* Retrieved December 16, 2003, from http://usability.gov/lessons/chemo.html

17 National Cancer Institute, Office of Communications. (n.d.). *Designing educational booklets for the web.* Retrieved December 16, 2003, from http://usability.gov/lessons/chemo.html

18 National Cancer Institute, Office of Communications. (n.d.). *Designing educational booklets for the web.* Retrieved December 16, 2003, from http://usability.gov/lessons/chemo.html

19 Meyertons, J. (n.d.). *Accessibility of online materials: Assistive technologies.* Retrieved December 10, 2003, from http://www.willamette.edu/~jmeyerto/Accessibility/workshops/technologies.htm

20 Connell, B. R., Jones, M., Mace, R., Mueller, J., Mullick, A., Ostroff, E., Sanford, J., Steinfeld, E., Story, M., & Vanderheiden, G. (1997). *Principles of universal design.* Version 2.0. Raleigh NC: North Carolina State University. Copyright © 1997 NC State University. The Center for Universal Design. Retrieved December 10, 2003, from http://www.design.ncsu.edu:8120/cud/univ_design/princ_overview.htm
For additional information, also see *General concepts, universal design principles and guidelines* from the Trace Research & Development Center, College of Engineering, University of Wisconsin-Madison, http://www.trace.wisc.edu/world/gen_ud.html

21 Meyertons, J., & Bowers, N. (2000, October 27). *Accessibility of Online Materials: Assistive Technologies.* Portland State University. Retrieved on December 10, 2003, from http://www.access.pdx.edu/workshops/technologies.html

22 Benner, J. (2001, February 23). When gamer humor attacks. *Wired News.* Retrieved January 6, 2004, from http://www.wired.com/news/culture/0,1284,42009,00.html

23 Story of All Your Base. (n.d.). *All your base are belong to us.* Retrieved January 6, 2004, from http://www.planettribes.com/allyourbase/story.shtml#game; also reprinted in Pearrow, M. (2002). *The wireless web usability handbook* (p. 100). Hingham, MA: Charles River Media.

24 Transperfect Translations, Press Room. (2003, January 6). *Bad translations make for a good laugh but are bad for business.* Retrieved January 6, 2004, from http://www.transperfect.com/tp/eng/badxlate.html

25 Perera, A. (2003, October 7). Directions for prescriptions in English a problem for some. *In the News.* Retrieved January 6, 2004, from http://www.transperfect.com/tp/eng/phillyinq100703.html

26 NASA Glenn Research Center. (n.d.). *NASA web accessibility statement.* Retrieved December 10, 2003, from http://www.grc.nasa.gov/Doc/access.html