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E-ffective Writing for E-Learning Environments
by Katy Campbell ISBN:1591402166
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This text is a combination manual/workbook that leads users through the steps of preparing effective content for the Web and display media such as electronic slide shows.

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Table of Contents

[E-ffective Writing for E-Learning Environments](#)

[Introduction](#)

[Chapter 1](#) - Five Factors for Planning

[Chapter 2](#) - User-Centered Design (Part 1 - Cultural Diversity)

[Chapter 3](#) - User-Centered Design (Part 2 - Age, Gender and Accessibility)

[Chapter 4](#) - Selecting and Evaluating Learning Objects

[Chapter 5](#) - From Text to e-Text - Message Design

[Chapter 6](#) - From Text to e-Text - Resisting Print

[Chapter 7](#) - Structuring the e-Learning Environment

[Chapter 8](#) - The Active e-Reader

[Chapter 9](#) - Usability Testing

[Chapter 10](#) - e-Learning Trends — The Mobile Environment

[Glossary](#)

[References](#)

[E-ffective Writing for E-Learning Environments Handbook](#)

[Index](#)

[List of Figures](#)

[List of Tables](#)

[List of Examples](#)

[List of Sidebars](#)

Team LiB

NEXT ►

Back Cover

E-ffective Writing for E-Learning Environments integrates research and practice in user-centered design and learning design for instructors in post-secondary institutions and learning organizations who are developing e-learning resources. The book is intended as a development guide for experts in areas other than instructional or educational technology (in other words, experts in cognate areas such as Biology or English or Nursing) rather than as a learning design textbook. The organization of the book reflects the development process for a resource, course, or program--from planning and development through formative evaluation, and identifies trends and issues that faculty or developers might encounter along the way. The account of the process of one faculty member's course development journey illustrates the suggested design guidelines.

About the Author

Katy Campbell received her Ph.D. in Instructional Studies from the University of Alberta. Dr. Campbell is currently Director of the Academic Technologies for Learning department, and Associate Dean of Research, in the Faculty of Extension. She has taught courses in writing for new media, developing critical literacy in the information age, and user-centered design. Her current research interests include gender/technology interactions and resulting design issues, faculty transformative practice through collaborative instructional design, psychosocial issues of faculty teaching with technology, inclusive design practices, and the lives and practice of instructional designers. Dr. Campbell serves in various roles in numerous professional and academic associations, and is currently the co-lead of the Learning Design Working Group, which is developing eLearning specifications through IMS Global Learning Consortium.

E-ffective Writing for E-Learning Environments

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Acknowledgments and Credits

One day in 1998, Dennis Foth, the Director of Applied Arts in my faculty, dropped by my office. His unit was in the middle of redeveloping their writing program and he wondered if they should include a course about writing for media other than text. *Writing for New Media*, a 12-hour evening course, was born.

Over the next two years, I taught this evening course on four consecutive Wednesdays. It soon became apparent that there were many more interested in the content than the program could accommodate. At the same time, I was getting frustrated with the face-to-face didactic approach. Dennis and I agreed that I would re-purpose the course for a blended delivery; incorporating the original materials I had developed. Over 300 hundred hours later, I uploaded a modular course of ten topics ranging from the role of the *New Media Writer* to the *Team Process* in new media design, which had two face-to-face meetings and ran over 20 weeks. Over that time participants developed a portfolio by completing only the topics they needed, completing activities in a workbook, and contributing to an asynchronous threaded discussion.

Those resources, which I now think of as learning objects, have again been re-purposed and extended for this book. So, thank you, Dennis, Susan, and your staff in Applied Arts, for getting me started on my writing career!

Teaching an online course over 20 weeks, at a home computer in the kitchen, requires tremendous patience and understanding from your family. My extraordinary husband, Rick Roder, and my excellent daughter, Courtney Bonar, supported me through several offerings of *Writing for New Media* and pitched in to find web site exemplars, references, glossary terms and new research for this book. Without Rick my uneasy relationship with technology would have long ago defeated me. I love you both and promise to date on you once this book is out of my hands.

I have wonderful and brilliant colleagues who have contributed to the process, helping me with research, identifying resources, tolerating my single-mindedness, and authoring sections, chapters, and activities in the Handbook. Special "thank-yous" to Wingham Chen, who flew in from Vancouver Island to spend a month editing and filling in missing pieces; Ellen Whybrow, a wonderful instructional designer in our unit who authored [Chapter 4](#) on her holiday; Margaret Haughey, one of my favorite colleagues, for her steady advice and insights; the excellent Colin Geissler who took away from his

own precious time to work with my husband to find exemplars and create examples; and Catherine Gramlich who has inspired me for four years. Catherine pulled the final version of this text together, which was a mighty creative, editorial and organizational task. And thank you to all my colleagues in Academic Technologies for Learning from whom I continue to learn.

Thanks also to our exceptional administrative assistant Bev "who is the boss of me" Adam who protects me from everyone, but especially from myself. Bev, I would simply have to end my academic career if you left.

Many of the examples in this book were offered by my very generous colleagues with whom we have worked and have supported in their efforts to design e-Learning environments. Dr. Sue Gibson, from the Faculty of Education; Dr. John Boeglin from Faculté Ste Jean; Dr. Rod Wood from the Faculty of Law, all from the University of Alberta; and Dr. Jose Pereira from the Faculty of Medicine, University of Calgary. Each of these individuals allowed me to use sections from their courses and stories from the development process, but more importantly I learned invaluable lessons about personal/professional growth and relationships from them all.

At the same time I was developing this content I was the co-lead of the Learning Design Working Group for IMS Global Learning Consortium. I want to express my appreciation to Industry Canada - Cliff Groen, Yuri Daschko and Mary daCosta - for supporting my participation; and to all the members of our working group for opening my eyes to the whole world of learning objects, and standards and specifications. Through these activities I have met wonderful colleagues and have found a whole new research program!

Finally, I come from a family of strong, smart, funny women who individually and collectively work critically, uncompromisingly, and with care, humor and integrity in the world. This group includes my late grandmother Margaret Gutteridge, a headmistress from Sussex who kept her family together in a new country; my much-missed mother Pat Campbell, a professional woman and highly-respected teacher in a time when women were supposed to stay home; my sister Sue Campbell, a fierce philosopher and her partner Jan Sutherland, a new lawyer with an active social conscience; my sister Lori Campbell, who has spent over a decade working with aboriginal communities in northern Canada and who is now helping launch the University of Alberta's new Aboriginal Teacher Education Program; my beloved daughter Courtney Bonar who is now following her own educational goals; and my new, adored niece Jesse Aluki Campbell, the "happy soul".

ABOUT THE AUTHORS

In 1994, **Katy Campbell** received her Ph.D. in Instructional Studies from the University of Alberta, Canada. Dr. Campbell is currently Director of the Academic Technologies for Learning Department, and Associate Dean of Research, in the Faculty of Extension. She has taught courses in writing for new media, developing critical literacy in the information age, and user-centered design. Her current research interests include gender/ technology interactions and resulting design issues, faculty transformative practice through collaborative instructional design, psychosocial issues of faculty teaching with technology, inclusive design practices, and the lives and practice of instructional designers. Dr. Campbell serves in various roles in numerous professional and academic associations, and was co-lead of the Learning Design Working Group for IMS Global Learning Consortium. The LD Working Group completed version 1.0 of the LD specification for e-Learning developers in February, 2003.

Ellen Whybrow completed an interdisciplinary Master's degree in Instructional Technology and Adult Education in 2000. Ms. Whybrow is currently an Instructional Designer with Academic Technologies for Learning Department at the University of Alberta, Canada. She has been involved in several projects related to undergraduate large enrollment courses. She has also been involved in the development of learning objects in a variety of disciplines for Canadian initiatives that are testing and evolving learning object repository prototypes. She is actively involved in faculty development around the concepts of learning objects, active learning and large enrollment models.

Introduction

Developing an e-Learning environment is a complex, time-consuming task. This book and accompanying Handbook have been designed to guide you through the process.

E-fective Writing for e-Learning Environments is written to support instructors of both young and older adults. Because I work in a higher education context, many of my guidelines and examples will reflect my experiences there. However, most of my recommendations can be equally applied to training, continuing professional education, or non-formal learning environments.

I have written this book with three audiences in mind:

1. The instructor who is *exploring* e-Learning options in order to make a decision about the design and delivery of a resource, activity, course, or program. I often refer to these e-Learning components interchangeably. Sometimes we refer to these as educational or learning objects.
2. The instructor who is *ready to begin converting* one of these components from a face-to-face delivery (F2F) to a hybrid or entirely online delivery format.
3. The instructor who has *already re-purposed* an e-Learning component, but wants to ensure that the result is effectively designed. The recommendations in this book will help you evaluate and perhaps revise your course.

The Handbook contains additional information, examples, practice activities, and tools and resources. Tools include checklists, charts, design guidelines, and other resources that you can use as references while you develop your e-Learning components. Please feel free to remove pages from the Handbook to support your work. For example, I have enlarged various checklists and taped them to the wall behind my desk so that when I need a reference I can simply glance up from my keyboard.

This book integrates research and practice in user-centered design and learning design and is intended as a development guide for experts in areas other than instructional or educational technology (in other words, experts in cognate areas such as Biology or English or Nursing), rather than as a learning design textbook.

You do not have to have technical skills to use this book. While based on current research, it is organized and written in direct language that does not assume that you want to learn about the field of instructional technology, become an instructional designer, or a Web developer. However, incorporating just a few ideas will make your course more accessible and effective.

The organization of this book reflects the development process - from planning and development through formative evaluation and identifies trends and issues that faculty or developers might encounter along the way. The story of faculty members' course development journeys illustrate design guidelines.

The book is based on user-centered design guidelines and learning design theory and practice. With a growing emphasis on supporting international learning audiences and with increasingly diverse local populations, accessibility is a concern. Accessibility guidelines reflect diverse learning needs related to sex, age, language, culture, geography, access to technology, mobility, perceptual and cognitive challenges, socioeconomic status, and others.

Instructors need to know whether their courses provide effective learning experiences. Usability, broadly defined, is an important component of this framework. Formative evaluation, or usability testing, is an essential step in course development. This book contains an entire chapter on usability methods and tools, illustrated with real-life cases.

Global repositories of learning objects are promoting the availability of adaptable and re-usable digital resources. With this emerging development, the faculty is relieved from the expensive and time-consuming task of creating their own technologically sophisticated resources - a task that requires the development of new skills over a steep learning curve. This book provides background information on learning objects - what they are, where to find them, and how to use them.

E-effective Writing for e-Learning Environments is designed to model the user-centered design guidelines on which the content is based. So, the page design reflects principles such as chunking, use of sidebars, and multiple headings. The readability level ranges from 8–10. Course examples are provided, as well as the reflections of faculty members who have been involved in e-Learning. The book is also based on active learning principles and each chapter contains embedded questions to challenge your assumptions and understanding about your audience, content and design. This is a cognitive strategy that encourages reflection - a strategy you can use in your own course.

The chapters of this book are outlined as follows:

[Chapter 1: Five Factors for Planning](#) contains five reasons to develop an e-Learning environment and five planning factors to consider in the development process. Learning outcomes in three domains are presented through Bloom's Taxonomy. Learning styles, learner profiles, learning activities, and authentic assessment are important concepts for designing a good environment. The resource implications, including staff costs and timelines, are discussed using two actual course development experiences.

[Chapter 2: User-Centered Design Part 1](#) extends the idea of learning profiles to a field that informs instructional design, message design, and usability testing. The challenge presented in this chapter is to write for as many diverse needs and expectations as possible. User-centered design guidelines, which are explored further in [Chapter 3](#), involve writing for inclusiveness and are legally (accessibility laws), morally (equitable learning opportunities), and practically (globalization) necessary.

[Chapter 3: User-Centered Design Part 2](#) continues the discussion in [Chapter 2](#), but focuses more exclusively on accessibility issues, especially as related to age, gender, and health.

[Chapter 4: Selecting and Evaluating Learning Objects](#) introduces the relatively new field of educational, or learning objects, the role of standards and specifications, and rubrics for evaluating these resources. The knowledge management concept helps provide a context for the learning object economy. The premise of [Chapter 4](#) is that most of us do not have the time to develop e-Texts and that reusing e-Texts that have already been developed and evaluated makes good sense.

Ellen Whybrow, the senior instructional designer with Academic Technologies for Learning, authored [Chapter 4](#). Ellen has worked extensively with faculty to support its understanding and effective implementation of learning object repositories.

[Chapters 5: From Text to e-Text - Message Design](#) and [6: Resisting Print](#) emphasizes implementing user-centered design to support your efforts to re-purpose your existing content into e-Texts and/or to develop original e-Texts. Together, these chapters have been written as a practical guide and reference as you re-design your textual materials to enhance accessibility and readability and, potentially, active learning. Both chapters refer throughout to the research and evidence-based practice that underlies user-centered design.

[Chapter 7: Structuring the e-Learning Environment](#) ventures into the vast field of user interface design. The content of [Chapter 7](#) should get you started thinking about how users will work with your site - how they will navigate, find needed resources, and so on. You are asked to think about your domain as a genre that has a defined structure and set of design guidelines for organizing and presenting content.

[Chapter 8: The Active e-Reader](#) focuses on learning interactions with e-Texts within the structure of your domain. Tools for presentation and communication are also discussed.

[Chapter 9: Usability Testing](#) provides you with conceptual and practical advice to plan and implement a usability, or formative evaluation strategy. You will learn about usability goals, methods, and tools. You will also be able to develop your own usability process.

[Chapter 10: e-Learning Trends - The Mobile Environment](#) surveys developments in m-Learning and suggests implications for strategic planning in post secondary.

The *Handbook* contains case studies, exemplars, tools, and additional resources to support your work. It also includes a *Story of Practice* from one colleague who redeveloped his course and re-purposed his content for e-Learning. The story illustrates many of the concepts in this book and provides examples of practical applications of the ideas.

Trends and Challenges for Learning Organizations

The rest of this introduction explores the social and political contexts within which learning organizations make decisions related to learning and learners and identifies the related planning factors. I briefly present the challenges to the traditional delivery of instruction and training, for example, changing demographics and globalization. Differences between entirely Web-based courses and face-to-face courses, which use the Web to enhance student learning, are introduced.

In [Chapter 1](#), you will learn about the unique nature of online environments and explore best design practices. This is the first step in the e-Writing process.

Team LiB

[◀ PREVIOUS](#) [NEXT ▶](#)

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◀ PREVIOUS ▶ NEXT ▶

Key Ideas

Key ideas include:

- The reasons why learning organizations are interested in e-Learning
- Issues and challenges faced by institutions in this decade
- The changing nature of learners
- Social and political contexts in which e-Learning is designed
- Planning factors
- Quality assurance

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◀ PREVIOUS ▶ NEXT ▶

Key Terms

Note This list contains many of the unfamiliar terms in this section. They are defined in the *Glossary*. The terms are also listed as a checklist in the accompanying *Handbook*, with enough space to define them in your own words or note examples, references, and resources ([go to Key Terms in Introduction](#) of the *Handbook*).

- e-Learning
- m-Learning
- me-Learning
- Web-based learning
- Online learning
- Distributed learning
- Distance learning
- Blended learning

Plan Your Progress

Note A concept guide for the ideas in this chapter is provided in the *Handbook* ([go to Concept Guide](#) in the [Introduction](#) of the *Handbook*). There is additional space for you to write the questions for which you need answers. At the end of the chapter, check your list of questions to determine whether you need additional information. A concept guide is an example of an advanced organizer that helps readers organize the information to enhance learning. It is another cognitive strategy that might be effective in your course.

Note Record your own information or learning needs in *Questions and Goals* in the *Handbook* ([go to Questions and Goals](#) in the [Introduction](#) of the *Handbook*). If you have questions about trends and challenges in learning organizations, record them here. This is a third cognitive strategy.

At the end of this section return to this list to develop an action plan to locate sources for the questions you did not find answers for. You may need to 'carry' a goal or a question forward with you as you work through the book.

Note A "[To do list](#)" has also been provided for you in the *Handbook* for you to record what needs to be done, who needs to do the task, and when the task should be completed ([go to To Do List](#) in the [Introduction](#) of the *Handbook*).

What is e-Learning?

e-Learning has become an almost universal term used to describe education and training delivered or supported via networks such as the Internet. This allows for anywhere, anytime learning. The "e" can also carry a commercial meaning. e-Learning can refer to a system with e-Commerce components. For example, in addition to learning online students might be able to locate, register for, and pay for courses online.

Throughout the book I have used the "e" prefix as shorthand to classify any activity or process that might be supported through electronic networks. For example, **e-Support** refers to systems such as online career counseling that an organization provides to learners.

m-Learning, though a less familiar term, suggests mobile learning, including digital texts and communication services.

"M-learning is the intersection of mobile computing and eLearning...it's eLearning through mobile computational devices: Palms, Windows CE machines, even your digital cell phone."

Quinn, 2001

One manager of an e-Learning team talks about **me-Learning**, which places the emphasis on the *learner* in these environments. Each of these definitions includes the idea of electronic learning spaces, so they refer to both the technical aspects and the teaching/learning activities that take place in these environments.

Whatever term you choose to use, institutions of higher learning are exploring electronic means for:

- Developing administrative systems and campus portals
- Communicating with internal and external clients and stakeholders
- Creating learning objects
- Delivering and evaluating instruction
- Supporting research networks
- Creating new communities of practice

Many campuses are exploring the development of learning portals and in some cases hosting of the portal by a commercial company.

Trent Batson, with the TLT group, characterizes campus portals as "new academic spaces." He identifies seven features of these new spaces:

1. Organization of the portal to reflect reliance on resources beyond the campus walls
2. Links to the student information system
3. Interactive discussion spaces open to the world, not limited to a class or to your campus
4. Increasingly rich interlinked libraries of both traditional and electronic resources
5. An array of interactive multi-media tools at your disposal - chat, streaming video, audio (Webcast or "voice chat"), and so on
6. Links among departments on campus (horizontal) and to national academic fields (vertical)
7. Increased opportunities for collaborative work on campus, nationally, and internationally.

Is your own organization or institution exploring other electronic processes?

Summary

Currently, there are several terms used to describe learning environments:

- e-Learning
- m-Learning
- me-Learning
- Web-based learning
- Online learning
- Distributed learning
- Distance learning
- Blended learning

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[◀ PREVIOUS](#) [NEXT ▶](#)

The Social and Political Contexts for Learning

Universities, colleges, and other learning providers need to strategically examine current demographic, socio-political, economic and workplace issues.

4 planning issues We have identified four key issues that influence this planning:

1. The changing learner
2. The rise of the information and global economy
3. The emergence of the consumer culture
4. The changing nature of work and implications for higher education

Note As you think about these issues, jot down in the *Handbook* ideas that are relevant to your own context (**go to My Most Pressing Issue in Introduction** of the *Handbook*).

The Changing Learner

Post secondary institutions are experiencing unprecedented growth. In the United States, a 22% increase in enrollment is predicted between 1998 and 2010. These learners increasingly have the following characteristics:

- They are older. In the U.S. only 16% of post secondary learners are in the 18–22 age group.
- They are not residents. In Alberta, Canada (2000/01), only 77% of new university students listed Alberta as their primary residence.
- They are female.
- If international, they are usually Asian. The Oregon University system reported (2000) 6% international students, most of them Asian.

These trends are projected to continue in Canada and the United States in the next several years.

Implications for e-Learning

Demographics reveal that the numbers of international, older, and female learners are increasing. The design of learning environments will need to reflect diverse learner needs. For example:

- A Web-based course may have to support three languages
 - Older learners may bring perceptual challenges to their learning; accessibility strategies have been legislated in some regions
 - Adult women may need different support services than their male cohorts
-

To ensure equal access to information and services, the United States amended a Rehabilitation Act in 1998. All Federal agencies must make their electronic and information technology accessible to people with disabilities, including their employees and the public.

The Rise of the Information and Global Economy

The 1990's gave rise to the information and global economy:

- *informational* in the sense that the economy is based upon the production, reproduction, and dissemination of information.

- *global* in the sense that this process extends beyond geographical borders.

Castells, 2000

global rules of economics	Countries are forced to compete in an international market governed by global rules of economic exchange. Recent developments in information and communication technologies (ICTs), such as the Internet and World Wide Web, enable increased production and dissemination of information across geographical boundaries. ICTs fuel globalization.
digital divide	Access to the global and information economy is largely dependant on a country's access to technology. Most of the individuals with access to the Internet reside in developed nations. The digital divide refers to inequities in access to the information, commercial, and learning opportunities available electronically.

Implications for e-Learning

A digital divide exists within our own borders. Many groups are excluded from e-Learning opportunities because:

- Content is not culturally inclusive
 - The dominant language of instruction is English
 - They belong to a marginalized group who lack access to resources and support
 - They live in communities with poor Internet access, for example, in a remote rural community
 - High-speed access is expensive
 - The workplace does not support learning
 - e-Learning is too expensive
 - They have competing social roles and responsibilities
-

How can learning organizations respond to these factors of exclusion?

The Emergence Of The Consumer Culture

consumerism	The emergence of the "new economy" has been coupled by the emergence of the consumer culture. Students, as consumers, want to invest in an education that will ensure their employability. They are seeking: <ul style="list-style-type: none">■ Practical knowledge■ A technical skill set■ The credentials that will increase their marketability
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competition for students	A student may view himself or herself as a client who is purchasing the commodity of education. He/she will demand quality and accountability. In some cases universities are forced to compete with technical colleges for students.
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Competition for student enrollment is also occurring on a global level. Some see e-Learning as a means to ensure a competitive edge within the global market.

competitive edge	Through distance education, learning organizations are able to capitalize on consumers who want to invest in lifelong learning opportunities.
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Conversely, students who would not otherwise be able to attend regular university courses, such as stay at home parents and professionals, are no longer limited by boundaries of space and time.

The types of programs offered by these competing institutions are determined in part by student and consumer demand and the current needs of the business sector.

Implications for e-Learning

Learning providers are competing for the education dollar. Potential "clients" have consumer sensibilities which encourage organizations to:

- Conduct careful needs assessments
 - Partner with professional organizations
 - Collaborate in developing or delivering programs
 - Establish quality assurance
 - Be more publicly accountable
 - Evaluate e-Learning environments
 - Be responsive
 - Improve support for teaching and learning
 - Explore alternative credentialing
-

How is your organization responding to these challenges?

The Changing Nature Of Work

With the aid of the new ICTs industries have restructured the organization of work. They are downsizing and decentralizing operations, in an effort to increase:

- Accountability
- Profitability
- Efficiency

Castells, 2000

The Workplace Learner

decline of salaried jobs with security	The recent restructuring of the workforce by private industries has increased the number of flexible and part-time workers. Individuals are able to work from a variety of locations and are not restricted to the traditional 35–40 hour workweek. The number of traditional salary-based jobs, which offer job security and benefits, has decreased.
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The type of education offered is also changing to meet industry needs. The increasing number of applied degree programs in higher education institutes and just-in-time training in industry, are an effort to prepare individuals for a life of flexible and part-time work.

Easton, 1999

Implications for e-Learning

Increasingly, providers are developing new learning opportunities in partnership with industry. Programs may be offered in the workplace, on the desktop of the learner. Today's worker understands that learning is open-ended and that new and emerging organizations require continuous upgrading and adoption of new skills and competencies. Programs will be delivered flexibly, not following the "traditional" school year. Programs will be delivered in alternative formats and may be comprised of an international group of learners.

Can you identify one or two ways to offer flexible learning in your own discipline or in your institution?

Summary

This section introduced four inter-related issues that describe the context in which HE must plan to develop effective online learning environments. They are:

1. The changing learner
2. The rise of the information and global economy
3. The emergence of the consumer culture
4. The changing nature of work and implications for higher education

Note Which issue will have the greatest effect on e-Learning development in your specific context? Are there other issues that affect your institution? Take some time to note them in the *Handbook* in *Four Issues Related to e-Learning* ([go to Four Issues Related to e-Learning in Introduction of the Handbook](#)).

What are the implications for you, as an online writer and teacher?

Team LiB

◀ PREVIOUS ▶ NEXT ▶

Factors for Planning

From the discussion of trends in HE, it is possible to draw some tentative conclusions about current and future directions and policies for e-Learning. The [next section](#) presents three main factors to consider when planning to go online.

A New Learner Profile

new literacies	Students between the ages of 18 and 22 are more likely to be influenced by consumerism. This group of learners is more likely to present a broader understanding of literacy. They are literate in computers, the media and the printed word. They expect that their learning environment will reflect this literacy.
marketable skills	They view themselves as customers who will look for a return on their educational investment. This influences the schools they will attend and the degrees or credentials that will result. The student/teacher relationship is based upon what marketable skill can be taught in order for the student to obtain a job.
continual professional development	Students over the age of 22 are the fastest growing segment of learners. They are linking their learning with professional development and the idea of lifelong learning. They demand a flexible structure in which they can enroll in courses, work and attend to family matters at the same time. This flexibility is reflected in alternative delivery methods that include online learning and Internet use.
lifelong learning	Since North Americans are living longer, older learners will also require access to information and lifelong learning opportunities. No group of learners will be finished learning upon completion of a program. Life-long learning will become the norm as skills requirements will continuously evolve.
diversity	Immigration has increased during the past two decades. At the same time, we have become more sensitive to: <ul style="list-style-type: none"> ■ The learning needs of the challenged ■ Adults returning to the workplace ■ Cultural and gender differences ■ Inequitable access to information

Workplace Requirements and the Role of the University

industry expectations	Industry expects employees to be productive within the workplace. They emphasize continual technical skill training and knowledge acquisition. However, the academic community disputes the role of the university in providing this service.
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Some faculty question the emphasis placed upon technical skill and knowledge acquisition in the effort to meet industry requirements. They argue that this detracts from the importance of the liberal arts and social sciences. They point to the need to create critical thinkers who *question* the very role that industry plays.

learning on the job Technical skill training acquired in post-secondary programs is quickly outdated. Many of these skills can be, and are, learned on the job. In addition, a large percentage of corporate funding is going to support and shape research and development in the science and technology areas.

Implications for e-Learning

Many programs of study now include a practicum or service learning requirement. Increasingly, professionals have learning opportunities in their workplaces, offered in hybrid or blended formats. And, professional associations and corporations are seeking to become accredited learning organizations.

Use of Technology

As student enrollment increases and government base funding for education decreases, the use of technology becomes more attractive to both administrators and instructors.

removing barriers to access	Administration views technology as a cost effective method of serving larger numbers of citizens with a resultant reduction of barriers to access. We look at this expectation again in Chapter 1 .
learning object repositories	As the use of technology-enhanced environments increases, projects such as <i>Multimedia Educational Resources for Learning and Online Training</i> (<i>Merlot</i>) gather and provide peer review for educational objects that are produced in a variety of situations and disciplines. Repositories of educational objects will serve to reduce costly duplication of effort and offer learners well-designed and evaluated educational components. We explore the use of learning object repositories in Chapter 4 .
knowledge management	Knowledge management systems will become increasingly more important as institutions attempt to deal with a variety of information needs and issues. Organizations will require agile, responsive and accessible systems in which to operate.

The use of WebCT™ and other learning and content management systems (LCMS) such as Blackboard™ have made eCourse development less onerous for faculty. These systems provide a set of tools for publishing, communicating, and tracking student activity. The *National Learning Infrastructure Initiative* has supported research on, and has held meetings exploring, the use of Learning Content Management Systems. [Figure 0.1](#) is an example of a course delivered by an LCMS.

The screenshot shows the homepage of an English Online course titled "Writing on the Web". The page includes a brief introduction, course objectives, and links to various course modules. A sidebar on the right provides information about group projects and student presentations.

Figure 0.1: An English Course Delivered by WebCT at the Chinese University of Hong Kong Used with Permission, <http://www.cuhk.edu.hk/wbt/webct/cdemo.htm>

NLII, May, 2002 Vancouver, B.C.

learning content management systems

smart classrooms	There has been a significant increase in smart classrooms that house multimedia equipment. There has also been a tremendous growth in the use of mobile multimedia equipment as well. Institutions are rapidly upgrading both large lecture theatres and smaller classrooms. Many of these classrooms will support F2F and distance learners.
synchronous tools	Communication tools that support real-time interaction are becoming more sophisticated and reliable. For example, an integrated synchronous tool can provide voice-over-IP , guided web site explorations, video, slide presentations, collaborative learning spaces, and many other facilities. These tools can stand alone or be used in conjunction with an LCMS.

blended learning models

Blended learning may be the next evolution of the training and education industry and the next phase in the digital evolution. Blended learning is defined as the careful use of Web-based tools to provide *both*synchronous and asynchronous learning opportunities

Hall, 2000

A number of technology-based models have been used to deliver instruction to learners. Few have been as successful as Web-based, online learning. Online learning uses integrated computer software to support the design, creation, and management of learning.

Marsh & Drexler, 2001

In a Web-based learning environment, interactions can occur both synchronously and asynchronously. When learners meet with their instructor for dialogue, interaction and other group-enabled activities, synchronous learning is occurring. When learners access course information, readings and take part in computer conferencing activities, asynchronous learning is occurring.

asynchronous vs. synchronous learning	Unlike their face-to-face counterparts, many distance courses employ an asynchronous approach to teaching and learning. Learners access a course and their instructor at any time and from any location. This approach provides a high degree of flexibility for both learners and instructors.
--	---

computer-mediated conferencing, or communication (CMC)	The dialogue, interaction and group activities that might normally occur in the classroom, are often mediated through computer conferencing technology. There are text-based tools that enable learners to respond to questions posed by other participants. Once a posting is made, it may be several hours or several days before a response to the posting is acknowledged. Despite the delay, instructors feel that comments are reflective and sometimes better thought out than the classroom based discussion.
---	---

New forms of online learning offer the convenience of online access combined with audio, text, graphics, video and interactive collaborative tools. They also support live interaction. This approach has been difficult to achieve due to bandwidth limitations of the World Wide Web.

converging technologies	Industry analysts are very positive about this movement towards converged technologies and the role they will play in the evolution of web-based learning. Part of the reason for this optimism is the ease with which content can be created - quickly and inexpensively, combined with the ability to develop learning objects, which can be re-purposed for other applications.
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Live e-Learning - Why Are Early Adopters So Excited?

The development of live e-Learning is forecast to be a significant trend, which will overtake the single mode, asynchronous format in corporate, government and post-secondary settings.

course development time

According to Tony Bates at the University of British Columbia, technologies can make greater or lesser demands on instructional resources. For example, a stand alone, Web-based course can be very time consuming to design and build. The amount of time required to monitor computer conferencing sessions can also be time consuming. This is due to the instructor replacing the time spent teaching, with monitoring and responding to online discussions. [Bates \(1995\)](#) raises the issue of development time in his ACTION model of media selection.

[Bates, 1995, 2000](#)

Do Learners Want or Need a Blended Learning Approach?

For the past three years, the University of Tennessee's Department of Continuing Education has been offering an innovative online MBA program to medical doctors located throughout the state of Tennessee. The program encompasses a blended learning approach that combines live, online synchronous sessions every Saturday morning, in combination with a course web site and optional computer conferencing. Outcomes from the initiative indicated a preference by learners for live, online sessions in comparison to computer conferencing and teleconferencing. Learners have varying needs for flexibility. For those who cannot attend live sessions for example, interventions can be recorded and later uploaded to the Web.

Jackson, 2000

Learners benefit from content that incorporates a range of modalities. LCMS like WebCT™ are looking at augmenting their live chat features with additional enhancements. For example, text and graphics may not be as effective as online courses that combine text with either audio or video. [Figure 0.2](#) is an example of an accessible, multimodal course.

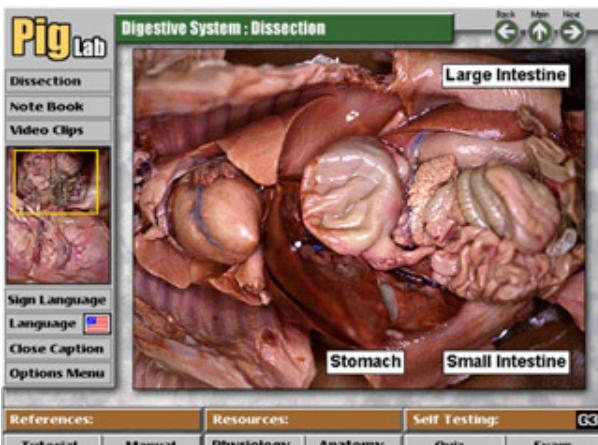


Figure 0.2: Fetal Pig Dissection Tutorial (<http://www.g3.com/education>) Used with Permission © Gordon G. Miller, III, President and CEO G3 Systems, Inc.

Quealy & Langan-Fox (1998) in LaRose, Gregg, & Easton (1998)

There was also a multi-language version of this project intended for California schools in an English as a Second Language effort. This type of strategy is all part of the President Bush "No Child Left Behind" project.

In many organizations, online courses rely primarily on an LCMS for content delivery. Content is often print-based with graphics. From the standpoint of information-processing the combination of video, slides, graphics, audio, and print addresses different learning needs. Using multiple modalities appeals to different senses or ways of understanding.

Depending on the learning outcomes, some types of stimuli such as print are more than adequate. For others, human interaction is essential to changing attitudes, fostering deeper understanding, or practicing skills.

Why Adults Take Online Courses

The American Society for Training and Development and the Masie Center undertook a recent study that examined factors that motivate adults to take online courses, and factors which contributed to user satisfaction. Based on a survey of 714 learners, taking 29 online courses, results showed that learners take online courses generally for personal development reasons. They are not as motivated and not by obvious external factors such as where and when to do online learning. The study recommends that organizations develop collaborative approaches that meet the learner's fundamental desire for synchronous interactions, which enhance the quality of the learning experience.

[eLearning News, 2001](#)

Summary

This section described characteristics of the "new" learner in HE.

Think about the learners for your course under development. Can you develop a learner profile and some design implications for your group?

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◀ PREVIOUS **NEXT ▶**

Trends in the Use of Learning Technologies

To help with planning for e-Learning, learning organizations should consider a number of key trends.

- | | |
|-------------------------------------|--|
| broadband access | 1. Greater broadband access that will deliver a richer content and enable a richer interactive environment. |
| wireless technologies | 2. Pervasive computing "in which computing, connectivity and communications technologies connect small, multipurpose devices, linking them by wireless technologies." |
| convergence | 3. Digital convergence, the merging of capabilities of telephone, radio, television and other interactive devices. |
| standards and specifications | 4. "Accelerating the pace of educational technology advances the establishment of technical standards for content development and sharing." |
| adaptive technology | 5. There is an emergence of adaptive technology that combines speech, gesture recognition, text-to-text conversion, language translation and sensory immersion to change net-worked human communication. |
| affordability | 6. The final trend is the reduction of costs in broadband delivery. |

Changes in the Delivery Of Instruction

A large percentage of courses offered at post-secondary institutions are in traditional, face-to-face (F2F) lecture format.

- | | |
|---|--|
| client-centered approach | However, a new model of instruction follows the client-centered philosophy of business. This emphasizes a student-centered approach to instruction. Active and collaborative learning are central principles to this instructional paradigm. |
| changing roles and relationships | Within this model, the traditional role of the teacher changes significantly. The nature of the traditional student-teacher relationship is also transformed. The teacher becomes the "guide on the side" or a facilitator of learning. A primary goal of the teacher is to meet student needs while providing instruction flexibly. |

Supporters of this model promote the use of technology, particularly in the development of distributed learning environments and the creation of Web-based courses or programs.

Communication and information technologies enable information sharing among academics globally - information that can be used to benefit both teaching practices and research.

business case Many believe that harnessing the effective use of instructional technologies in education will improve student learning and therefore, secure a competitive edge in the global economy. Recently, national task forces have been established to explore the business case for e-Learning. Key stakeholders within the business and education communities produced these reports. Recommendations for design include:

- Expert-rich content and curriculum
- Ease of use
- Flexibility and convenience
- Continuous assessment
- Real-time feedback, tracking and metrics
- Multimedia simulations
- Rich case studies
- Threaded discussions
- A dynamic, engaging environment for learning

The e-Learning evolution in Colleges and Universities (2001), a report produced by the Advisory Committee of Online Learning in Canada

The Power of the Internet for Learning (2000), a report produced by the Web-based Commission in the United States

research on learning effectiveness These reports stress the need for systematic and standardized approaches to development of Web-based and technology-enhanced courses. Establishing standards of quality for instructional design and delivery is a central concern. The provision of faculty support and incentive in the development of online courses is addressed. The reports recommend that further research in the effective use of instructional technologies is needed.

Assuring Quality of Instructional Delivery

While the quantity of distance and distributed education courses has increased, the quality varies widely. An established set of universal standards used to assess distributed or distance learning courses does not currently exist. However, efforts towards establishing such criterion have been made by several institutions.

assessing quality For example, in April 2000, the Institute for Higher Education Policy based in Washington, D.C. produced the report *Quality on the Line: Benchmarks for Success in Internet-based Distance Education* outlining benchmarks for success in the areas of institutional support, course development, teaching/learning process, course structure, student support, faculty support, and evaluation and assessment.

In May 2000, the Higher Education Program and Policy Council of the American Federation of Teachers also produced a report, *Distance Education: Guidelines for Good Practice*. In addition to the establishment of standard assessment criteria, they recommend establishing procedures to assess Web-based courses.

faculty incentives Reward structures for faculty and content developers must be addressed. The effective integration of technology into any curriculum requires a great deal of preparation and technical and pedagogical expertise.

Criteria used to determine tenure, promotion, and salaries are based primarily on the quantity and quality of publications and the number of grants attained. Consequently, there is limited incentive for faculty to devote the needed time to use instructional technologies effectively. Similar to the peer-review process of publications, a standard process of evaluation for the delivery of distance and distributed courses is necessary.

Does your institution consider the development of technology-based courses to be a form of scholarship within the university reward structure?

Privacy and Security

In the online world, the privacy and security of both students and faculty continue to be a primary concern. Many states and provinces have laws that protect Internet users. The *Alberta Freedom of Information and Protection of Privacy Act (FOIPP)* is a typical reflection of public concerns about access to information.

Is there a similar guide for your jurisdiction?

Summary

In this section, trends that affect the design and use of e-Learning environments suggest public and academic concerns about an evolution in learning in higher education and in other learning organizations.

You may have heard some of these concerns expressed by your colleagues. You probably have more than a few concerns yourself.

Note In the *Handbook*, note two or three of the most pressing concerns or questions you have about creating these online learning opportunities ([go to My Most Pressing Issue in the Introduction of the Handbook](#)).

What action could you take to explore the issue more thoroughly? What do you already know?

Practice

At this point, you have a good idea of the scope of the commitment you are about to make. To address

resource limitations, availability of learning materials in your field, effective learning design, and other issues, explore the idea of inter-institutional or inter-organizational collaboration.

- Take some time to talk to colleagues in your area
- Go to the Web and search for similar courses or sites
- Activate your research network
- Do a focused literature review

Are there any opportunities for you to share resources or development activities or adapt an existing set of Internet resources, in order to make your project more cost-effective or efficient?

As you work through this book and encounter information that helps you answer your questions, return to this page again and again to flesh out the "problem."

At the end of the book, decide whether you are comfortable that you have adequately addressed your concern(s). You may also have *new* questions. Note them here as they arise.

Team LiB

[◀ PREVIOUS](#) [NEXT ▶](#)

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Resources

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For information on ensuring quality in distance learning:

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For more information on learner profiling:

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◀ PREVIOUS NEXT ▶

Recommended Activities

In preparation for your project, do a little research at your own institution or organization. For example:

- Do you have access to demographic information and predictions?
- Do you have access to a centrally supported LCMS?
- Does your institution centrally support a faculty development and support unit?
- Is there funding or release time, available for course development?
- Does your institution have quality guidelines?
- Does your institution have visual identity guidelines for web interfaces?
- Do you have a colleague who has some experience with e-Learning?

These are just a few of the questions you need to explore.

Tip Start a "to do" list from which you can assign topics to an assistant. You will find one in the *Handbook*.

Chapter 1: Five Factors for Planning

Overview

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This chapter is for a reader who is at the beginning of the writing or development process, or who wants to affirm planning decisions.

In this chapter you will consider five planning aspects in e-Learning design:

1. Outcomes
2. Learners
3. Activities
4. Assessment
5. Resources

An overview of each aspect will help you describe your own hopes and expectations for your online course.

By the end of the chapter you should feel confident that the Web is a good delivery technology for your course.

Key Ideas

Key ideas include:

- The design of a course will depend in part on your learners' needs and on the desired learning outcomes.
- Authentic learning activities and assessment strategies can be designed to support your learner's needs and desired learning outcomes.
- Be aware of what is involved in providing on-line learning opportunities and the potential disadvantages and advantages.

Key Terms

Note This chapter introduces a number of terms and phrases that you may not be familiar with. These terms are listed in the accompanying *Handbook* with enough space to define them in your own words or note examples, references, and resources ([go to Key Terms in Chapter 1](#) of the *Handbook*).

- Learning outcome
- Knowledge construction
- Cognitive
- Affective
- Psychomotor
- Active learning
- Authentic assessment
- Collaborative learning
- Learning style
- Constructivism

Plan Your Progress

Note A concept guide for the ideas in this chapter is provided in the *Handbook*. There is additional space for you to write the questions for which you need answers ([go to Concept Guide in Chapter 1](#) of the *Handbook*). At the end of the chapter, check your list of questions to determine whether you need additional information.

Note Record your own information or learning needs in the *Handbook* ([go to Questions and Goals in Chapter 1](#) of the *Handbook*). If you have questions about factors for planning, record them here.

At the end of this section return to this list to develop an action plan to locate sources for the questions you did not find answers for. You may need to 'carry' a goal or a question forward with you as you work through the book.

Note A "[to do list](#)" has also been provided for you in the *Handbook* for you to record what needs to be done, who needs to do the task, and when the task should be completed by ([go to To Do List in Chapter 1](#) of the *Handbook*).

Why e-Learning?

In the [previous section](#) you identified trends and issues related to e-Learning.

You saw that e-Learning provides new opportunities for learners and teachers. It also comes with its share of challenges.

challenges

- Perhaps you have doubts about the effectiveness of e-Learning
- You aren't sure whether your colleagues or supervisors will recognize the time and effort you commit to creating your own online resources
- Your students may be suspicious of online learning. For example, they may believe that an increase in web-enhanced courses is based on an administrative decision to save money by using fewer instructors
- You have been a successful lecturer during your career and question why you would want to use an approach with which you are not familiar or comfortable
- You may think that the costs of creating e-Learning opportunities cannot be justified
- You could have a healthy respect for the vagaries of the technology

This chapter addresses these concerns and provides you with a number of decision-making tools to help you determine whether your course is a good candidate for the Internet.

Note The following questions relate directly to various planning factors. These *Five Key Questions* are repeated in the *Handbook* ([go to 5 Key Questions in Chapter 1](#) of the *Handbook*). Take a moment to answer them briefly now.

1. Who are the learners or readers?
2. What learning goals or information outcomes do I want to achieve?
3. How will I know when this happens?
4. Is the web the best learning/information environment for this course?
5. Will it add value to the teaching or learning experience?

At the end of the chapter, return to your responses. Has anything changed?

Learning Outcomes

What is a Learning Outcome?

Learning outcomes describe as precisely as possible what will happen after a unit of learning. The outcome statement may include a description of the learned behavior, under what conditions it will be accomplished, and the level it will be performed at. In training, objectives are often five-part statements that include the following information:

- | | |
|------------------------------------|--|
| conditions
for learning | <ul style="list-style-type: none"> ■ Who (will do the task) ■ Where (under these circumstances) ■ How (by performing an "action") ■ What (the learner must do to show mastery) ■ With what criteria |
|------------------------------------|--|

Depending on your philosophical orientation, learning is described as both information processing and knowledge construction. Throughout this book I will take the knowledge construction or constructivist approach.

The information processing perspective describes knowledge as an *objective representation* of experience, while constructivism describes it as a *subjective interpretation* of experience.

Newby, Stepich, Lehman & Russell, 2000

Knowledge construction, or constructivism, involves thinking about and interpreting experience to arrive at some new experience in a more complete, complex, or refined way. In this view, learning occurs best in a social context.

In either case, a learning outcome reflects the new learning or understanding in an observable form.

- | | |
|--------------------------------|--|
| observable
learning | For example, a tennis coach wants a learner to be able to serve the ball over the net. Teaching this psychomotor skill involves demonstration or modeling, discussion of biomechanics or physiology, mental rehearsal, and guided practice - lots of it. The desired learning outcome? |
|--------------------------------|--|

The learner will be able to serve the tennis ball six times without error, using the proper form. In other words, the learner is able to demonstrate mastery of a psychomotor skill *in the form in which it is taught*.

Outcomes in a bioethics course include being able to identify the salient argument and the sociopolitical values a case represents. The learner must then develop and defend an ethical solution.

What outcome reflects learning in a creative writing class?

Types of Outcomes

Outcomes may be cognitive, psychomotor, or affective in nature. In some cases, a learning outcome may reflect two or more domains.

Cognitive Outcomes

In the cognitive domain learning is described as a change in knowledge stored in memory. The central principle is that most behavior is controlled by internal memory processes rather than by external

circumstances.

Benjamin Bloom, a cognitive psychologist, described a schema of cognitive objectives that move from the lowest level of cognitive functioning (sometimes called lower order thinking) to the highest level (sometimes called higher order thinking).

Learning to read an engineering problem is an example of a cognitive outcome. *Think of a way that a learner can demonstrate this new learning.*

Bloom, 1956, 1976

Examples of outcome statements in the cognitive domain:

- The learner will list three reasons to include graphics with text in an online explanation.
- Students in foods and nutrition 101 will be able to describe, with 100% accuracy, the action of yeast in bread dough.
- Dental hygienists will label a tooth with no more than one error.

Figure 1.1 represents action terms related to stages of learning in Benjamin Bloom's cognitive taxonomy.

Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
Know	Restate	Translate	Calculate	Compose	Appraise
Define	Discuss	Interpret	Relate	Design	Value
Memorize	Describe	Use	Debate	Formulate	Revise
Repeat	Explain	Operate	Solve	Construct	Estimate
List	Identify	Illustrate	Criticize	Create	Rate
Name	Review	Sketch	Contrast	Organize	Judge

Figure 1.1: Cognitive Taxonomy

Place each of the cognitive outcome statements above into the related stage.

Psychomotor Outcomes

In the psychomotor domain learning takes physical form. The "psycho" in psychomotor acknowledges that there is a cognitive aspect to learning a physical skill. For example, in learning to write cursively a child has to understand how cursive letters relate to the printed letter and how letters go together to make words, and so on.

Are there any psychomotor outcomes for your course? How would you evaluate the learning?

Examples of outcome statements in the psychomotor domain include:

- The student will serve the volleyball correctly two out of three times.
- The driver will perform the six steps in performing a lane change with 100% accuracy.
- The student will correctly insert the floppy in the disk drive: shutter face up and pointing toward the disk drive.

Harrow, 1972

Barry & King, 1993

Figure 1.2 represents outcome action terms related to stages in the psychomotor taxonomy. Based on the work stemming from Bloom's original taxonomy, these stages move from the more simple to the more complex levels of psychomotor functioning.

Reflex	Fundamental Movements	Perceptual Abilities	Physical Abilities	Skilled Movements	Non-discursive Communication
	Jump	Catch	Stop	Play	Express
	Reach	Write	Change	Swim	Create
	Skip	Balance	React	Use	Design

Figure 1.2: Psychomotor Taxonomy

Harrow, Barry and King suggest that skilled movements and non-discursive communication are applicable to programs in the creative and professional areas. For example, clinical skills such as palpation might qualify as psychomotor skills in the skilled movement category. Painting, drawing and acting, for example, are well aligned with the non-discursive communication category.

Affective Outcomes

The affective domain is concerned with emotional learning. Affective outcomes may involve changes to a learner's value system. For example, you might design an online group debate in which participants have to adopt a different point of view to argue effectively for each side.

Of course, a participant's *actual* point of view may remain the same as it was before the debate. *How would you know if his/her point of view had changed?*

Examples of outcome statements in the affective domain include:

- The medical student will demonstrate empathic listening in a patient interview.
- The learner will be able to justify his/her position on the death penalty by stating his/her view in one statement and providing evidence for the point of view.
- The prisoner up for parole will be able to identify the moral issue in shoplifting.

Figure 1.3 represents action terms related to learning outcome stages in Bloom's affective taxonomy.

Receiving	Responding	Valuing	Organization	Characterization
Observe	Comply	Feel	Relate	Evaluate
Realize	Engage	Enable	Judge	Judge
Attend	Cooperate	Examine	Weigh	Change
Prefer	Contribute	Accept	Regulate	Collaborate

Figure 1.3: Affective Taxonomy

As you read the example outcome statements below, note how the learning expectations progress through listening to a debate to taking a personal stand supported with evidence, on the two opposing political arguments. Match each outcome statement to a stage in the taxonomy.

- The learner will attend the scheduled debate between the two mayoral candidates.
- The learner will contribute one idea to the online class discussion about the mayoral debate.
- The learner will examine the key argument about animal control made by each candidate and will verify the accuracy of quoted statistics about stray cats.
- The learner will judge which candidate has presented the best evidence in defense of her political stance and will provide a valid reason for voting for that candidate.

Outcomes Supported by the Web

Active learning strategies involve learners in activities that deepen their understanding and enable them to readily transfer what they have learned to new situations. Active learning strategies may be implemented in the classroom or over the Web.

Note A checklist of strategies to encourage active learning is in the *Handbook* ([go to Checklist of Active Learning Strategies in Chapter 1](#) of the *Handbook*).

Take a moment and write two outcome statements that encourage active learning in your e-Learning environment.

There are several excellent online guides to help you increase learner engagement. Two are suggested here. Bookmark these sites and others you find for quick reference.

Instructional Design for Online Course Development, Illinois Online Network,
<http://illinois.online.uillinois.edu>

Quick Guide: General Teaching Models, Virginia Tech,
<http://www.edtech.vt.edu/edtech/id/models/index/html>

Advantages of e-Learning

Note This section offers six advantages of e-Learning. The points are presented again in *Advantages and Disadvantages of e-Learning Environments* in the *Handbook* ([go to Advantages and Disadvantages of e-Learning Environments in Chapter 1](#) of the *Handbook*).

There is also space to write potential disadvantages of e-Learning in HE. As you read this book, add information in this space that either refutes or supports the disadvantages. You will need to weigh both if you go online.

Advantage 1: Active Learning

Active learning means *doing something* with new information. Online environments encourage learners to:

Smith & MacGregor, 1992

- Make choices
- Interact with others in a social environment
- Choose media

Advantage 2: Real-world Context

Online environments can provide *authentic* experiences because learners have access to so much more information and so many more points of view than before. They can work with:

- Cross-country research projects
- Workplace learning
- Real, current data
- More resources (both formal and non-formal)

Advantage 3: Depth of Coverage

Because anyone can publish on the Internet, learners can find more information from more sources and up-to-date research findings, than one professor can possibly provide.

Online research opportunities can be accompanied with instruction about critical information literacy.

Advantage 4: Information Literacy Skills

e-Research is a good context for finding and assessing information from non-traditional sources. What

is the most appropriate theory of learning for hypermedia environments? The answers to this question are many and varied. Many converge on one point:

Learning is a cognitive learning process involving the acquisition of high-level skills of problem-solving and critical thinking.

Advantage 5: Critical and Creative Thinking

Linking through time and space gives learners exposure to the thought processes of others through:

- Discussion
- Problem-solving peer assessment of writing
- Public process
- Writing as cognitive process

Because there is no need for an immediate response in an asynchronous class discussion, learners have more time to reflect on their responses, which encourages higher-order critical thinking.

Nunes & Fowell, 1996

Ryser, Beeler & McKenzie, 1995

Ewing et al., 1999

Hakkarainen, Javea, Lipponen & Lhtinen, 1998

The belief that underlies this statement is that "learners actively increase their knowledge and understanding by *working in collaborative learning environments* which encourages them to adjust their views of the world."

Advantage 6: Collaborative Learning

Individuals can participate in collaborative learning activities even if they are separated across time and space.

Collaborative learning compares very favorably with other approaches, for example, individualized learning. Research on collaborative learning refutes the initial belief that computers would displace or replace the live human teacher and the social setting of the classroom.

Five Assumptions about Collaborative e-Learning

Collaborative learning is based on a set of five assumptions from the student outcome research showing clearly that students learn more when engaged in the learning process:

1. Learning is an active, constructive process
2. Learning depends on rich contexts
3. Learners are diverse
4. Learning is inherently social
5. Learning has affective and subjective dimensions

Implications for e-Learning

Multimedia electronic documents can be enormously useful adjuncts to the existing teaching, research, and learning tools of scholars, but to do this they must provide facilities that are different and more powerful than those of paper books. These facilities ...include tools to promote connectivity, enhance audio visualization, aid in the creation and revision of information, facilitate the search for and retrieval of data, and maintain historical integrity of materials.

Yankelovich et al. (in Korolenko, 1998, p. 41)

Summary

In this section, you encountered several ideas about learning and how to recognize it when it has occurred. Learning outcomes relate to the idea of authentic assessment, which we will discuss later in this chapter. Take a moment now to think about the course you are going to develop.

Note Write down one to five learning outcomes you expect for your course. A space has been provided for you in the *Handbook* ([go to Five Learning Outcomes in Chapter 1](#) of the *Handbook*).

Note Finally, a *Decision-making Checklist* provided to you in the *Handbook* presents the ideas in this section in another way ([go to Decision-making Checklist in Chapter 1](#) of the *Handbook*).

Learners

Your class contains learners who have preferences for learning using different perceptual modalities and different intelligences.

- Some are learning in a language other than their mother tongue
- Some learners have returned to school after a long absence
- There are males and females
- There may be visually challenged individuals or individuals with limited mobility
- Some may be working many hours a week
- Some are outgoing, while others are shy

How would you describe the diversity of your learners?

Try this: Ask an instructor to recall a typical class that they recently taught. Ask specifically about gender, ethnicity, mother tongue, etc. Use a graph or chart to demonstrate the diversity of learners.

[Chapter 2](#) explores the e-Learner in more depth and from many different perspectives.

Note [Table 1.1 Learning Activities and Formats](#) reflects one author's efforts to map e-Learning activities to the ways that we learn in other contexts. This table has also been provided to you in the *Handbook* ([go to *Table 1.1* in Chapter 1](#) of the *Handbook*).

Table 1.1: Learning Activities and Formats Adapted from [Horton, W. \(2000\). Web-based training. New York, NY: John Wiley and Sons, Inc., p. 15–16.](#)

We learn by ...	
aFace-to Face Activities	Online Activities
<p>Listening to:</p> <ul style="list-style-type: none"> ■ Lectures ■ Interviews ■ Debates ■ Sermons ■ Speeches ■ Stories ■ Testimonials ■ Discussion among experts ■ Critiques 	<ul style="list-style-type: none"> ■ Webcasts ■ Case-study activities ■ Online conferences ■ Audio and video conferencing ■ Presentation sequences ■ Reading online ■ Discussion groups ■ Mentoring ■ Peer-review

Seeking advice from: <ul style="list-style-type: none">■ Parents■ Mentors■ Co-workers■ Consultants■ Experts	<ul style="list-style-type: none">■ Mentoring and coaching, apprenticing■ E-mail■ CMC among class members■ Bringing in online experts, guest speakers■ Collaborative problem-solving
Reading: <ul style="list-style-type: none">■ Books■ Manuals■ Papers■ Articles■ Reports■ Case studies	<ul style="list-style-type: none">■ Presentation sequences■ Resource pages■ Course notes■ Virtual libraries■ Transcripts■ Narratives■ Case studies
Watching and hearing: <ul style="list-style-type: none">■ Presentations■ Plays■ Media■ Demonstrations■ Debates	<ul style="list-style-type: none">■ Webcasts■ Presentations■ Whiteboards■ Screen-sharing■ Movies, animations
Organizing: <ul style="list-style-type: none">■ With lists■ With outlines■ With tables and tools■ By classifying or grouping■ Annotating	<ul style="list-style-type: none">■ Using file folders■ Creating annotations■ Cut and copy (or paste)■ Downloading online documents■ With online tools such as File Maker Pro™

Examining exemplars or models by/of: <ul style="list-style-type: none">■ Visiting and touring museums■ Seeing a demonstration■ Work experiences■ Traveling■ Critiquing work of others■ Modeling the behavior of others■ Memorizing	<ul style="list-style-type: none">■ Virtual museums, etc.■ Online conferences■ Virtual field trips■ Case studies■ Online lab experiments■ Virtual reality■ Mentoring■ Webcasts■ Guest experts■ Case studies■ Simulations■ Application sharing■ Reading and repeating■ On-line MC
Exploring and manipulating: <ul style="list-style-type: none">■ Environments■ Objects and tools■ Working models■ Language■ Building something■ Documents	<ul style="list-style-type: none">■ Guided tours■ Simulations■ Case studies■ Role plays■ Virtual labs■ Brainstorming■ Shared online documents
Practicing with: <ul style="list-style-type: none">■ Tasks■ New knowledge■ Others■ New abilities and skills	<ul style="list-style-type: none">■ Games■ Experiments, simulations■ Role-playing■ Manipulable objects

Contributing to: <ul style="list-style-type: none">■ Discussions■ Debates■ Group problem-solving■ Writing	<ul style="list-style-type: none">■ Threaded discussion groups■ Chat sessions■ Role-playing■ Virtual labs■ Visiting experts
Conducting research: <ul style="list-style-type: none">■ In libraries■ With interviews■ In the field■ In focus groups	<ul style="list-style-type: none">■ Guided research activities■ Group projects■ Case studies■ Online databases■ Simulations■ Online chats and threaded discussions

Note You will find the same table in the *Handbook* ([go to Decision-making Checklist in Chapter 1](#) of the *Handbook*). Keeping the audience and the learning outcomes for your course in mind, check off e-Learning activities that you think could support learning.

Summary

The field of learning theory is very rich. A number of theories or models on how we learn are available both online and in traditional sources. These sites were found at [Merlot.org](#).

Note Compare and contrast at least two of these *Learning Style Theories*. An "advance organizer" is available in the *Handbook* ([go to Learning Style Theories in Chapter 1](#) of the *Handbook*).

Student Learning Styles - based on MBTI

Discussion of styles and suggestions for design. <http://www.gsu.edu/%7Edschjb/wwwmbti.html>

Learning Styles and Multiple Intelligences

This is a reference site on learning styles and multiple intelligences with learning style inventories and tips and tricks for the learner. <http://www.ldpride.net/learningstyles.MI.htm>

Cognitive Styles and Distance Education

A paper on the application of cognitive style constructs to the design of online materials.
<http://www.westga.edu/~distance/liu23.html>

Learning Styles: Or, how we go from the unknown to the known.

This site provides an overview of 4 major models.
<http://www.nwlink.com/~donclark/hrd/learning/styles.html>

Explore one of these models or inventories. *What are your learning style preferences?*

Internet Teaching by Style: Profiling the Online Professor

http://ifets.ieee.org/periodical/vol_2_2000/pearce.html

This paper describes the results of a pilot study that examined the personality type and teaching

style preferences of faculty who elected to teach an on-line course. The article presents a description of personality assessments, including the Myers-Briggs Type Indicator (MBTI) and Anthony Gregorc's Transaction Ability Inventory used to determine teaching tendencies and styles.

Team LiB

◀ PREVIOUS | **NEXT ▶**

Learning Activities

As you think about your own course you can begin to plan the kinds of learning activities that will lead to the learning outcomes you have identified.

In other words, what will your learners do in order to be able to demonstrate their learning to you?

For example, what and how, do you have to teach so that your learners can conjugate a Spanish verb? What type of outcome would this reflect?

Return to the learning outcomes you listed for your course.

- How do you teach these in a face-to-face class?
- Do any of these activities translate to an online environment?
- Is there an activity that *must* be accomplished in real time and space?

Return to [Table 1.1](#). In the left hand column identify all the learning activities you use in your F2F course. Does the column on the right contain an online activity that will accomplish the same goals?

constructivism

The constructivist approach suggests that we all learn through problem-solving in a realistic or authentic context. This approach asks students to put their knowledge to work *within the context of solving real, meaningful problems*. These problems need to be:

[Jonassen, 1999a,b](#)

[Reeves & Reeves, 1996](#)

[CTGV, 1993](#)

- *Relevant and interesting*, so that learners will invest time and energy
- *Realistically complex*, mirroring the real world (the messy swamp). Complexity encourages students to share diverse experiences
- *Require students to use their knowledge* to explain and to make and test predictions

The teacher's role is to:

- Provide opportunities for learning in context
- Create group learning activities so that learning can occur through social dialogue with peers, experts and coaches
- Model and guide knowledge construction within the discipline

Learning Activities Supported by the Web

Note Morten Flate Paulsen, NKI Distance Education, Oslo, Norway, has developed a model of learning activities supported by methods of online communication. The model reflects the level and scope of participation and who is communicating with whom. A summary of Paulsen's work is in the *Handbook* ([go to Morten Flate Paulsen's Online Teaching Methods and Techniques in Chapter 1](#) of the Handbook). Compare this table to Horton's comparison of F2F and online activities in [Table 1.1](#).

What context will you need to plan for? How can these ideas help you?

Implications for e-Learning

For more ideas of e-Learning activities and assessment strategies visit these sites. Remember to

keep a list of ideas that you could use in your own course design.

ELearning Guru

<http://www.e-learningguru.com/index.htm>

Learnativity.com

<http://www.learnativity.com/>

Summary

Collaborative learning experiences can foster development in all learning domains. The Web supports collaborative learning activities enabling communication among learners at a distance and/or on-campus.

The Web also supports individual activities such as information retrieval, original research, peer-to-peer and/or expert/novice coaching and mentoring, and writing and presenting.

Team LiB

◀ PREVIOUS ▶ NEXT ▶

Learning Assessment

This section contains useful information about online assessment. There are many effective assessment strategies for Web-based environments that support both synchronous and asynchronous activities. You may even find some new ideas here for assessing F2F learning.

Assessing Outcomes

Note The best learning assessments reflect a match between the learning activity and its demonstration in a real context. This is called [authentic assessment](#). *Strategies Related to Learning Domains* in the *Handbook* lists implications for assessment in each of the learning domains ([go to Strategies Related to Learning Domains in Chapter 1](#) of the *Handbook*).

Cognitive Assessment

To assess cognitive objectives ask learners to state, describe, or list information, or select from a list or array of options. Appropriate online assessments could include:

- Multiple choice test questions
- A listing task
- Choosing among options (similar to multiple choice test)
- Completing a question
- Completing a checklist
- Matching questions (drag and drop)

Assessing intellectual skills is similar at the concept-learning level. Listed items can be visual or aural:

- Completing an answer
- Simulations
- Problem-solving can be assessed by
 - Completion items
 - Case studies
 - Problem-based learning

Assessing Psychomotor Skills

Psychomotor skills can be difficult to assess online. However, examples of assessment methods/tools include:

- Actual or mental checklists
- Evaluation of finished products
- Judging activities

Examples:

- Checking off steps observed as a student prepares a chemistry experiment by Webcam
- Judging mastery of a graphics program by the quality of the finished graphic imported into a text document

Assessing Affective Outcomes

To assess attitudes, you must first determine whether students have the attitudes and then whether they choose to display them. To assess an attitude, provide the student with a situation in which that attitude or behavior would be appropriately displayed. Or, assess the learner's attitude using a cognitive focus; for example, can the student describe what conflict resolution is and how it contributes to group productivity?

In each example given in this section actual learning can be assessed because the learner performs the new learning in the form that it will be used in a real (work) context. For example, how can you assess whether an education student can manage a classroom of Grade 5 students?

Which of the following is the more *authentic* form of assessment?

authentic assessment in 3 domains

- Writing an essay on classroom management models
- Demonstrating effective classroom management skills in the classroom

In this example, can you think of an online learning activity/assessment related to classroom management?

Imagine that you teach in the political science department at your college. You want your students to:

1. Develop critical thinking skills
2. Perform original research on a current global issue

You teach this course face-to-face. How would you develop a learning activity to achieve these outcomes? Suppose you set a problem for your learners to resolve in small groups. They then have to demonstrate their solution to the rest of the class. The activity requires original library research, interviews with individuals on both sides of the issue, and finally public debates. *How would you adapt this activity to an e-Learning environment?*

Online Assessment

adapting F2F assessment

Online assessment can take many forms. Many of the assessment forms translate fairly easily from paper-based or F2F assessments to online contexts. For example, a role-play, performed in class after online research, is one way to learn about historical figures. This same activity can be designed for an online course. However, the online activity may need to be assessed through transcripts from an asynchronous discussion forum instead of through a dramatic visual presentation.

Take a moment now and think about the learning activities you find to be effective in your course. *Can you create similar kinds of e-Learning activities that will still result in the desired learning?*

Summary

The assessment of learning, or learning outcomes, can flow naturally from the learning activities that teach these concepts. This is as true of F2F classrooms as of online environments.

Note Evaluation methods involve a range of learning assessments. These methods are outlined in the Handbook ([go to Evaluation Methods in Chapter 1](#) of the Handbook). For each assessment method extend the table to include its online adaptation.

- Do you need to adapt the information in any of the other columns?
- Can you complete the empty columns?
- Can you add additional methods of assessment?

Resource Factors

For a long time, we expected online learning to help us do more with less — less infrastructure, less traveling, less people, less confidence. Then we realized that e-Learning helps us to do more with more — more support infrastructure, more time commitments, more tools and, sometimes, more frustration.

e-Learning can help us provide the kinds of learning experiences to new communities of learners that we might not have been able to with traditional constraints. But it comes at a price. In this section, you consider several inter-related resource factors to help you answer the question: Is it worth it?

Course development is not cheap. Is going online with a course justified by the value added to the learner or the institution? Think about ways in which to assess value. This question should be asked for each potential investment in e-Learning.

After reading the case below look at the time, people and resources needed for instructional development, production, and evaluation of the course. *Can the value of this course redesign justify the associated costs?*

A Case Study Writing for New Media (WNM)

WNM was a 12-hour course, taught face-to-face over four evenings to about 12 adult learners. The audience included professional writers, people in the creative arts, administrative staff in charge of creating a departmental web site, teachers, programmers, and the plain curious.

I developed original content and designed the classes to be as interactive as possible. On certain evenings, we sat in a circle and talked about our experiences and our curiosities. At other times we met in a computer laboratory. We also combined these two environments. Primarily, though, this was a face-to-face course.

Because we were constrained by time, space, and energy, we didn't have much opportunity to 'write,' or to share each other's work for peer feedback. It was also difficult to provide individual coaching.

In the second course cycle, I created a class forum so that we could all share our experiences, issues, and the "new writing" that was emerging. With the addition of an asynchronous conference, the course design was more blended.

The department decided to re-design the course to be delivered completely online. For the third cycle of *Writing for New Media*, I developed new content and designed the course and all its accompanying resources. I also agreed to teach the course online. The course was offered over 13 weeks, instead of four.

In its new format, the class met twice, once at the beginning of the course and once in the middle. For the rest of the instructional time, learners explored new media writing in the context of their own individual projects. The Web-based modules were supported through an ongoing, asynchronous conference and a print-based course pack. The learners worked at their own pace exploring only those topics that they needed in order to develop a writing product.

In the fourth course cycle we added four synchronous conferences or a live chat. The final course design included two face-to-face meetings, four live chats, and a writing project supported by 10 online modules of content and a workbook. This latest version was a fully blended approach.

Even though I had developed much of the content during the first two years that I had taught this course face-to-face, I estimated that an additional 281 hours of time were needed to adapt it to the Web for the first version.

Learning hours estimate: if a course has definite (but some branched) paths, course-hours are based on the learner who would visit every page and complete every activity ([Korolenko, 1997](#)).

We tracked the number of teaching, or contact hours this online version of the course required. Because the course was designed to be asynchronous and flexible, the *contact* hours increased from

12 hours to over 60 hours.

At the same time, the course attracted learners who:

- Were not able to drive in to the city four weeks in a row
- Were able to develop their own online writing portfolio over a longer period of time
- Lived in other countries such as Thailand
- Could develop their own learning plans by choosing from among 10 different modules to resolve a writing problem

Finally, future participants can be assured of a consistent quality of content. Content that has been refined over several course iterations now resides as "permanent" online modules or learning objects, which can also be aggregated with content from other courses and modules.

Table 1.2: Case Study: Writing for New Media

Developing a WebCT Course: Writing for New Media				
Stage	Details	Comments	Time	Total Time
Content Development	Reviewed former F2F versions for ideas and content.	Compared to F2F versions and reorganized those materials into folder for new "Online" version. Started new workbook.	4 hours	95 hours
	Research	Purchased and read new references. Internet search for concepts	14 hours	
	Identify course concepts	Made Master List of all possible concepts to be covered, related examples	4 hours	
	Outline/syllabus 1	Refined ML for 12-hour course	2 hours	
	Outline/syllabus 2	For Fall F2F into online. Outline 1, too teacher-centered.	2 hours	
	Detailed module plans with resources	Web sites, CDs, references, PowerPoint slides, tables, etc.	10 hours	
	Revised workbook for Fall F2F/online			
	New PBL workbook design	Content development (Print) continued for online version	27 hours	
	Copyrighted materials identified	CanCopy, photocopying, integrating into WB	7 hours	
	Exemplars identified	New media exemplars evaluated and selected	10 hours	

	Glossary	Keywords identified in text of modules	4 hours	
		Version 1 of Glossary completed and "revealed"	9 hours	
	E-texts/elements	Selected images, icons, etc., from clip-art, WebCT collection, packages...	2 hours	
	Solicit e-experts for activities, add to calendar		2 hours	
Instructional Design	1 st idea: Learning Centres Approach (a la Vancouver Science Centre). One centre per major topic	Learner starts with a problem or mystery, each center visited fills in another piece of the puzzle. Learner keeps track of clues on master sheet and can make predictions at any time, with supporting evidence.	4 hours	88 hours
	2 nd design idea: 4 modules with 6 steps based on Gagne-Hunter.	Refreshed memory of early design. Sketched out some possible activities. Decided that first design would require more than 12 hours of work from course participants.	2 hours	
	Developed learning outcomes for fall F2F course and new online version	Used Bloom's taxonomy to work through levels of critical thinking in each module. Reviewed 2 ID theory references.	2 hours	
	Matched outcomes, strategies, activities, resources	Added a concept breakdown. Developed syllabus document, module overview chart, content outlines, and started a reading list.	3 hours	
	Project-based design chosen for online version	Chose portfolio construction as project. Reviewed learning outcomes (from above) and matched PBL strategies to model.	3 hours	
	Module design	10 modules, intro page + 3 activities, last one to be synthesis. 3-column table used as consistent standard.	50 hours (content and ID are integrated here)	

	WebCT site design	Homepage, information page, tool choice, Button bars, calendar etc.	6 hours	
	Designed forums	14 forums - 1 per module, social, course feedback, and intro. Inserted introductory message in each forum.	5 hours	
	Workbook design	Research/project plan and supported activities	4 hours	
	Course settings and student management decisions	Settings (e.g., access) and student lists and access	3 hours	
	Published workbook	Format, page numbers, T of C, catalogues and additional materials, integrated Web with online course (page numbers, etc.)	6 hours	
Production	WebCT chosen as platform	Learned beginning WebCT through online tutorials	10 hours	98 hours
	Refreshed knowledge of HTML	Maricopa tutorials	8 hours	
	Learned Netscape's Composer	Decided on Composer as development tool as we recommend it to faculty. Tried various formats/designs using module 1.	2 hours	
	Determined standards document	Visual design, columns, sidebars, screen areas, language use and tone, readability, heading format, etc.	4 hours	
	Organized working materials - folders. Binders, etc.		1 hour	
	Composed content pages	Page layout, style, etc.	50 hours	
	Insert graphics and icons	Clip art online and in packages, reformat for jpeg and insert in Composer pages	10 hours	
	Final check	Links, graphics, text, navigation	11 hours	
	Formatted all module pages	Composer, HTML source code, fixed graphics, clean-up using DreamWeaver	12 hours	

Evaluation	Course feedback forums	Gather and analyze data		
	Develop online survey	Ditto		
	Usability	Target learners to complete selected activities		
	Interviews	Telephone interviews		
	Report with recommendations			
Revision	Version 2	Download all Web pages into DreamWeaver	3 hours	
		Research new thinking in writing for NM	6 hours	
		Find new Web sites	3 hours	
		Check broken links	3 hours	
		Design new activities (x)	25 hours	
		Align workbook with new activities	20 hours	
		Reformat web pages for uploading	15 hours	
		Glossary revisions	3 hours	
		References tool added	6 hours	
		Added References page with links	8 hours	

Total for course development Version 1: 281 hours

If contact hours = 56 hours online + orientation (1.5 hours) + synchronous activities (3 hours) = 60.5
 Development time is equivalent to: 1 hour contact time = 4.6 hours development time

This estimate doesn't include small revisions during length of pilot. Note also that I've included personal time learning or relearning platforms and development tools, which would be amortized over time if several courses followed this design format. The ID literature suggests that design takes about 40–60% of the cycle. In this case, the first 3 stages have each accounted for about 30% of the development time. However, in my case content development and design are closely integrated.

Bates and others suggest that a distributed course costs between \$20–40k to develop. Smith puts that figure much higher. Course development and delivery costs will increase respectively as course design includes increasing interactivity and multimedia elements (which are more expensive to produce).

Development costs for WNM @ \$100/hour = \$28,100

Note A second case of a course redevelopment in psychology is presented in the *Handbook* ([go to A Case Study: Introduction to Psychology in Chapter 1](#) of the *Handbook*). Read the case and decide whether the costs associated with the project justify the value added to the instructor, learners, faculty, and institution.

Estimating Development Costs

To estimate the costs associated with developing an online course, consider three factors:

1. People

2. Hard costs
3. Timelines

People

Models of development of learning resources range from the individual faculty member or instructor, who may have the help of a trusty graduate student, to a course development team that provides instructional design, development, production, implementation, evaluation, and technical support.

Many institutions in North America partially support units that support course development to some degree. However, these units are never able to fully support all faculty that are interested in creating e-Learning environments. Relatively recent developments such as Learning Management Systems have helped institutions and organizations leverage their resources.

In the past five years a number of integrated Web tool sets have become available to support the development of online content. These suites, or Learning (Content) Management Systems (LCMS), contain tools for:

- Content management
- Learning assessment
- Communication
- Student management

Does your institution or organization support one of these systems?

Although these systems make the assembling and publishing of learning content easier, the instructor remains responsible for developing the content.

Some instructors are interested in the Web development tools themselves, tools like *PhotoShop™* or *Flash™*. But, most are experts in a discipline and not interested in learning a set of technical or production tools. They are the writers. They will provide the content to a Web support team that may include:

- An instructional designer
- A graphics designer
- A Web developer
- An editor
- A video technician
- A graduate student assistant
- Other specialists.

This team may also include a usability expert or an evaluation expert.

Although most institutions will have an infrastructure in place to support instructors, they range from consultation through full-scale production. Even if these individuals are already employed by the organization, the cost of their services should be included as soft costs. First, estimate how much your time is worth by the hour (or day). Include content development time, writing time, and time to learn about the tools, systems, and most importantly, the new pedagogy involved.

Hard Costs

In this category, include resources you must acquire or purchase.

For example, your institution or department may have to purchase a site license for *DreamWeaver™*. If you need a series of animated sequences, for example, to demonstrate the operation of a mechanical system, you will need to either create original animations with a tool like *Flash™* or obtain permission to

use learning objects from a repository.

Include any texts or manuals you must buy, photocopying and distribution charges, toll charges, and so on.

Timelines

Development time for web-based instruction is from 1–8 times more than for F2F courses, depending on the amount of new content to be developed or adapted, and the complexity of the course design.

For example, if you have taught the course F2F twice a year for five years, you will likely have redeveloped the content several times.

Suppose you are going to continue to meet with your class several times a week, but have decided to make some content and learning activities available online.

You might have extensive lecture notes, a finely-tuned syllabus, a databank of assessment items to upload into a system, a collection of slides, etc. The course redevelopment time for an online delivery might then depend on the time it takes to digitize photographs, mark up your text into HTML, and set up an asynchronous discussion group.

On the other hand, if you are going to re-purpose your content to be delivered entirely on-line, you might need to develop new content in new forms, create new learning activities and assessment tools, and learn how to effectively facilitate an asynchronous, threaded discussion, or use a new synchronous, Web-conferencing tool such as *Centra™* or *Placeware™*. In this case, you must anticipate the time it takes to find and adapt new materials and learn new approaches. Your timelines should reflect this.

Although there are many models for estimating course development times or time for conversion, here are some rough estimates from *Rapid Instructional Design*. The hours reflect each hour of development time for one hour of instruction.

Piskurich, 2000, p. 103

- Lecture 2–3 hours
- Activity-based classroom 5–10 hours
- Print-based self-instructional 15–30 hours
- Low-level computer based 25–50 hours
- Multimedia based 40–150 hours
- Satellite based 50–100 hours
- Web based (synchronous) 25–40 hours
- Web based (asynchronous) 45–100 hours

To determine the amount of time you and your support team will need to develop the e-Learning environment, start by drawing a timeline with the date that the course will start at one end and work backwards.

Next, list all the milestones to be accomplished before the course development is complete. They could include:

- Complete a survey of the latest developments in your discipline
- Learn how to use Blackboard™
- Take a two-day workshop on facilitating an asynchronous conference
- Survey a group of students who took your course last semester for their feedback on content, learning approach, etc.

- Plan a window for usability testing mid-way through the development
- Identify two dozen web sites to which you will provide links
- Provide the new text to your graduate student to markup in HTML and upload into the LCMS
- Digitize your slide set that supports the biology labs in the course
- Identify or create new learning objects
- Develop a new, print-based lab manual
- Schedule your face-to-face lectures

Try to think the tasks that need to get done and who will complete them. Plot them along a timeline.

Summary

This section on costing e-Learning development is meant to give you a sense of the resource commitment involved in going online, in whole or in part.

A number of sophisticated cost-benefit analyses are being developed as institutions and organizations explore the e-Learning world. These models include factors not discussed here, such as the costs of learner support, the resources needed to complete planned revisions, the number of learners required in order to amortize course costs, the resources required to market the course, and so on.

See, for example, Tony Bates' (1995, 2000) business model for course development.

Keep in mind that a cost-benefit analysis may not refer to the non-quantifiable advantages of developing an e-Learning environment. These advantages could include reaching new students, developing new research relationships, and enjoying a new learning experience.

Note More advantages related to improved learning outcomes are briefly discussed. Using the *Value-added Checklist* provided in the *Handbook*, take some time now to apply this rather simplistic model to your own development project ([go to A Value-added Checklist: Key Features of Good e-Learning Environments](#) in Chapter 1 of the *Handbook*).

Should I Choose the Web?

In this chapter, you have thought about your learners, the learning goals and related activities, ways to assess learning, and resources you will need to design a Web-based course.

Reflect on your reasons for going online and ask:

Will enhancing my course by using the Web add value to the learning experience?

If you cannot answer this question affirmatively, you might want to reconsider your decision.

An evening spent browsing the Web reveals a broad spectrum of site designs. You will see sites for:

- Shopping
- Playing
- Communicating
- Publishing
- Learning

Each site is designed to meet specific goals. The designer has a reason for trying to reach a particular audience via the Internet. The following case study provides an example of a site designed to meet specific goals and reach a particular audience.

A Case Study Government Goes Online

Goals and outcomes

A government department decides that publishing its documents on the Web is a less costly format than print and will reach more people. They available.

Activities

The department intends to increase access to information through an online consultant. Users will be able to request help or ask a specific question online and will receive a response by e-mail within 24 hours.

Other ideas include a public forum space and special interest discussions.

Audience

The department feels that they will achieve a wider distribution of public resources online. They will also be able to add more visual interest and audio information for the visually impaired. They can embed hyperlinks in each document to encourage readers to explore an issue more deeply.

Readers have access to an online discussion. They can also e-mail their political representatives directly from the site.

Resources

A team consisting of a writer, a graphics designer, and a Web expert will design a document template to be used for all subsequent online government reports. The initial project will take about six weeks, but will not have to be repeated for each new document.

The government department has identified:

Goals or outcomes

The audience

The activities

The resources

Now they will decide whether to take that final step. Why go to the Web? What is the advantage?

You can ask yourself the same questions. What will you accomplish by going online with your course or part of your course? If you can't answer this question, it might be better to expend your limited resources on other instructional planning activities.

Note [The next section](#) proposes five good reasons to consider an online presence. As you read, use the space provided in your *Handbook* to take notes ([go to Concept Guide in Chapter 1](#) of the *Handbook*).

Can you check-off one or more reasons from this list?

Five Reasons to Build a Web Course

Multiple Perspectives - Access to a wide range of perspectives, information, current, and authentic representations is desired

Semantic Linking - The opportunity to make personal sense of information through organization and categorization (semantic linking) is key

Diverse Learning Needs - A wide range of learning style preferences, perceptual modalities and options should be supported

Communication - Communication and reflection with others when a removal of time or place is necessary

Global Access - Global access to a learning environment is encouraged

Three e-Learning Formats

In the Introduction, you were introduced to three delivery models for online learning: asynchronous, synchronous, and the blended approach. In post-secondary institutions, most of the Web development results in a course based on the blended approach.

These scenarios present different combinations of media and methods that are unified by a careful choice of the media that support the design and delivery of instruction.

As you read these, identify the scenario that might be a good match for your own course.

Learning Scenario 1: Supporting Classroom Instruction

Typically, this model includes a high proportion of on-campus, F2F instruction. A course Web site contains content, examples, and assessment activities. The course design may also include an asynchronous class discussion through an e-mail list.

Learning Scenario 2: The Virtual Course

Often offered asynchronously at a distance to learners at different locations in the area, the country, or the world. Recently, asynchronous courses support learners who are local, but who need flexible options, for example, a working parent. Course delivery may be based on asynchronous or synchronous tools, or a blend of the two. Note that synchronous tools are more complex to implement when the learners are in different time zones.

Learning Scenario 3: A Blended Approach

In this model, asynchronous and synchronous technologies are combined to support the learning outcomes and audiences. This model may include both online and "off-line" technologies. For example, an "off-line" tool is the telephone.

Throughout [Chapter 1](#), I have referred to different instructional delivery models: supporting classroom

instruction, a virtual course, or the blended approach. The model that is best for your context depends on the answer to these, and other questions:

- Instructor-led or student-led?
- Synchronous or asynchronous?
- When to use each format?
- How many learners are there?
- Where are they?
- To group or not to group?
- Where will they do the online portion?
- If the course needs both formats, how many times should we meet f2f?
- How much support is available for me, and for the learners?

Note You have been recording your questions and answers throughout this first module. Add the new questions that you need answers for in the *Handbook*.

Summary

In this chapter, you have considered five factors in making a decision to design an e-Learning experience for your learners. The five factors are:

1. Outcomes
2. Audience
3. Activities
4. Assessment
5. Resources

Earlier you asked yourself the question:

Will e-Learning activities add value to my course?

Note The *Handbook* contains a *Value-added Checklist* that presents this information in another way ([go to A Value-added Checklist in Chapter 1](#) of the *Handbook*). You should be able to check off at least eight items on this list in order to commit the necessary time, effort, and resources into developing an e-Learning environment for your course.

Tip Make many copies of this checklist to help you evaluate other e-Learning environments.

Practice

Analyze one of the following Web sites using the decision-making tools from this chapter. Is the site an example of a value-added learning experience? What suggestions do you have for its creator?

Module 1 - Hardware Basics - Sample Module

http://training.skillspride.com/samples/apluspcchs1_sample.pdf

Training courses

<http://www.canadiantraining.com/>

Choose - Enter, then Products, then any of the 'course/trainee' demos.

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For more information on Instructional Design for Online Course Development:

Illinois Online Network. Retrieved on August 15, 2003 from the World Wide Web:
<http://illinois.online.uillinois.edu/>

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Bruce, C. S. (1997). Seven faces of information literacy in higher education. Retrieved on August 15, 2003 from the World Wide Web: <http://sky.fit.qut.edu.au/~bruce/inflit/faces/faces1.htm>

Kathy Schrock's guide for educators - Critical education surveys and resources. Retrieved on August 15, 2003 from the World Wide Web: <http://school.discovery.com/schrockguide/eval.html>

For more information on virtual architecture:

Virtual architecture's web home. Retrieved on August 15, 2003 from the World Wide Web:
<http://virtual-architecture.wm.edu/>

Recommended Activities

Academic librarians have developed some excellent materials to encourage critical information literacy skills. Use of one of the checklists from one of these sites to help you identify other factors to use in your decision-making process.

Thinking Critically about World Wide Web Resources by Esther Grassian, UCLA College Library.

Created by Esther Grassian, UCLA College Library

<http://www.library.ucla.edu/libraries/college/help/critical/index.htm>

Criteria for Web Site Evaluation; Points to consider when performing a site critique

<http://webdesign.about.com/library/weekly/aa071801a.htm>

Chapter 2: User-Centered Design (Part 1 - Cultural Diversity)

Overview

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In the Introduction you encountered the idea of learner profiles. You had the opportunity to assess the skills and background of your audience and to relate these ideas to planning learning outcomes. You looked at learning styles and diverse learning needs.

In this chapter, you will explore more information about your target audience and ways to analyze their needs. Knowing your audience will give you confidence that your e-Texts and the design for your course will meet their learning needs. This process is called user-centered design.

This chapter is the first of two chapters that present ideas and guidelines for writing for a wide range of users. In this chapter you are introduced to the user-centered design framework. We look at e-Writing related to cultural issues such as age, ethnicity, language, and cognitive development. In [Chapter 3](#), we broaden user-centered design guidelines to include the better-known issue of accessibility. As you read the chapter, record your questions about user-centered design in the *Handbook*.

Team LiB

◀ PREVIOUS ▶ NEXT ▶

Key Ideas

Note By the end of the chapter, you should be thinking about the diverse cultures represented by your audience. You should also be able to evaluate your current content, and the content of other available e-Texts for accessibility and appropriateness ([go to Questions and Goals in Chapter 2](#) of the *Handbook*).

Team LiB

◀ PREVIOUS ▶ NEXT ▶

Key Terms

Note This chapter introduces a number of terms and phrases that you may not be familiar with. These terms are listed in the accompanying Handbook with enough space to define them in your own words or note examples, references, and resources ([go to Key Terms in Chapter 2](#) of the Handbook).

- Learning outcome
- Knowledge construction
- Cognitive
- Affective
- Psychomotor
- Active learning
- Authentic assessment
- Collaborative learning
- Learning style
- Constructivism

Plan Your Progress

Note A concept guide for the ideas presented in this chapter is provided in the Handbook ([go to Concept Guide in Chapter 2](#) of the *Handbook*). You can use this outline to help guide your exploration.

Note Record your own information or learning needs in the *Handbook* ([go to Questions and Goals in Chapter 2](#) of the *Handbook*). If you have questions about UCD, record them here.

There is additional space for you to write the questions for which you need answers. At the end of the chapter, check your list of questions to determine whether you need additional information. Use the chart to organize an action plan.

Note A "[To do list](#)" has also been provided for you in the *Handbook* for you to record what needs to be done, who needs to do the task, and when the task should be completed by ([go to To Do List in Chapter 2](#) of the *Handbook*).

What is User-Centered Design?

Before beginning this section, think of a definition of user-centered design. *What could it mean in the context of your own learning audience?*

Learning Style Inventories

When you explored several learning style inventories in the Introduction, you began to think about your own learning needs and preferences. *What kinds of Internet sites support your learning style?*

As writers/designers, we have to overcome a very human tendency to design for ourselves. Try this experiment.

Note Pick one of your favorite Web sites. It can be instructional, entertainment related, marketing - any kind of Web site. In the *Handbook* ([go to Design Features in Chapter 2](#) of the *Handbook*), write down three design features that you really like or find powerful.

Now show this Web site to three other people. Are their reactions the same? Do the same three elements match their own learning style preferences?

This is the challenge for you as an effective instructional writer. How can you write to meet as many of the diverse needs of your audience as possible?

Participatory Design

Michael Muller asks, "How do you get past your own biases when you design a course site?" He claims that participatory design is the answer.

Schuler & Namioka, 1993

In the participatory design process, you involve an end-user in the design and writing process for your Web course. For example, if you are designing a supporting Web site for a third-year law course, you might hire two students who have just completed the course or who are going to be students in the course in the next term as your writing partners. Who better to represent the expectations and needs of their peers?

Design Co-owner

Through participatory design, users move out of roles such as observer or approver and into the roles of:

- Peer co-designer
- Design co-owner
- Expertise contributor
- Self-advocate

participatory roles

Involving a student as a co-designer moves him/her from 'other person as problem' into 'other person as partner.'

Fleming, 1998

A Case Study Participatory Design in Law

Dr. Rod Wood is a professor of law. When he first started thinking about redesigning Law 614, he was concerned about the expectations of third-year law students, who were used to lecture-based courses

with a "100% final." In other words, most courses in the Law Faculty were assessed by final exam and did not include mid-term assignments such as papers or presentations.

Dr. Wood wanted to replace didactic lectures with more inquiry-based activities, some of which would be based on collaborative projects. A threaded discussion forum was planned to support a case-based approach.

In addition, he wanted to make source materials and resources available in a hypertext format. All text materials had to be re-purposed and a course site needed to be developed using WebCT™.

Dr. Wood wanted to base the course design on the needs and expectations of his users, while coaching his students into a new learning model. He felt that a good way to do this was to hire two summer research assistants to represent, or advocate for, their peers' views. These two students became participatory designers who encouraged user-centered design decisions, developers who repurposed course texts under Dr. Woods' supervision, and advocates for the course design when it was introduced to the first pilot group of law students. In return, they acted as coaches during the term the course was implemented and brought peer concerns back to the instructor. They also participated in developing the evaluation strategy and in revising the course for the second term.

When you are designing online learning for an audience, you need to know:

- Who they are
- Where they are
- How they like to learn
- The kinds of learning experiences they have had
- audience characteristics**
 - How their day is organized
 - How learning activities will fit into the schedule
 - What access they have to technology
 - What kind of technical assistance is available to them

Needs Assessment

Can you think of other questions you would like to ask a potential learner or reader? You might be able to design a survey or questionnaire for potential 'clients' before designing the course.

Writer as Researcher

Stansberry suggests a planning approach based on the reporter's model: *who, what, when, where, how, and why?* In this model, the effective e-Writer is, first of all, a researcher.

Note Using the work of Stansberry and others suggested here, develop a survey or questionnaire for your audience before you start to write or design. Some questions are suggested in *Needs Assessment: Sample Survey* in the *Handbook*([go to](#)*Needs Assessment: Sample Survey*[in](#)[Chapter 2](#) of the *Handbook*).

User Experience and Expectations

Imagine that you are a young male user, 23 years old, who has had a computer at home for ten years. You have played video games for all of that time. When you were in high school you had access to a center in your classroom with four networked computers. You conducted Internet-based research for class assignments as often, and as naturally, as you went to the school's extensive library holdings of texts, encyclopedias, and artifacts.

- What kinds of online experiences are you likely to have had?
- How do you expect to interact with a Web site?
- How patient are you with a long download?
- What is your comfort level with multiple pages of scrolling text?

Now, step back into your instructional shoes.

- What kinds of elements could you use on your site to keep this user motivated and interested?
- How detailed and complex should directions for navigating be?

What if you were developing the same content, but for an audience of lawyers whose average age is 43 and whose only contact with a computer is for office billing? Considering these questions is an important component in user-centered design.

Genres

You must find out as much as possible about your readers to be able to make decisions about content formats, use of media, organization of information on a screen, and so on.

Most media can be classified by type or style. For example, a movie may be a romantic comedy, an action film or a mystery. Literary genres include drama and poetry.

Can you think of **musical** genres?

1 genre, multiple formats You will also need to think carefully about your web genre. A genre attracts readers with particular expectations for their experience with your site or course. A genre is not the same as a medium or format. For example, a mystery story can be enjoyed as a film, a novel, a play, or an interactive Web site.

Compare [Figure 2.1 Adventures in Problem-Solving](#) with [Figure 2.2 Adbusters CultureJammers Headquarters](#). What is the purpose of the site? To entertain? To inform? To sell a product? For political advocacy? What kind of user or reader or learner would be attracted to this kind of site? Is the site designed to support this reader or to meet the user's expectations about what should be contained in this type of Web site?



Figure 2.1: Adventures in Problem-Solving



Figure 2.2: Adbusters Culture Jammers Headquarters Courtesy AdBusters @ <http://www.adbusters.org/home/>

Form and Function

In user-centered design, you must consider your reader *and* the most appropriate way to shape your message. In other words, in user-centered design *form follows function*.

Usability

User Testing

Usability is a field based in human-computer interface or interaction (HCI) research. User testing, or usability testing, is an excellent way to test your decisions before you actually "go to press."

Problems of Use

Usability testing helps you discover:

- Typos and grammatical errors
- Inappropriate readability levels
- Biased examples
- Confusing visual design
- Poor navigation design
- Unworkable architecture
- Inconsistent interface decisions
- Unclear explanations
- Technical problems
- Unrealistic expectations (yours) about download times and many other "[problems of use](#)"

Additional resources:

[Nielsen & Mack, 1994](#)

[Peppers & Rogers, 1997](#)

Usability testing emerges from the concern that web sites and courses be designed to meet the target

audience's needs and expectations about:

- What should be in the site
- How the site should be presented
- How the users interact with the content

You are really testing that your application of user-centered guidelines works in a real context. You will receive much more information about how to use usability testing to improve your course site in [Chapter 9](#).

Writing for Inclusivity

Because your audience can be so diverse, even in one class, you need to design for needs beyond learning style. Other considerations include:

- Mobility
- Age
- Health
- Perceptual challenges
- [Culture](#)
- Language
- Access to technology
- Gender
- Previous experience
- Political context

Accessibility

The term [accessibility](#) was coined in the mid-nineties to refer to Internet users with perceptual challenges or physical conditions that limited their use of the Web. Accessibility has been broadened to include the groups incompletely listed above.

Legal Implications

In many countries, accessibility has a legal definition and implications. For example, in the United States, publicly-funded web sites must satisfy accessibility guidelines set out in (Section 504 of the Rehab Act; 29 U.S.C. Section 794).

International groups, for example the World Wide Web Consortium, have published sets of accessibility guidelines and criteria against which you can test your site.

Design Tip

Download the current guidelines from Web Accessibility Initiative (WAI) and use them as a checklist for your site.

<http://www.w3.org/WAI/>

CAST Bobby

Online tools will evaluate your site for accessibility. For example, CAST's *Bobby* will evaluate your site, make recommendations for making your site compliant, and will bestow the CAST Bobby icon, or seal

of approval, on the homepage.

Standards and Specifications

Several international consortia are currently developing standards and specifications for e-Learning content developers and the learnware industry. For example, the *IMSGlobal Learning Consortium*, with international membership in its working groups, has developed a set of standards and specifications for compliance with accessibility. These standards, if adopted, will "guarantee" that learners' accessibility needs are met.

Standards and specifications work will be explored further in [Chapter 4](#).

The remainder of this chapter explores inclusive design or, if you like, accessibility, in more depth. These ideas are framed by a discussion of the culture of e-Writing.

Implications for e-Learning

Just as a doctor would not prescribe a course of treatment without first examining a patient's symptoms and diagnosing the problem, the effective e-Writer would not begin to write content without knowing the reader. User-centered design guidelines are based on understanding and designing for your audience. The better your pre-writing research, the better the chance of achieving your instructional or informational goals. You can improve these chances by:

1. Doing a needs assessment
 2. Creating a learner profile
 3. Knowing the forms of your genre
 4. Planning for diversity
 5. Testing your assumptions
-

Culture

The field and language of educational technology emerged in America very strongly after World War II. Theories and models of instructional design such as the *Instructional Systems Design* (ISD) were quite prescriptive. These models were meant to maximize instructional effectiveness, creating optimal instructional blueprints.

Thomas, Mitchell, & Joseph, 2002

These approaches are based on an understanding of the learning process that is culturally-based.

Minority cultures are often excluded from learning activities designed by the "dominant culture."

Often, minority cultures wishing to incorporate technology in their learning are not well served by instructional design approaches designed for mainstream values. As learning is a cultural activity, the design of a Web site is also infused with cultural meaning and with cultural nuances and identity issues. Instructional designers and developers bring their own viewpoints and perspectives to the design process.

McLoughlin, 1999

e-Writing is culturally-based As effective writers, we need to be aware that we are not designing culturally neutral e-Texts. We write from the culture we belong to. But our readers may not share those cultural assumptions. If, as some believe, the Internet is also an American invention, then the delivery system for Web-based instruction may also be culturally-based.

So, the content and the way the content is experienced reflect the values and practices of a particular cultural group - Americans or, more broadly, English-speaking Western cultures.

What is Culture?

social relationships The term "culture" has been used to define social relationships (a cultured person) and patterns of behavior that reflect traditional ideas and actions.

Powell defines culture as "the sum total of ways of living, including values, beliefs, aesthetic standards, linguistic expression, patterns of thinking, behavioral norms, and styles of communication, which a group of people has developed to assure its survival in a particular physical and human environment."

Powell, 1997

Cultures are not static because the people in them interact with these systems and patterns as well as with the others in the group and outside of the group. These interactions encourage a cultural evolution of new ideas.

cultural communities A cultural community can be a nation, social class, a religion, or a race; a language group, an age group, a gender group; or a professional association, a special-interests group, or a university.

What cultures do your learners represent?

globalization Learning organizations in North America tend to think of the globalization of learning opportunities, or the internationalization of content, as a matter of language translation or replacement of cultural images.

internationalization In 1997, 80% of total Web users were in Canada and the U.S. By 1999, the proportion had dropped to 55%. It's not good enough to simply deliver Western curriculum materials to students in other cultures.

It is equally problematic to design learning activities and interactions from the 'dominant culture' perspective. Other cultures have very distinct learning cultures and expectations.

intercultural dynamics	For example, an Australian university offered a blended approach to a management course. The group included three students from Hong Kong, one from Papua New Guinea and one European-Australian. After a six-week on-campus institute, the Hong Kong students returned home. Videoconferencing and the Internet were then used for the rest of the semester.
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However, the Hong Kong students struggled because they had to make a fundamental change to the way they interacted with their peers and the lecturer. It is not within their culture to question lecturers or to debate issues. So, they struggled with the new communications method.

Lundin, 1997

inhibition and disinhibition	This instructor thought that an effective learning community had been established, but the learning design, in which the students were asked to challenge the ideas of everyone, combined with the technology itself had an inhibiting effect.
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Implications for e-Learning

Consider the audience for whom you are writing or designing. Even if you are not planning to include international students in your course, about 1/4 of your class will represent different cultures - Asian, Indian, European, Middle Eastern, South American, and others.

The way you create your e-Texts, the language and images you use, and the design of the environment all reflect your cultural values.

For example, you may wish to provide as many options as possible for your audience, providing the same content in text format at various levels of difficulty, a graphic with a caption, and a small video clip. Elsewhere in this chapter, you are encouraged to write to accommodate for diverse learning styles.

good intentions gone wrong	But, using a hyperlinked environment emphasizing user choice may not be consistent with a hierarchically oriented culture or an audience that expects a linear sequence in texts. Many adults find hyperlinked environments disorienting.
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Use with caution:

- Questioning
- Debating
- Use of visual models
- Ways to disagree
- Use of humor
- Use of specific cultural references

iconography	Consider the icons you see on your desktop or in your familiar productivity tools such as word-processing or drawing applications.
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Can you identify the cultural values or expectations that [Figure 2.3](#) represents?



Figure 2.3: Wearing Many Hats

For example, Web sites that use icons such as a pointing hand to indicate direction may violate a cultural taboo in certain African cultures by using a dismembered body part.

What might an African user make of Figure 2.4?

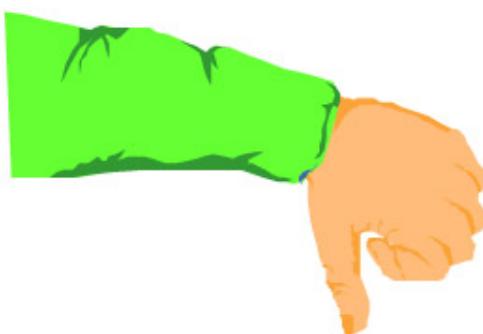


Figure 2.4: Thumbs Down

color Practically every culture uses color symbolically, probably because the sensation of color is a primitive one. We need to understand that different cultures sometimes interpret colors in different ways, based on cultural conditioning.

For example, when it comes to marketing a product, research suggests that colors do have subliminal meanings. A red car is perceived as being "faster" than a green one or one of any other color.

subliminal meanings We use color to describe our moods and signal value. When we choose colors for the Web, they often carry extra, culturally based meaning. For example, you might choose a bright red for a hand signaling "Danger, don't do something" on your site. In China, red is the color of extreme happiness. In other words, the red will not convey your intended meaning.

Remember that a disembodied hand is problematic in some cultures. And, a palm facing away from you may not mean "stop" in every culture.

Researchers don't agree whether color enhances learning, but it is wise to be careful about using color to add meaning to your e-Texts.

[Figure 2.5](#) *Color and Culturally Sensitive e-Texts* compares some color symbolism across cultures.

Look for additional resources in the References.

Color	US/Canada	France	Japan	China	Middle East
Red	Danger Stop	Aristocracy	Danger	Festivity Joy	
Yellow	Cowardice, Caution	Happiness and Prosperity	Grace and Nobility		
Green	Money Prosperity Serenity	Safe Slow Criminality	Future Youth Energy	Betrayal	Fertility and Strength
Blue	Masculinity Calm Authority		Future Youth Energy		Virtue, faith and truth
White	Purity and Virtue		Death and Mourning		
Purple	Aristocracy Mystery Passion	Death and Crucifixion Spirituality			
Black	Death and Evil				

Figure 2.5: Color and Culturally Sensitive e-Texts

DeBry has listed a number of cultural and technical differences in e-Texts and technical layouts. For example, text flows from left to right and top to bottom in North America and Western Europe, but from right to left in Hebrew. Addresses and postal codes, acronyms, measurements, currency - each culture has conventions for representing these ideas and information.

DeBry, 2001

Implications for e-Learning

We cannot assume that our cultural understandings and conventions will, or should, be conveyed internationally using North American conventions. This 1997 user survey of cultural preferences on the Web demonstrates this point.

http://www.gvu.gatech.edu/user_surveys/survey-1997-10/bulleted/culture_bullets.html

Try this exercise.

language Retrieve your e-mail correspondence for the past two weeks, including your responses. Read it again, marking every idiom, every metaphor or analogy, every reference to popular, or traditional culture, and every humorous reference.

How many shared cultural understandings and assumptions does the e-mail message contain?

Examine the following texts from two different sites. How might these texts exclude readers?

Text 1

DSV2 MEDIA, a talented Web site development company located in Calgary won the Gold Award in the Entertainment - Professional category for their work on the Kenny Bonnline Web site (www.kennybonline.com). "Wow. Fast loading Flash, crisp audio, intuitive interface, cutting edge design, this site hits the market like an axe into a log" said Tom Green when he describe the DSV2 Media's entry.

Text 2

Once the bugs are ironed out...

Face-to-face classes have a history going back to Cain and Abel being home-schooled in the suburbs of Eden.

Does your discipline have its own language, its own cultural assumptions?

Think about a novice in your discipline and who is reading your e-Texts. This reader has at least two major tasks: to interpret the meaning of the text and to begin to acculturate to the discipline through language and practice.

English is breaking into many differentiated communities

Earlier, you encountered the term "[participatory design](#)." How might you use your readers' backgrounds and experiences to help you identify the cultural assumptions reflected in the language of your e-Texts?

Even native speakers of English belong to different language communities. Kalantzis and Cope made this point at a conference in Greece:

At the same time as English is becoming a lingua mundi, a world language, and a lingua franca, a common language of global commerce, media and politics, English is also breaking into multiple and increasingly differentiated Englishes, marked by accent, national origin, subcultural style and professional or technical communities.

[Kalantzis & Cope, 1997](#)

The e-Text on the left, from the *Open and Distance Learning Quality Council* (<http://www.odlqc.org.uk/st-1.htm>) was written for a reader whose first language is English, was raised in the UK, and educated through the British post-secondary system. Compare it to the e-Text on the right, re-written for a North American audience. Note the differences in language.

UK version	American version
Where the outcome of a course is the declared competence to sit examinations offered, or be otherwise assessed, by another external organisation, the learner is informed of this and of the respective responsibilities of provider and applicant prior to enrolment.	In the case where external organizations provide the assessment, including setting examinations, the learner is informed of this and of the responsibilities of both provider and applicant prior to enrollment.
Whilst the provider takes responsibility to ensure that the course fits the currently declared curriculum of the awarding body, with other matters it should be made clear which are the responsibilities of the provider and which the applicant: who should ascertain, for example: the on-going availability of any external qualification; the nature of any prior qualifications or other entrance requirements imposed by such an external organisation; the currency of any qualification offered as outcome by an external organisation	While the provider is responsible for ensuring that the course fits the currently declared curriculum of the awarding body, it should be made clear at the outset whom is responsible for: the on-going availability of any external qualification; the nature of any prior qualifications or other entrance requirements imposed by such an external organization how current the qualification is

Although you cannot avoid every cultural nuance in your writing, you can take steps to avoid the

problems that cause the most dissonance for readers who may:

- Be second-language readers or who belong to a different English language group
- Have reading challenges
- Have limited literacy
- Read at a different level or for a different purpose than you had anticipated
- Be reading from a computer screen
- Have a visual impairment

For example, making the same content available in a different format or e-Text that is culturally sensitive provides readers with more than one way to get at the content.

Note William Horton provides some tips for avoiding cultural chauvinism. Look in the *Handbook* for the *Checklist: Evaluating Texts for Language* to help you evaluate your own writing for language and semantic issues ([go to Checklist: Evaluating Texts for Language in Chapter 2](#) of the *Handbook*).

Horton, 2000

Minority Cultures

rich cultural mix Increasingly, learning communities are composed of a rich cultural mix. However, many cultures remain in a minority position within the group. In North America, our audiences may include students that are:

- Aboriginal
- African
- Asian
- Arabic
- Hispanic
- Eastern European

These minority groups may differ in their access to and experience with technology, language, religious traditions, socioeconomic status, attitudes towards computer use and learning culture, among other factors.

In the U.S., the Commerce Department estimates that only 1% of all Web sites address cultural barriers that effect minority learners, such as limited-literacy and increased workloads.

Challenges when writing for minority learners include:

- English language fluency
- Learner discomfort with accessing external resources
- Different learning needs such as
 - Sequencing
 - Structure
 - Time required for completion of assignments
 - Interpersonal communication patterns
 - Study habits

Williamson, Goldstein & Goldstein, 2002

To improve F2F, blended, and online courses follow these guidelines:

1. Build content based on learners' background knowledge and experience
2. Relate content to multiple experiences
3. Provide handouts and advance organizers to help students follow a presentation
4. Engineer learning groups
5. Develop online study guides that are always available and that can be annotated
6. Share lecture notes, or use a variety of e-Texts to provide portions of the actual lecture (video streaming, slides, or slides with audio)
7. Synthesize content for non-English speakers; texts will help with language learning
8. Avoid a technocentric approach: focus on learners and not the technology
9. Build in opportunities for self-reflection
10. Try a participatory design model, involving minority learners
11. Use e-Texts to preserve valuable cultural heritage resources and knowledge
12. Record the language and stories of elders
13. Preserve cultural artifacts with photos and other e-Texts
14. Create learning object repositories to make resources more accessible

Note For practice in developing a critical eye for culturally inclusive e-Writing, analyze the screen in [Figure 2.6](#). There are at least four improvements you can make. Check your findings with the suggestions in the *Handbook* ([go to](#) [Figure 2.1 Ways of Knowing: Learner Profile and Implications for e-Writing](#) in [Chapter 2](#) of the *Handbook*).

The screenshot shows the homepage of WebCT at the University of Alberta. At the top, there's a banner featuring the Alberta coat of arms and the word 'ALBERTA'. Below the banner, the header reads 'WebCT at the University of Alberta' and 'Sun Microsystems Centre of Excellence for E-Learning'. The main navigation menu includes links for 'Login to myWebCT', 'Course Listing', 'Student Resources', 'Instructor Resources', 'Related Links', 'Administrative Information', 'News & Events', 'Upcoming workshops', and 'WebDAV file management'. A search bar is located in the bottom right corner. The footer contains information about the administrator, Susan Stein, from Computing and Network Services, and the WebCT Institute logo.

Figure 2.6: ©WebCT at the University of Alberta <http://www.ualberta.ca/webct>

Guidelines for Indigenous Cultures

Many culturally appropriate guidelines for the design of e-Texts for indigenous learners are similar to those for women and other world cultures. This model includes:

- Community-based values, content and ownership
- Conceptualization of the learners as creators and co-learners

- Technology as tool
- The world as a classroom; a holistic view

Allen, Resta & Christal, 2002

Summary

The effective e-Writer recognizes that a learning community may include a wide variety of individuals, with diverse needs and expectations. The notion of culture provides one way to address this diversity.

In the definition used in this book, individuals belong to many different cultures at one time. Writing for these complex interactions is not an easy task. However, there are guidelines that help you challenge your own assumptions and avoid making the more serious writing mistakes.

Team LiB

◀ PREVIOUS **NEXT ▶**

References and Resources

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Resources

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GVU WWW user surveys. Retrieved on August 15, 2003 from the World Wide Web: http://www.gvu.gatech.edu/user_surveys/

Online Internet survey, demographics, statistics and market research - NUA Internet surveys. Retrieved on August 15, 2003 from the World Wide Web: <http://www.nua.com/surveys/>

For more information on web page accessibility:

Accessible webpage design: Resources. Retrieved on August 15, 2003 from the World Wide Web: http://library.uwsp.edu/aschmetz/Accessible/pub_resources.htm

For more information on improving web site usability:

Improving web site usability and appeal. Retrieved on August 15, 2003 from the World Wide Web:
<http://msdn.microsoft.com/library/default.asp?url=/library/enus/dnsiteplan/html/improvingsiteusa.asp>

Web Accessibility Initiative (WAI). <http://www.w3.org/WAI/>

Additional Resources Available in the *Handbook*

Note Examples of Learner Profiles (**go to:***Practice: Suggestions for Improving the e-Text***in**
Chapter 2 of the *Handbook*).

Guidelines for Designing e-Texts for Adults (**in****Chapter 2** of the *Handbook*).

Designing and Evaluating Interactive Materials for Adult Learners (**in****Chapter 2** of the
Handbook).

Multiple Intelligences and e-Learning (**in****Chapter 2** of the *Handbook*).

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Recommended Activities

Work with a colleague to evaluate your course site. Plan and identify a participatory design team to help you design your course.

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Chapter 3: User-Centered Design (Part 2 - Age, Gender and Accessibility)

Overview

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In the [previous chapter](#) you looked at the challenges involved in writing for diverse audiences. You became aware that diversity is not limited to international audiences, but that just one group may contain learners with varying learning styles, native languages, and cultural backgrounds.

This chapter focuses the work on accessibility in the better-known sense. That is, accessibility issues such as levels of cognitive development, health, mobility, and perceptual factors which inform user-centered design practices. This chapter includes gender and technical access issues as well.

Key Ideas

By the end of the chapter, you should be thinking about the accessibility concerns of your audience. As in[Chapter 2](#), you should also be able to evaluate your current content and the content of other available e-Texts for accessibility and appropriateness.

Key Terms

Note This chapter introduces a number of terms and phrases that you may not be familiar with.

These terms are listed in the *Handbook* with enough space to define them in your own words or note examples, references, and resources ([go to Key Terms in Chapter 3](#) of the *Handbook*).

- Accessibility
- Ways of knowing
- Intrinsic motivation
- Extrinsic motivation
- Reflexive
- Spatial map
- Compliance

Plan Your Progress

Note A concept guide for the ideas in this chapter is provided in the *Handbook* ([go to Concept Guide in Chapter 3](#) of the *Handbook*). You can use this outline to help guide your exploration.

Note Record your own information or learning needs in the *Handbook* ([go to Questions and Goals in Chapter 3](#) of the *Handbook*). If you have questions about user-centered guidelines, record them here.

There is additional space for you to write the questions for which you need answers. At the end of the chapter, check your list of questions to determine whether you need additional information. Use the chart to organize an action plan.

Note A "[To do list](#)" has also been provided for you in the *Handbook* for you to record what needs to be done, who needs to do the task, and when the task should be completed by ([go to To Do List in Chapter 3](#) of the *Handbook*).

A Diversity Checklist

There are many cultures to consider when developing e-Texts for learners within your own "classroom walls". For the rest of the chapter you will look at user-centered design issues for only four:

- Age groups
- Groups with health or other challenges
- Technology access-defined groups
- Gender

As you explore these ideas and relate them to your own design context, think about different ways to represent your content or discipline. If you have already designed e-Learning resources, use the information in this chapter to evaluate your e-Writing or to design a "diversity checklist" to guide your future activities.

Age and User-Centered Design

There are many theories, models and questions related to learning characteristics at various life stages. Questions include:

- How do we define adult learners?
- Are post-secondary undergraduate learners in the 18–25 age range adults?
- Do adults learn in different ways from children or young adults?
- Are there stages of adult learning?

While there is considerable discussion and debate around these questions two venerable theories presented here should start you thinking about the nature of learning at different ages.

Stages of Reasoning in Undergraduates Ways of Knowing

Magolda, 1992

Marcia Baxter Magolda undertook a five-year longitudinal study of over 100 undergraduates. Starting from the premise that students interpret or make meaning of their educational experiences as a result of their assumptions about the nature, limits and certainty about knowledge, she describes patterns of reasoning that are fluid and dynamic. Patterns may change over time as ways of knowing evolve. The patterns may evolve as a result of experiences, cognitive development, a shift in values, and other factors.

ways of knowing are socially constructed

Baxter Magolda names four distinct patterns, or ways of knowing, that she observed in undergraduate students over four years of college. These patterns are related to, but not dictated by, gender. They are:

1. Absolute knowing
2. Transitional knowing
3. Independent knowing
4. Contextual knowing

Being aware of these patterns may help you write at the appropriate levels of cognitive complexity and include activities and interactions that are most effective for your audience.

As you read through this section, challenge your understanding by considering how you would write for an audience that contains different levels and patterns of knowing and reasoning.

Absolute Knowing

Absolute knowers view all knowledge as certain and absolute in all domains. They believe that experts may differ because they are discussing varying levels of details. There are authorities and they have all the answers. Their role is to obtain these answers from the authorities. These learners concentrate on receiving and mastering knowledge.

For example, absolute knowers enjoy a didactic presentation of concrete information with the opportunity to ask questions directly of the instructor. However, they resist activities in which their peers might take authoritative roles. In online discussions, absolute knowers seek reinforcement for their comments from the instructor and may not participate actively in a peer-led conference. These learners appreciate the opportunity to demonstrate their mastery of the material and prefer to be evaluated by the classroom 'authority.'

In a traditional post-secondary setting, where would these learners be concentrated? Would they tend to be at senior levels?

Transitional Knowing

Transitional knowers understand that *some* knowledge is uncertain. The authorities in the domain may differ because some answers are unknown. At this level, understanding takes precedence over acquiring and memorizing information. These learners expect instructors to focus on the application of knowledge. They will invest time and energy in learning if they perceive the learning to be of direct use to them. An online debate may be an effective forum to exchange ideas as long it is facilitated fairly.

How might these learners expect to be evaluated?

Independent Knowing

Independent knowers accept that knowledge is mostly uncertain. At this level, the learning process can change significantly. Authorities are no longer the only sources of knowledge. They can create their own perspectives and feel confident that their views are valid. They stress being open-minded. They like to negotiate the processes and criteria for evaluation and are comfortable with peer assessment.

What kinds of learning experiences will independent knowers value?

Contextual Knowing

Contextual knowers accept that the nature of knowledge remains uncertain. Some knowledge claims are better than others in particular circumstances and contexts. These learners make their own judgments based on a critical review of the evidence: they know that not all perspectives are equally valid. They appreciate learning through problem-solving and integrating and applying new knowledge in contexts. They value a learning process in which learners and instructors work with each other to establish goals and measure progress.

What kinds of relationships with the instructor and peers will these learners prefer?

Note [Figure 3.1 Ways of Knowing: Learner Profile and Implications for e-Writing](#) contrasts knowing patterns by life stage and gender and provides suggestions for developing content for e-Learning environments. This table is also included in the Handbook ([go to \[Figure 2.1 Ways of Knowing: Learner Profile and Implications for e-Writing\]\(#\) in Chapter 2 of the Handbook](#)).

Way of Knowing	e-Writing Suggestions	Gender pattern
Absolute knowing (Junior undergraduate)	<ul style="list-style-type: none">■ E-mail or online forums build in opportunities for teacher-student interaction■ Set behavioral expectations for how to disagree■ Use links and sidebars to give choices for different levels of difficulty■ Write less formally, use a more relaxed tone	Males tend to be mastery-pattern knowers, who: <ul style="list-style-type: none">■ Enjoy a public learning role■ Show interest to instructor by participating■ Are more argumentative in class■ Appeal to authority to resolve differences

	<ul style="list-style-type: none">■ Use surveys and interviews that students initiate with each other■ Describe your assessment goals and methods clearly and provide examples	Females are more likely to be receiving pattern knowers, who: <ul style="list-style-type: none">■ Are private learners■ Expect to listen and record rather than interact with instructor■ See peers as sources of support■ Value evaluation that lets them demonstrate mastery■ Try to work out discrepancies for self rather than consult experts
Transitional knowing	<ul style="list-style-type: none">■ Use private e-mail to show concern and interest■ Use public forums for interaction■ Set up a social chat■ Use a positive tone■ Maintain a FAQs section which is regularly updated■ Encourage peers to answer each others' questions■ Build in questions related to personal experiences■ Create practical exercises or point to other sites that will support applications of knowledge■ Build in high-level questions that require research	Males tend towards impersonal knowing and: <ul style="list-style-type: none">■ Prefer to exchange ideas through debate■ Expect to be challenged■ Value evaluation that is fair and practical■ Resolve uncertainty by logic and research <p>Females tend towards interpersonal knowing:</p> <ul style="list-style-type: none">■ Prefer to be involved by collecting others' ideas■ Expect to have their views heard by peers

	<ul style="list-style-type: none"> ■ Pair students for one task ■ Activities should be open-ended and require evaluating evidence ■ Provide sample assessment questions ■ Provide opportunities to encounter contradictory views, for example through a debate or inviting 'virtual guest lecturers' 	<ul style="list-style-type: none"> ■ Desire exposure to new points of view through interaction with peers ■ Seek rapport with instructor to enhance self-expression ■ Value evaluation that considers individual differences ■ Resolve uncertainty by their personal judgment
Independent knowing	<ul style="list-style-type: none"> ■ Connect learning to real life by providing authentic contexts and examples ■ Promote skills, which can be used in the workplace/profession ■ Give independent assignments requiring creative thought ■ Give lots of choice on activities and assignments ■ Build in team assignments ■ Don't use multiple choice tests ■ Give choice of assessment forms 	<p>As independent knowers, males' primary focus is on their own thinking, and they therefore:</p> <ul style="list-style-type: none"> ■ Expect peers to think for selves ■ Stress thinking for themselves ■ Prefer to be allowed to define own learning goals ■ Enjoy being challenged <p>As inter-individual knowers, females believe that:</p> <ul style="list-style-type: none"> ■ They learn well by engaging views of others ■ Evaluation is a joint process ■ Instructors should engage all points of view ■ Learning

		should involve interplay and exchange
Contextual knowing (Often not evident until senior year or in graduate school)	<ul style="list-style-type: none"> ■ Don't write as absolute authority; embed open-ended questions ■ Build-in threaded discussions for meaningful dialogue ■ Insist that online responses are evidence-based and demonstrate responsibility for own thoughts and work ■ Examples and contexts reflect the BIG issues ■ Activities based on teamwork and collaboration 	Magolda didn't identify patterns but identified increasing compassion, degrees of humanity, and initiative

Figure 3.1: Ways of Knowing—Learner Profile and Implications for e-Writing

The Adult Learner

"Adult learner" is a term that encompasses a wide range of circumstances, experiences, readiness, characteristics, and interests.

A number of instructional models have emerged in the past two decades that attempt to define the essential conditions of adult learning.

Cross, 1981

Kolb, 1984, 1985

Rogers & Freiberg, 1994

DeBono, 1971

Spiro and Associates, 1992

- The *Characteristics of Adults as Learners* (CAL) model integrates other theoretical frameworks such as experiential learning
- *Lateral thinking* proposes that adults use different cognitive styles in different contexts and for different purposes
- *Cognitive flexibility theory* and *social learning theory* suggest models for complex problem-solving and the power of the social in human learning

Although there is no one standard audience profile, taken together, some common assumptions emerge. Malcolm Knowles' work on adult learning includes many of these assumptions.

Andragogy

Malcolm Knowles (1984) has defined "andragogy," a theory widely used in the adult learning literature. The term is based on the psychological definition of adult, which states that people become adults psychologically when they arrive at a self-concept of being responsible for their own lives and of being self-directing.

Andragogy is based on six fundamental assumptions about the unique characteristics of adult learners:

1. The learner's self-concept

Once adults have arrived at the stage where they take responsibility for their own lives, they develop a deep psychological need to be seen and treated by others as being capable of self-direction.

2. The role of the learner's experience

Adults enter a learning experience with both a greater volume and wider diversity of experience over children.

3. Readiness to learn

Adults are ready to learn what they need to know and be able to do in order to cope effectively with their real-life contexts.

4. Orientation to learning

Adults are problem-centered, or life-centered, in their learning orientation. They are motivated to learn to the extent that learning will help them perform tasks or deal with real-life problems.

5. Relevancy - need to know

Adults need to know why they should learn something before devoting the energy to it.

6. Motivation

The best motivators are internal, such as self-esteem, quality of life, or increased job satisfaction.

To apply these ideas to your planning, consider some of the advantages of multimedial Web-based environments for adult learners. These environments:

- Accommodate desire for self-directed learning
- Allow learners to initiate, plan, and manage their own learning
- Allow for greater personal autonomy and for the learner to have control over pacing and timing of instruction
- Provide a novel and intrinsically motivating environment

Interactive environments can be responsive and reflexive. They can permit free exploration at a personal pace, with immediate feedback. They can also represent a real world context in which to obtain and use new information.

In general terms...a motivating multimedia program tends to include experiential and exploratory features rather than the buttons and menus associated with productivity software. A motivating environment also... includes authentic activities...is interactive and challenging, and includes expert performance and guided discovery.

Stoney and Oliver, 1998, p. 57

Use the following listing of adult characteristics to determine whether your Web site is appropriate for adult learners. Figure 3.2*Adult Learner Characteristics: Implications for Training* should give you some design ideas.

Key design element	Adult learner characteristic	Application to training environments
Adults are self-directed learners...	Prior experience	<ul style="list-style-type: none"> ■ Share biographies with other participants ■ Give credit for prior learning ■ Group by similar interests ■ Value personal experience as source of legitimate knowledge ■ Create activities based on subjective content
	Autonomy	<ul style="list-style-type: none"> ■ Give options; choices in activities and content ■ Support self-paced learning ■ Give flexible timelines ■ Provide opportunities to self-assess ■ Include coaches and mentors ■ Treat learner as mature individual
	Intrinsic motivation	<ul style="list-style-type: none"> ■ Relate new learning to life experience
	Pragmatism	<ul style="list-style-type: none"> ■ Include real-life content ■ Short information bursts ■ Provide many opportunities for practice ■ Support work-related projects ■ Provide reminders of transfer to work setting
	Self-efficacy	<ul style="list-style-type: none"> ■ Acknowledge fears ■ Encourage learning

		<p>partners</p> <ul style="list-style-type: none">■ Give opportunities to display competence■ Encourage exploration; experimentation■ Create a non-punitive environment (safe to make mistakes)■ Sequence activities to progress from least to most difficult or complex■ Support mastery learning■ Give learner control with advisement
	Unaware of learning style	<ul style="list-style-type: none">■ Have learners complete learning styles inventories■ Share experiences of successful learning
	Consumer-orientation	<ul style="list-style-type: none">■ Invite and value feedback on training■ Act quickly on feedback■ Be flexible■ Take a marketing orientation■ View learner as stakeholder; co-designer■ Negotiate learning goals, assessment, activities

	Have multiple roles	<ul style="list-style-type: none">■ Be flexible■ Provide opportunities to review and repeat■ Stagger scheduling■ Set appropriate "take-home" requirements■ Allow open entry and exit points
Adults prefer authentic contexts	Task orientation	<ul style="list-style-type: none">■ Provide clear learning outcomes■ Give very short theory bursts followed by practice■ Take a concrete over abstract approach
	Preference for problem-based learning	<ul style="list-style-type: none">■ Set problem, then provide multiple resources■ Provide coaches and mentors■ Accept many solutions■ Provide opportunities to experiment
	Readiness to learn	<ul style="list-style-type: none">■ Give pre-tests■ Provide opportunities to review without penalty■ Provide opportunities to elaborate or extend learning■ Provide open entry points
	Practical	<ul style="list-style-type: none">■ Relate training to work life■ Don't expect "after-hours" commitment

Effective learning requires social interaction	Reflective	<ul style="list-style-type: none">■ Use journals or diaries■ Use portfolios showing progress■ Encourage discussion■ Provide opportunities to self-assess and correct
	Seek structure	<ul style="list-style-type: none">■ Suggest learning paths■ State expectations clearly
	Different value systems and perspectives	<ul style="list-style-type: none">■ Encourage discussion■ Negotiate social protocols
	Multiple learning styles	<ul style="list-style-type: none">■ Provide multiple representations of information■ Negotiate tasks and assessment■ Use multimedia
	Sense of self and Need to be valued	<ul style="list-style-type: none">■ Create safe environments■ Ensure privacy■ Acknowledge experience and expertise
	Need to be successful	<ul style="list-style-type: none">■ Provide appropriate, non-evaluative feedback■ Give opportunities to reach mastery before final assessment■ Ensure opportunities for early successes■ Scaffold learning (simple to complex)

	Desire to share expertise (knowledge becomes new content, resource for others)	<ul style="list-style-type: none">■ Use discussion and group work■ Partner learners in knowledge construction
	Seek relationships	<ul style="list-style-type: none">■ Provide opportunities for cooperative learning■ Use learning cells

Figure 3.2: Adult Learner Characteristics— Implications for Training

Adult users are often unable to explore hypertext without experiencing navigational problems at some point, leading to feelings of bewilderment and confusion and a decline in learning performance. Problems include:

McDonald & Stevenson, 1996

1. The keyhole problem

- Users are unable to gain an overview of the information contained within the document
- They may not know new information exists
- They may not be able to find new information

Solutions:

- Use spatial maps to show relationships of information and concepts versus contents lists
- Provide orientation to search techniques

2. Users take longer to find information

Solutions:

- Advise users of the scope of the task
- Build extra time into the course
- Provide help

3. When left to browse freely, users often neglect to read entire sections of the document

Solution:

- Use chunking techniques

4. Users are unable to plan and execute direct routes to desired information

Solution:

- Advise users on the best paths to complete the task

5. Users may wander without reflecting on information encountered, so they may not recognize which nodes have been visited.

Solution:

- Use annotation or highlighting function
- Embedded questions in the text

- Ask learners to generate hypotheses rather than simply find information
6. Inconsistent or incoherent interface

Users have to focus too many mental resources on orientation, to the detriment of the learning task

Solution:

- Use tools and scaffolds (such as checklists, incomplete outlines to be filled in) to help them collect, organize, annotate, and evaluate difficult-to-process information.

Implications for e-Writing 8 Factors for the Most Motivating and Engaging Web sites

1. Immersion

- The learner is completely absorbed physically and psychologically
- Provides an authentic context for realistic learning activities

Design Tip: Use examples or cases from the real world

2. Reflection

- Changes the way the one thinks about the subject matter
- In a problem-solving context leads to active engagement with the content

Design Tip: Include questions or activities relevant to past experiences

3. Play and Flow

- Dynamic activities lead to growth and discovery
- The challenge changes constantly and is at an optimal level

Design Tip: Create a 'microworld' with challenges and problems to solve

4. Collaboration

- Provides peer scaffolding and support
- Gives alternative perspectives

Design Tip: Use an online class discussion tool to share ideas

5. Learner control

- Supports self-pacing and self-efficacy
- Respects learner experience and need for relevancy

Design Tip: Use many different activities, at different levels that lead to the same outcomes

6. Curiosity

- Novelty and surprise
- Complexity

Design Tip: Embed links to information that is new or unexpected

7. Fantasy

- Support and reinforce the learning goals of the activity

- If maintained, proficiency increases and learning goals change

Design Tip: Tell a story

8. Challenge

- Encourages students to explore,
- Initiate, and
- Pursue tasks

Design Tip: Pose a problem at a higher level of cognitive activity than the learners are accustomed to.

Stoney & Oliver, 1998

Note Additional ideas for effective e-Writing for adults are included in the *Handbook in Designing and Evaluating Interactive Materials for Adult Learners* summarizes some current thinking about design guidelines for adult learners ([go to Designing and Evaluating Interactive Materials for Adult Learners in Chapter 2](#) of the Handbook).

In the [next section](#) we present Gardner's Multiple Intelligences framework. This work also has relevance to e-Writing for older learners and for diverse audiences.

The Young Learner

Some theorists believe that children learn in different ways than adults. Piaget introduced a learning theory based on developmental stages, which has influenced pedagogical models and approaches for over 70 years. Likewise, the ideas of John Dewey continue to inform instructional practice for all age groups.

Multiple Intelligences is useful for planning e-Learning activities because the framework encourages instructors to consider diverse learning characteristics and to include a range of learning options.

Multiple Intelligences and e-Learning Content

[Gardner, 1993](#)

Howard Gardner, at Harvard University, extends the traditional definition of intelligence by describing it as "the capacity to solve problems that are valued in one or more cultural settings." Gardner's work reveals a pluralistic view of intelligence in which all individuals have eight (1997) intelligences which operate in varying degrees depending on individual profiles and context:

linguistic	Linguistic intelligence is the capacity to use language effectively as a vehicle of expression and communication.
	Design Tip: <i>Design activities that encourage writing, or dialogue online.</i>
logical-mathematical	Logical-mathematical intelligence is the capacity to think logically, use numbers effectively, solve problems scientifically, and discern relationships and patterns between concepts and things.
	Design Tip: <i>Design activities based on problem-solving.</i>
spatial	Spatial intelligence is the capacity to think visually and orient oneself spatially and graphically represent visual and spatial ideas.
	Design Tip: <i>Use visual models and graphical representation to represent concepts or information.</i>
musical	Musical intelligence is the capacity to appreciate a variety of musical forms in addition to using music as a vehicle of expression.
	Design Tip: <i>Assessment strategies could include the option to create a multimedia presentation.</i>
bodily-kinesthetic	Bodily-kinesthetic intelligence is the capacity to use one's own body skillfully as a means of expression or to work skillfully to create or manipulate objects.
	Design Tip: <i>Include simulations as e-Texts.</i>
interpersonal	Interpersonal intelligence is the capacity to respond appropriately and effectively to others, and to understand their feelings.
	Design Tip: <i>Design for affective outcomes, for example, include a role play, or an activity that requires negotiation.</i>
intrapersonal	Intrapersonal intelligence is the capacity to accurately know one's self-strengths, motivations, goals, and feelings.
	Design Tip: <i>Build in opportunities for critical reflection.</i>
naturalistic	Naturalistic intelligence is the capacity to work with holistic representations and to relate and appreciate the impact of experiences and actions on the community.
	Design Tip: <i>Provide many examples of where new concepts can be practically applied.</i>

Note *Multiple Intelligences and e-Learning* in your Handbook shows how you can use these ideas to plan the context for your course ([go to Writing for Multiple Intelligences in Chapter 3 of the Handbook](#)).

Implications for e-Writing

There are many developmental learning theories of how individuals learn at different stages in their lives. We have presented several here. Designing learning environments based on these theories can be controversial.

If you compare the core ideas in each theory or model, you will observe many similarities. Each model:

- Acknowledges the importance of recognizing and validating prior life experiences.
- Supports diverse learning styles.

- Recommends that content be represented in more than one way.
 - Suggests that learning be extended with a variety of activities and assessment strategies.
 - Suggests that you think of your readers as co-writers.
-

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Health, Physical and Perceptual Challenges

Writing for inclusiveness means including all readers, not just readers who are young, have good eyesight, have complete mobility, and can hear and read well.

Accessible e-Texts - text, video, audio, graphics - accommodate diversity in learning needs and expectations, different levels of technical access and competence, and physical and emotional challenges.

Reasons to Develop Accessible Web-based Resources

3 reasons to care about accessibility

Cyndi Rowland, director of the higher education *Web Accessibility In Mind* (WebAIM) project, lists three reasons why you should develop accessible Web-based resources:

Ethics

Providing equal access to educational opportunities is simply the right thing to do. Just as physical accessibility is routine across campuses, virtual accommodations are just as necessary across the Internet.

Economics

When Internet courses are accessible to individuals with disabilities the institution will see an increase in the number of learners registering and paying tuition.

Legalities

In the U.S., federal statutes guarantee that learners with disabilities will not be discriminated against based on their disability status, and that they will not be "excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance..." (Section 504 of the Rehab Act; 29 U.S.C. Section 794). On the international scene, governments recognize a moral and political obligation to make access to information on the Internet available to as many world citizens as possible. For example, see the United Nations *General Assembly Standard Rules on the Equalisation of Opportunities of Persons with Disabilities*.

In Canada, the *Guide to the Internet* states that "Since the end user cannot count on either standard technology or helping devices to ensure access to information on the [World Wide] Web, the onus is on the web page developer to deliver the message in a way that allows everyone to benefit."

Degrees of Accessibility

Estimates of accessibility vary, but Martin Bayne estimates that only 1% of all Web sites are accessible. Jacob Neilsen estimates that about 10% of Web sites are accessible. Whatever the figure, between 1–10% of accessible Web sites excludes an enormous number of users worldwide.

Neilsen urges us to design for "our older selves." As lifelong learning becomes a key market for HE institutions and other educational providers, this seems sensible advice.

What does accessibility mean in higher education?

Usability research defines the concept of disability as whether the user has some condition that makes it difficult to use traditional computer input and output devices in the way they were intended. Accessibility issues include both the ability of the user to access information electronically and the efforts made by the designer to enable a page to function for all individuals with disabilities or

challenges.

Challenges to Access

Sheryl Burgstahler discusses the impact of mobility impairments, visual impairments, learning disabilities, hearing impairments, speech impairments, and seizure disorders on a persons' ability to learn online.

Mobility Impairments

Some students and instructors with mobility impairments do not have the fine motor skills required to select small buttons on the screen. And, if their input method is slow, they cannot effectively participate in real-time "chat" communications. Some students and instructors require wheelchair-accessible locations to attend on-site meetings.

Visual Impairments

Text alternatives to graphic images need to be provided at a web site for blind students and instructors. Printed materials, videotapes, televised presentations and other visual materials also create access challenges for some students enrolled in distance learning courses; tactile materials, audio presentations and electronic text may be required.

Those with limited vision, including aging baby boomers and the elderly, may not be able to read standard text sizes. They may use devices that display only partial screens.

A higher proportion of men than women are colorblind. If colour is used to represent meaning or if color is an important key to navigating a site, they may encounter barriers.

Learning Disabilities

Some specific learning disabilities impact the ability to read, write and/or process information. People with some learning disabilities have difficulty understanding web sites when the information is cluttered and the screen layout changes from one page to the next.

Hearing Impairments

Audio e-Texts, including video or captioned slides, prevent access to the hearing impaired. These e-Texts should include text captions or transcriptions.

Remember that the hearing impaired, including a higher proportion of males than females in the middle years and older, may not be able to participate in audio or video conferences without interpreters.

Speech Impairments

Speech impairments prevent participation in these conferences as well.

Seizure Disorders

The use of animations or images that flash or flicker may induce seizures.

These challenges have implications for educational services beyond the design of e-Texts.

Accessibility and the Library

Not surprisingly, web accessibility issues are now being faced by educational institutions. Library reference services are being transformed by the efficiency of Internet access to information systems and search engines. Professors are teaching long distance learning courses over the Internet and even if a student is physically in class, homework assignments and resources are being posted on class homepages. Yet, even if a library terminal has assistive computer technology installed for students with disabilities, Internet research by students with disabilities is not possible with inaccessible web page design.

[Waddell, C. \(1999\). Electronic curbcuts: Universal access for everyone.](#)

Approximately 1 out of 5 individuals have a disability. The number is higher if we include seniors and those whose first language is not English. If you are not aware of accessibility issues, you may be planning activities and developing resources for 80% of your learners, at best. This is true for your F2F classes as well.

Groups such as those at the Center for Universal Design at North Carolina State University have worked on guidelines and policies that will help you include 100% of your audience.

Universal design is defined by the Center as "the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design."

Accessibility standards help web designers identify and address these issues. The *World Wide Web Consortium's (W3C) Web Content Accessibility Guidelines* were the first major effort to establish guidelines for design. This standard consists of fourteen guidelines, each with three levels of checkpoints.

Priority One checkpoints are those that the web developer *must satisfy* to ensure that the page itself is accessible.

Example: 1.4

For any time-based multimedia presentation (e.g., a movie or animation), synchronize equivalent alternatives (e.g., captions or auditory descriptions of the visual track) with the presentation.

Priority Two checkpoints are those that the web developer *should satisfy* to ensure that certain groups will be able to access information on the Web page.

Example: 13.3

Provide information about the general layout of a site (e.g., a site map or table of contents). In describing site layout, highlight and explain available accessibility features.

Priority Three checkpoints are those the web developer may do to ensure that all content on the page is completely accessible.

Example: 13.7

If search functions are provided, enable different types of searches for different skill levels and preferences.

There are several resources on the Web to help you evaluate your site or e-Writing for accessibility.

Note Use Nielsen's *Accessibility Guidelines* in the *Handbook* to evaluate this section of *Epicurious* ([go to Nielsen's Accessibility Guidelines in Chapter 3](#) of the *Handbook*). How would you improve its accessibility rating?

Summary

Writing for accessibility is a challenge; there are many layers to this problem. This book focuses on content concerns in e-Texts: readability, usability, cultural inclusiveness.

Accessibility work to date has emphasized technical issues and solutions. If you are not interested or experienced in the technical problems of accessibility or do not have access to experienced individuals

in your organization the sites recommended in this section will help you avoid more serious pitfalls.

All Things Web

Still, there is something deeply and profoundly satisfying about encountering deliberately inclusive Webspace—and something equally satisfying about creating it.

Finding new and creative ways to accommodate readers with various physical impairments is one of the most challenging aspects of reader-friendly Web design. But it is undeniably among the most rewarding, as well.

<http://www.pantos.org/atw/35412.html>

Access to Technology: The Many Dimensions

Access to technology has many dimensions. Access refers not only to computer ownership and the ability to connect to the Internet, but also includes concerns about:

- Speed of connection
- Capability of computer
- Access to the computer at home, at work, and in other contexts
- Level of access to information
- Degree of privacy and security

Access relates directly to experience by influencing attitude and achievement. Unless we address these inequities, marginalized groups are in danger of becoming "the disappeared" in educational, economic, and employment initiatives that rely on computer technologies.

For example, global estimates of employment equity suggest that, on average, women in industrialized countries make from 70–80% of male salaries for comparable work. Single-parent families are also disproportionately headed by women. Given women's relatively lower discretionary income and less ability to purchase new, multi-media computers and high-speed Internet access, children in these families may have reduced access to the Internet.

41.6% of Caucasian Americans have Internet access vs. 55.7% that own a computer

While rates of computer ownership and Internet access are increasing, the U.S. Department of Commerce reports that there are significantly fewer people with Internet access than with computer ownership. Access can be affected by:

- Geographical location
- Climate
- Political context
- Socioeconomic status
- Values

Access issues are often defined by more than one factor, including:

- Culture
- Health
- Age
- Gender
- Language

According to the 1999 United Nations Human Development Report, the majority of the world's population who have access to the Internet resided in *developed* nations. According to the report, "the typical Internet user worldwide is male, under 35 years-old, with a college education and high income, urban-based and English speaking-a member of a very elite minority world-wide."

[United Nations Human Development Report, 1999](#)

The Digital Divide

The separation of those who have access and those who do not has been termed the "digital divide."

In the U.S., access gains have been made by all ethnic groups since 1998; yet African and Hispanic Americans are still behind Caucasian Americans.

In fact, the gap in ownership has widened since 1998. According to Pearson, this inequity is not remedied by access in schools, libraries, and other public areas, which all reflect the same divide based on the socioeconomic status of the neighborhood.

Pearson reveals the following figures:

- Hispanic - Caucasian 17.2% in 1998 to 22.5% in 2000.
- African American - Caucasian 18.6% in 1998 to 22.6% in 2000.

Pearson, 2002

Learning from Home or Work

In North America, the fastest growing segment of learners, students over the age of 22, are linking their learning with professional development and the idea of lifelong learning. They demand a flexible structure in which they can enroll in courses, work and attend to family matters at the same time.

trends in content delivery

This flexibility is reflected in alternative delivery methods that include on-line learning and Internet use. As we are living longer, older learners will also require access to information and lifelong learning opportunities. No group of learners will be 'finished' learning upon completion of a program. Lifelong learning will become the norm as skills requirements based upon global economic determinants will continuously evolve.

How will inequities in access to technology impact on the needs and expectations of all of these audiences?

The Power of the Internet for Learning, December, 2000

According to the report titled, *The Power of the Internet*, emerging trends in alternative delivery of educational content include:

- Greater broadband access that will deliver a richer content and enable a richer interactive environment
- Pervasive computing "in which computing, connectivity and communications technologies connect small, multipurpose devices, linking them by wireless technologies" (p. 23)
- Digital convergence. This means the merging of capabilities of telephone, radio, television and other interactive devices
- The establishment of technical standards for content development and sharing
- An emergence of adaptive technology that combines speech, gesture recognition, text-to-text conversion, language translation and sensory immersion to change net-worked human communication
- The reduction of costs in broadband delivery

Access and Post-Secondary Learning Environments

On the one hand, improvements in delivery technologies are making highly interactive, rich, accessible content available to more people. But on the other, the digital divide continues to widen.

How can the design and delivery of e-Texts resolve this conundrum? In Canada, an influential report

released 2001 recommends that on-line learning environments:

The eLearning e-volution in colleges and universities. A Pan-Canadian Challenge, 2001

- Offer an expert-rich content and curriculum
- Be easy to use
- Be flexible and convenient
- Involve continuous assessment
- Allow real-time feedback, tracking and metrics
- Use multimedia simulations
- Employ rich case studies
- Permit threaded discussions
- Create a dynamic, engaging environment for learning

Summary

The Digital Divide is a global concern. Access to technology means access to information and sociopolitical participation in the world's affairs. Barriers to access include social, cultural, economic, geographical, physical, historical, and political factors.

In post-secondary environments, access to education may be both enhanced by technology and reduced by technology. The e-Writer must balance a number of factors in designing an environment that provides the best access, for the right reasons to the most learners.

Gender

Technology is not Value-Neutral

Technology has great promise for equalizing the learning experience for marginalized groups such as women. But, we need to remember that technology and technology-based models of teaching and learning are not value-neutral. At the moment, many models tend to reflect a rational stance to knowledge and learning.

This idea is expressed by Leslie Regan Shade, who emphasizes the importance of vocabulary used on the Net: "we must pay close attention to the metaphors that people will use and see in this new world, so that they won't exclude women, or include them in undesirable ways."

Gender Issues in Computer Networking, 1993

Rational and Relativistic Ideals

If content arrangement is dominated by concepts such as information and representation, it signals that the subject is governed by a rational knowledge ideal and not relativistic-oriented traditions, such as those in the humanities — structures preferred by women who prefer inter-actional styles.

Language often reveals this alienation in terms used in the computing field, where military origins are reflected in aggressive and masculine technical vocabulary such as killing a file, aborting a function, fatal errors, crashing, and booting up; or in metaphors using sports or adventure analogies.

Campbell, 2003

Each of these examples comes from a Web-based tool or course. Each presents a problem of cultural context. Think of a different way to get the same meaning across.

1. This message appears on the screen while you are downloading a file:
Hold your horses
 2. This message appears as feedback on a WebQuest:
Great! You hit that one right out of the park!
 3. In the clip-art collection that you use, female teachers appear in any image that relates to instruction.
 4. A training course in network administration has been adapted for a university in Malaysia.
The American version uses the image of sausage links to represent hypertext links.
-

The following sample of text is taken from the Web site of a non-profit new media association. The dominant title on this page is: *Blast into the Future*.

Read the text and evaluate it for both content and form:

- Is this an inclusive site for women or other groups potentially marginalized in the new media industry?
- What recommendation would you make to the leaders of this association and creators of the site?

Blast into the Future

Banff Television Festival, June 9 – 14

This annual festival of the television industry is a great place to pitch your show ideas, and to pitch the producers for web site design projects.

Thank you, SuperNet / Axia

The SuperNet is a major undertaking of the Alberta government to extend high speed Internet connectivity to 422 communities across Alberta by 2004.

Click on the title above for more details.

Paintball

Last fall we played paintball and a good time was had by all, so we are doing it again, this Saturday, June 15, 2002 from 12:30 - 5:00 pm. Click on the "Paintball" title above for more e-mail or email John Doe.

"Tech" Me Out To The Ballgame Mixer AUG 3

Get your tickets reserved for an evening of fun at TELUS Field supporting the Edmonton Trappers New Media Mixer: August 1st "Major Players"

We're skipping July so everybody can have more time for Stampede!

Summary

Many Web sites and other learning objects have been designed from the perspective of the dominant culture. Some researchers feel that when it comes to technology-mediated environments, women are a group outside of this culture.

standpoint theory Being sensitive to the needs of one group of marginalized learners makes it easier to be aware of design practices that exclude many others. This is known as standpoint theory.

Many universities have developed diversity guidelines for faculty and designers developing curriculum and creating e-Learning environments. The University of Western Australia has made their guidelines accessible at no charge on the Web. An excerpt is presented here.

Note The guide is also contained in the *Handbook*, so that you may duplicate it (with proper acknowledgments) for your colleagues ([go to Teaching for Diversity Checklist in Chapter 3 of the Handbook](#)).

Does your organization have a similar document?

Teaching with Diversity Checklist

The University of Western Australia's student population is characterized by diversity with regard to, amongst other characteristics, gender, race, age, disability, sexual orientation, cultural background and socio-economic status.

Teaching which disregards diversity places students at a disadvantage by reducing their capacity to learn. An inclusive curriculum which acknowledges, respects and responds appropriately to diversity can contribute to:

- Enhanced learning outcomes for a greater number of students
- Validation of student experiences and world views
- Development of international skills, cross-cultural perspectives, respect for different values and learning styles, and other skills useful in a diverse global environment
- Improvement of academic standards and the quality of university teaching

- Recruitment and retention of a greater number of students from diverse backgrounds.

In this chapter, you have considered many new issues involved in writing effectively for your audience. Many of the ideas are new; as an instructor you have probably addressed many of them before as you create resources for your courses and learners.

Chapters 5 and 6 have many more specific suggestions for writing accessible e-Texts.

Based on good "research," create your own core guidelines, use them consistently and test every text against them.

Practice

Analyze the Web site for your organization or institution. How can it be made more accessible?

Use the Writing for Multiple Intelligences to evaluate these sites:

The Philosophy 101 Homepage

<http://www.arts.ualberta.ca/phil101/index.html>

Epicurious:

The World's Greatest Recipe Collection

<http://www.epicurious.com>

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 PREVIOUS  NEXT 

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Team LiB

◀ PREVIOUS ▶ NEXT ▶

Chapter 4: Selecting and Evaluating Learning Objects

Overview

ELLEN WHYBROW, M.ED.

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In the previous chapters, you became acquainted with key issues in developing online learning. You gained an awareness of some of the overall issues facing learning organizations. Finally, you looked at the needs of your audience in terms of learning styles, inclusivity, and adult learning characteristics.

Team LiB

◀ PREVIOUS ▶ NEXT ▶

Key Ideas

This chapter provides you with resources to allow you to find and incorporate appropriate online resources for your course. You will explore:

- the concept of online repositories that store digital learning resources for post-secondary environments
- the advantages in using learning objects for enhancement or development of online learning resources
- what to look for when choosing learning objects
- how to incorporate learning objects in a variety of teaching contexts

Key Terms

Note This chapter introduces a number of terms and phrases that you may not be familiar with.

These terms are listed in the *Handbook* with enough space to define them in your own words or note examples, references, and resources ([go to Key Terms in Chapter 4](#) of the *Handbook*).

- Learning object
- Repository
- Metadata
- Usability
- Re-purpose
- Standards
- Modular course design
- Free-standing
- Applets
- Electronic documents
- Peer review
- [Granularity](#)
- Search engine
- Streaming
- Monolith

Plan Your Progress

Note A concept guide for the ideas in this chapter is provided in the *Handbook*. You can use this outline to help guide your exploration ([go to Concept Guide in Chapter 4](#) of the *Handbook*).

Note There is additional space for you to write the questions for which you need answers. Record your own information or learning needs in the *Handbook* ([go to Questions and Goals in Chapter 4](#) of the *Handbook*). If you have questions about selecting and evaluating learning objects record them here.

At the end of the chapter, check your list of questions to determine whether you need additional information. Use the chart to organize an action plan.

Note A "[To do list](#)" has also been provided for you in the *Handbook* for you to record what needs to be done, who needs to do the task, and when the task should be completed by ([go to To Do List in Chapter 4](#) of the *Handbook*).

The Web: The Problem and the Potential

Instructors have always turned to other instructors for help, ideas and resources to put together their courses. The Internet has enlarged the pool of available resources to choose from. For those of you involved in online education and training, the Web has been a boon and a barrier. Thousands of online learning resources exist, but how do you find them? Most Internet users turn to search engines to find Web-based resources. However, this poses several problems.

First, simplistic entering of keywords can bring thousands, sometimes millions of search results. A user needs to become very familiar with advanced search techniques such as building queries, using Boolean operators or searching by domain, URL or language in order to reasonably limit the number of returns to a manageable number.

Even those of us who are fluent in the use of advanced search techniques run into other types of problems. The Web pays no attention to:

- The quality of the online resources. There are no processes in place to evaluate the design, usability or content of the resources that you find.
- The level of the resource. This poses a particular problem for educators who have to wade through resources that may deal with the content in an overly simplistic or complex way.
- The format. There are still limitations on specifically searching for images, audio or video clips.

access to databases

Finally, some collections may be accessible only through one specialized database. Some departments, faculties and educational institutions have developed databases for the searchable storage of digital media. However, in order to use these resources you must know of the existence of the database, its location, and its access login. An educator looking in the wrong place will come up empty handed.

duplication of efforts

While the Web has opened up a wealth of materials, it has also encouraged massive duplication of efforts. There are hundreds of institutions and thousands of educators creating similar online learning materials for similar purposes. These online resources may look different but many serve the same purposes.

Find 3 Merlot objects for the same discipline. Do they meet the same goals?

<http://www.merlot.org>

Until recently, there was no easy way to catalogue and store these to make them easily available. Fortunately, technology also holds great potential to allow for more effective distribution and development of online materials. Imagine creating a course with online resources that:

- You can find quickly
- Fit the level, needs and interests of your audience
- Have been reviewed for quality
- Are in the format you need

learning object repositories

This potential exists in a new model of courseware development that will benefit not only individual instructors, but also departments and organizations that support the development of technology enhanced education. The solution lies in what those involved in instructional development call *learning objects* and their storage facilities, otherwise known as *repositories*.

Course Development Issues: The Monolith Problem

Not long ago, learning resources were what we found in a typical classroom, for example books, maps, and pictures.

The Internet has provided new opportunities for learning. Resources that were difficult to create on paper or use within a conventional classroom are possible in an online environment. Consider the difference online learning resources make in the examples in [Figure 4.1](#).

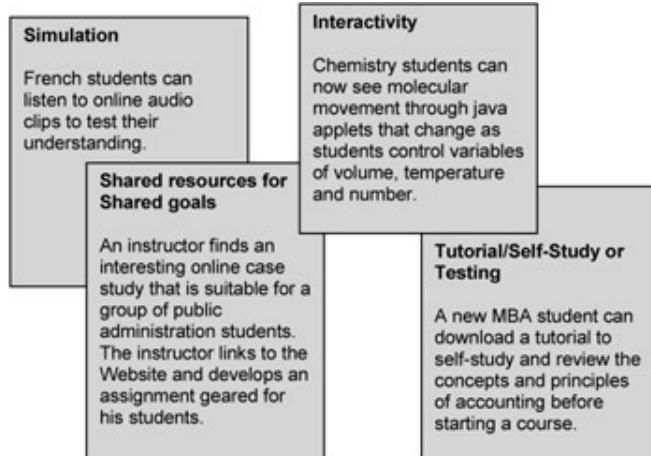


Figure 4.1: Interactive Resources

Online learning resources have a broader application when we think about enriching or developing entire courses. Since the Internet has become a common tool, the number of useful online learning resources has increased. It is now possible to have access to a number of high quality resources that contain a wide range of informational and interactive content.

Consider the following scenarios:

Scenario 1:

A course in health sciences that was previously taught through lecture and textbook can be enhanced in a variety of ways. The instructor can provide a Website that links the students to video clips demonstrating concepts, databases with the latest research and online exercises for students to test their understanding of the content.

Scenario 2:

A management course with both distance and on campus students can provide quality resources to both. All students, regardless of location have at their disposal PowerPoint slides of the lectures, a Web streamed video of a guest speaker who had visited the group earlier that year and a discussion board with current and archived discussions of the course case studies. All case studies are available from the Web.

Clearly, there are many ways to use technology in exciting ways, but it's a lot of work! Imagine how much effort it takes to produce all the applets, Web-streamed video and interactive tests you need. It's a project that would discourage even the most innovative teacher.

Time is not the only issue. Cost is another factor that makes the development of technology enhanced or distance courses very expensive. In fact, the development of a high quality, stand-alone course for interactive distance delivery has been estimated at up to \$1,000,000 per unit.

[Bates, 1995](#)

time and cost	The model of course development is a contributing factor in course development costs. Until recently, traditionally taught campus-based courses have been thought of in terms of monoliths. In other words, the course is a single entity and its quality depends heavily on the time and ability of the instructor to incorporate new elements or ideas. Frequently, the materials and content of the course are tied to the instructor most heavily involved with the teaching of the course. When he/she leaves or works in other projects, much of the expertise involved in delivering the course is gone as well.
monoliths	
lack of flexibility	Monolithic courses also do not allow for much flexibility. If research developments in a particular field mean that courses must be revised frequently, then the monolith approach poses a sustainability problem.

Fortunately, there are solutions to the monolith.

Team LiB

[◀ PREVIOUS](#) [NEXT ▶](#)

Solutions

There are a number of ways that online learning resources can be incorporated into teaching and learning. To clearly understand their potential, we will examine how a modular approach provides solutions to the time-consuming task of courseware development.

The Learning Object Solution

The monolith approach to course development is one approach. However, there is another way of viewing the process.

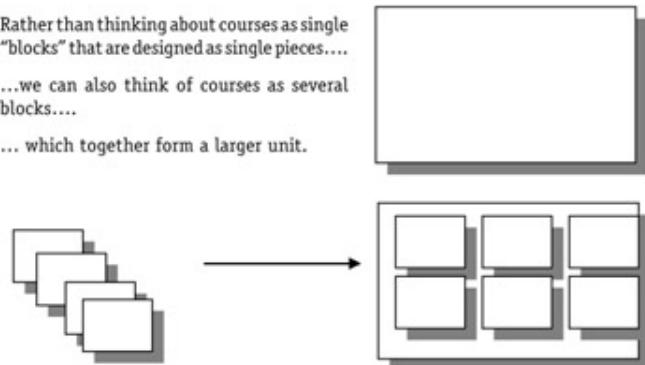


Figure 4.2: Modularizing

modularizing course development

This is where the term *learning object* comes in. Borrowed from the discipline of computer programming, it refers to the process of modularizing the development process. Learning objects are online resources that can be used, reused and combined with other objects to provide a rich learning environment and reduce the time, instructor skill or cost associated with Web-based development.

Learning Object Characteristics

Learning resources used to support a course can be modularized in an online environment. A course can be comprised of numerous online learning resources or learning objects. These learning objects can be used as single resources or combined to form a much larger unit of instruction.

An online learning resource or object has certain characteristics. Ideally, it has:

- An educational application to support
- A single instructional objective
- Instruction corresponding to the objective
- Assessment that measures the instruction

use and reuse

A learning object can also be used and reused in similar contexts, making development easier across departments, institutions and geographic regions. For example, an instructor teaching a course at one university may find the material produced by an instructor at another university to be useful.

Versatility is another important characteristic. An online learning resource or object can be modified for other contexts. Online resources produced for nursing students may, with some revamping, be suitable for medical students, rehabilitation practitioners or other health science professionals. With the learning object as a starting point, time spent on costly production is reduced.

versatility A learning object can also be versatile for different learning situations, as shown in [Figure 4.3](#).

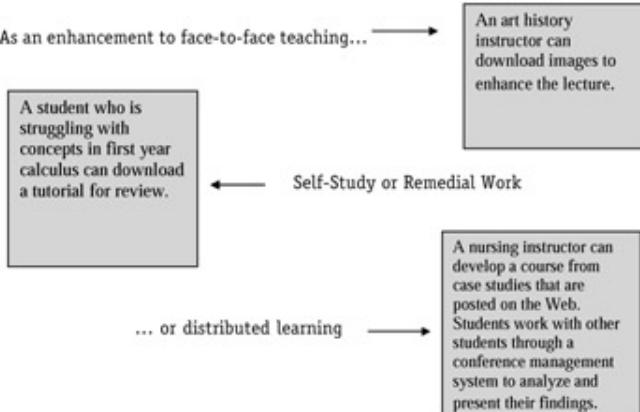


Figure 4.3: Versatility

There are other issues in the development of online learning resources.

Ease of use

First, learning objects should be easy to use. Instructors and learners should be able to find these resources easily. Objects can be stored in databases, which are also known as repositories and retrieval by means of meta-data, the keyword descriptors of the object.

This approach has a variety of benefits in terms of retrieval. The repositories ensure that the user can find content with standards in terms of level, quality and format. Educational repositories should allow for much easier and more accurate retrieval than search engines.

Interoperable

Learning objects are designed to be useful without the user having to update their hardware or software requirements substantially. Ideally, learning objects are created for use across platforms, browsers and software for maximum use in a Web-based environment.

Tracking

Storing online learning objects in repositories allows the potential for tracking. There are various reasons to track the use of a resource. For example, content may be tracked over a program to ensure consistency and avoid redundancy. Creators may wish to know how many people have used a particular learning resource. Users may want to know which objects have been rated highly through peer-review processes or user comments.

Durability

Finally, the learning object approach to course development allows for some measure of durability. Because the design is more flexible, a course can be more easily updated. If creators of learning objects adhere to the standards specified through the repository design, then the resource has a better chance of being sustainable despite changes in technology.

Examples of Learning Objects

Learning objects can take any number of media forms. They may include interactive forms of media or e-Texts. Characteristics of these e-Texts are discussed in [Chapters 5](#) and [6](#). To explore these formats, visit one of the learning object repositories discussed on pages 107–110.

As you read about these forms, think about the accessibility implications.

Applets

complexity As a sub-module of a larger program, an applet supplies added complexity to software. Learning objects that use applets allow students to manipulate objects to explore concepts. For example, a student can compare the effect of increasing or decreasing the variables on the constant. This has obvious uses in mathematics and sciences but can also be applied to other disciplines, such as business or economics where numeric values need to be determined or compared.

Animation can also be added to create a visual effect not easily replicated in the classroom such as tracking molecular movement in a chemistry course, comparing mass and force in physics or changing or manipulating variables of agriculture production.

Animations

movement and change Animations allow learners to see movement, change and variation in phenomena not easily demonstrable or accessible. The growth of a cancerous tumor, the movement of stars through the year and chemical compound formation can be animated to demonstrate concepts and principles.

Video Clips

demonstrations Demonstrations are often quicker and more effective than lectures or text-based descriptions. A video of a counseling session provides a valuable tool for psychology students as does a video of proper weight-lifting techniques for physical education students. Videos are therefore valuable tools for content that needs to be seen in order to be understood or modeled. Videos also provide a stimulus for discussion of controversial or difficult situations.

Audio Clips

enrichment An audio clip enhances learning that is sound based. Audio can enrich the instruction of foreign language instruction, literature and music.

Learning objects can also be presentational rather than interactive and may include:

Static Images

layering These may include pictures, photos or diagrams and support the age-old saying "A picture is worth a thousand words." For example, a picture of human organs provides necessary information on the size and location to health science students.

Electronic Documents

Ready-made documents provide a wide variety of uses. A Word document can provide information for understanding, discussion or debate. An Excel file can be the raw material for science students to chart variables.

Web Pages/Web Sites

structure A Website may contain some or all the above elements of presentation and interactivity. It may be considered as a learning object unto itself or it may be a site comprising numerous learning objects. It provides structure to numerous learning goals.

Size & Context of Learning Objects

There has been much debate about what constitutes a learning object. Does a single picture qualify? Would the picture need to be added to a Website that contains information about the picture, or

possibly a section to test user understanding, in order to be categorized as a learning object?

educational objective	To be useful, a learning resource or object must have at least one educational objective. How this is specified varies. The creator may add lesson plans, student assignments or questions to classify the purpose of the resource. The resource may be tagged with information about learner levels, subject area or discipline. Finally, the repository or database where the learning object is stored may provide end-user or peer review that will give others valued information on the quality or application of the object.
additional information	

However, online learning resources or objects can vary greatly in size. At one end of this range, an object can consist of a single digital component. For example, a single photograph of Paris, shown in [Figure 4.4](#), can be used to enhance learning about:

- Paris
- Historical symbolism
- Architecture or construction
- Photography



Figure 4.4: Paris, a Single Digital Component

creator and user defines purpose	Figure 4.4 can be incorporated into interactive or presentational media or it may be used to enhance an instructor's lecture. In short, the educational purpose of a single object is as much defined by the user of the resource as the creator.
limits on size	At the other end of the spectrum, an entire Website can also be a learning object. The picture shown above can be incorporated into a Website devoted to any of the topics listed above. There are only two limits on size: <ol style="list-style-type: none">1. A learning object must have at least one clearly identifiable purpose. It cannot be so devoid of context that its purpose is obscure.2. A learning object cannot be so large that it is restricted to one educational context or purpose. An entire course that is tied to institution specific logos, timetables and administration, for example, would not be an object.

What Should You Look For?

evaluating learning objects	You have enough to do in developing your course without formally evaluating learning objects. Educational repositories seek to make the task easier for users through peer review processes. The specific peer review processes and their stage of development vary from repository to repository and will be described more fully in the section on storage.
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Evaluation of learning objects is based on content accuracy and instructional usefulness. Because learning objects are digital, their technical usability is another important issue.

Williams (2000) had determined four key questions that guide the development of learning object evaluation:

- Who is the audience of instructors or students who may be accessing the learning object?
- What are the users of the learning object most interested in?
- What methods can be used to gather evaluation data that will inform users?
- How will evaluation be built in the process of development to ensure quality of usefulness of all learning objects contained within a collection?

Note Other criteria identified from the literature for *Evaluating Learning Objects* are supplied in the *Handbook* ([go to Evaluating Learning Objects in Chapter 4](#) of the *Handbook*).

Most important — ensuring that learning objects are designed with the primary needs of the instructors who will be working with them or incorporating them into their online courses and the students who will be using them. This is a complex issue as there are diverse opinions about criteria. A high school teacher working with remedial students in a mathematics course has different needs and will view the potential of a learning object in a different way than a university instructor teaching the same content.

UCDG	User-centered design guidelines are as important in selecting learning objects as they are in developing plans and resources. To review some important issues related to learner characteristics, review Chapter 3 .
instructional goals	You should ask yourself how useful the learning object will be in a particular environment. A video clip of people talking at a meeting may have little obvious instructional value unless the instructional goals are clarified. An instructor using the clip to demonstrate general communication skills may evaluate the material quite differently than an instructor providing instruction on the specific content of the video.

The size of a learning object plays into the evaluation formula. For example, the instructional value of a simple video clip may not be as apparent as an entire Website that provides a shell of instruction and direction to view the video clip.

Distribution of Learning Objects

Consider the following problems.

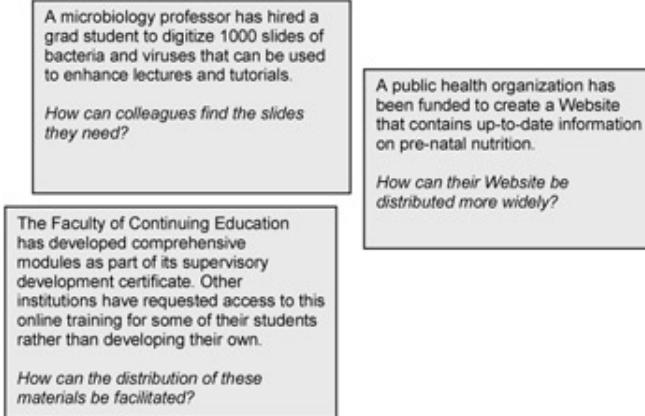


Figure 4.5: Instructional Problems

sharability These scenarios all deal with the issue of sharing or distributing their resources among colleagues, other institutions or the wider general community. To understand this process look at where the "object" is located, how it is catalogued and retrieved.

Storage

Currently, a number of databases or repositories exist to facilitate the process of sharing or distributing online learning resources. Four repositories that contain multidisciplinary collections are described here:

Merlot

peer review

No, it's not a wine! Merlot stands for *Multimedia Educational Resource for Learning and Online Teaching*. A free resource for students and faculty in higher education, Merlot provides links to online learning resources.



Figure 4.6: © Merlot (www.merlot.org)

Note A system of peer review is in place to provide a guide for users. Evaluation standards have been developed and are being conducted through a twostage process. Reviewers examine material separately and if their reviews correspond an integrated report is posted to Merlot. *Merlot's Peer Review Guidelines* are available in the *Handbook* ([go to Merlot's Peer Review Guidelines in Chapter 4 of the Handbook](#)).

Links to the resources frequently have member comments on how to use the resource and accompanying assignments. Merlot also lists affiliate repositories such as *The SMETEDigital Library* (www.smete.org) and California State University's *Service LearningInternet Community* (www.slic.calstate.edu).

CAREO

Campus Alberta Repository of Educational Objects is another free and open resource that contains a continuously growing number of learning objects appropriate for settings in higher education. CAREO has been designed as a research prototype to provide quality online learning resources for educators in Alberta. Membership is free.



Figure 4.7: © CAREO (www.careo.org)

Alexandria

Alexandria is Canada's first national repository and contains the same collection as CAREO. The service is designed for students, researchers and educators and membership is free. Alexandria is part of an ongoing national research initiative that explores various areas of building learning object repositories.



Figure 4.8: © Alexandria (Alexandria.netera.ca/)

Peer review is a critical component of both CAREO and Alexandria. A model and a set of tools based on both current faculty evaluation processes and learning object evaluation is being developed and tested as a resource for users of these repositories.

Blue Web'n



Figure 4.9: ©Blue Web'n (<http://www.kn.pacbell.com/wired/bluewebln/>)

Blue Web'n is an online library of over 1,200 Internet sites categorized by subject, grade level, and format (lessons, activities, projects, resources, references, and tools). The repository can be searched by grade level, including higher education and adult/ professional and broad or refined subject area. Subject areas include arts, business, community interest, education, vocational education, science, mathematics, foreign languages, technology, health and physical education, English, and history and social studies.

Note Sites are rated by an evaluation rubric and receive between 1–4 stars. The rubric is online and has been adapted for the *Handbook* ([go to Evaluation Rubric for Blue Web'n in Chapter 4 of the Handbook](#)).

storage options Online learning resources are stored in a number of ways. In the case of interactive media, the resource may be uploaded to the repository. In other words, an exact copy of the resource is placed in the repository.

In the case of a larger object such as an entire Website, only the URL may be referenced in the repository. A user accessing the URL will be accessing the resource at its original location on the creator's server.

Searching

How can you find learning objects that suit your purposes? The answer lies in the description or "metadata" provided for each object. When a learning object is stored for distribution, a controlled and systematic description allows the creator or potential user to find the object quickly and easily. These descriptions or metadata allow for retrieval on the basis of:

- Subject area
- Learner level
- Interactivity (case study, tutorial, simulation, etc.)
- Format (video, audio, web presentation, etc.)
- Author or date

copyright androyalties Users of Merlot, CAREO and Alexandria may search these repositories free of charge. The same copyright restrictions that govern use of Internet-based resources apply to those found in public repositories. Other repositories may charge royalties for the use of their objects.

Standards and Specifications

Developing content using learning objects poses certain challenges for designers. According to the model proposed by Cisco (2000), a learning object, is a resource that addresses but one single instructional objective.

Longmire,2000

Note This level of "granularity," or size, maximizes the usefulness of the resource for assembly and reassembly to diverse learning environments. You must try to retain the big picture of how a learning object may fit within a course and the narrow focus of how it may stand alone as a learning resource by itself. Adhering to a variety of standards help you maximize the usefulness of an object. These standards are recreated in a *Standards Checklist* in the *Handbook* ([go to Standards Checklist in Chapter 4](#) of the *Handbook*).

Technology

- Can the learning object be used on both Macs and PCs?
- Does the learning operate equally effectively in both Netscape and Internet Explorer?
- Is the learning object easily accessible with standard computer software without the user having to spend time or money to upgrade?
- Is the meta-data used to describe the object one that allows for retrieval based on a variety of criteria?
- Is the object easily retrievable?
- Does the object operate in a variety of tools such as course or learning management systems?

Instructional

- Does the learning object function in a way that allows for use in different courses or as a freestanding unit?
- Have terms been standardized and is language consistent to allow for modularization in different learning environments?
- Have proper methods of Web design been used to ensure accessible and comprehensive presentation?
- Does the learning object avoid referring to previous content such as chapters, courses or objectives?

- Have technical terms been presented in easily read formats through the use of tables or bullets or through supplied definitions or glossaries?

Social

- Has the learning object been designed for a broad audience of users that would typically view this type of content?
- Does the learning object avoid use of regional, cultural or organizational terms?
- Has the learning object been designed to be inclusive for a variety of users?
- Does the learning object avoid elements that contribute to gender, racial or other biases?
- Has the resource been designed to ensure accessibility by people with disabilities?

Why Create & Contribute?

Learning objects have substantial benefits for users, but what about developers? Will faculty involved in the intense and time consuming process of content development for Web-based delivery want to contribute their work so it can be freely accessed by others?

intellectual property rights

The answer varies. Some institutions, faculty and developers of content may wish to restrict access to their work, either to collect royalties or because they want to limit the viewing and use of their work to select individuals. In this case, repositories may designate royalty fees through arrangements with individuals or institutions. Other repositories may prevent downloading of selected objects or limit viewing to only an abstract, rather than a full version.

scholarly contributions

However, some faculty may see learning object development and donation as part of their contribution to the field. They may be motivated by a sense of collegiality and the desire to contribute to a growing collection of materials.

customizability

This doesn't mean that courses are standardized with similar formats. Learning objects can be assembled to support a course that still remains the domain of the institution and the professor. Learning objects are merely resources that can be used to support the particular learning environment of the course or delivery style of the professor.

Some learning objects may not encroach on your intellectual ownership. For example, an instructor who contributes an applet or an image that demonstrates known phenomena may not see the issue of intellectual property as such a concern as another instructor who has written results of experiments on the phenomena.

marketing

Still other contributors may contribute a portion of their work as a way of demonstrating their work for professional prestige or for marketing purposes. For instance, a program that wants to increase enrollment in one of their courses may contribute a small module of their work with contact information on registration. Students interested in the material may wish to enroll. Other institutions seeking the content provided without a budget to develop may contact the creator to make use of additional modules.

leveraging contributions

Finally, momentum creates choices for faculty. Leveraging collective contributions has the potential of providing value and resources to educational communities. As learning objects are contributed, the usefulness of repositories and learning objects grows creating even more interest and potential contributions.

Teaching Use

The ways that online learning resources can be used are as numerous as the instructional styles of the educators who have created them. Your creativity and imagination are the only limits in the infinite ways that learning objects can be used to support various learning environments. As you look through the examples listed below, think of what applications are possible within your own environment.

**matching
LOs to your
discipline**

There are broad differences between disciplines in their general use of learning objects. The sciences tend to use simulations and multimedia to provide concrete representation of the abstract. Images are often more easily understood than extensive descriptions; animations and applets allow students to experiment with variables of phenomena that are usually impossible to replicate in the physical world.

The humanities and social sciences tend to use informational learning resources to foster discussion and critical thinking. Case studies, problem-based learning or cooperative learning projects are examples of online learning resources that can be used to encourage student participation and active learning.

Structuring content for your own discipline is a topic covered in [Chapter 7](#).

However, creativity is the key. Resources that provoke discussion have their place in the sciences and animations, and applets may convey a variety of concepts to a liberal arts student. Let your imagination be your guide. Compare the examples of learning objects integration in various settings, in Figure 4.10 through Figure 4.14.

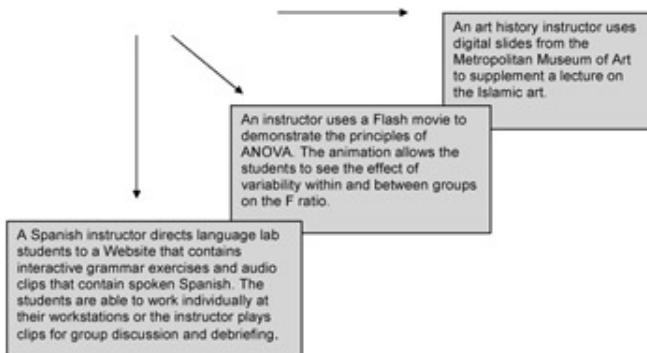


Figure 4.10: Face-to-Face

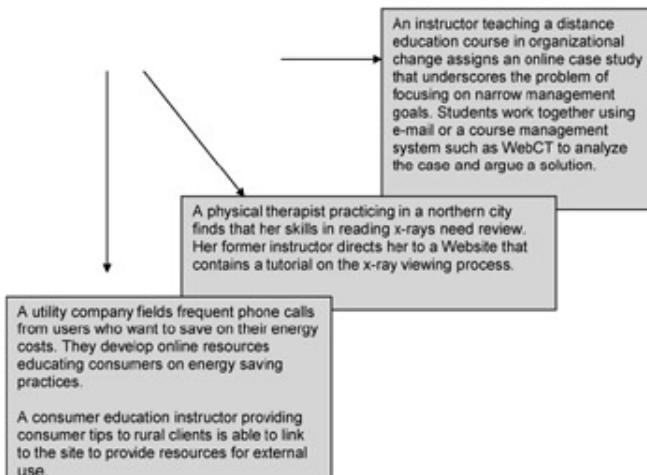


Figure 4.11: Distance Education

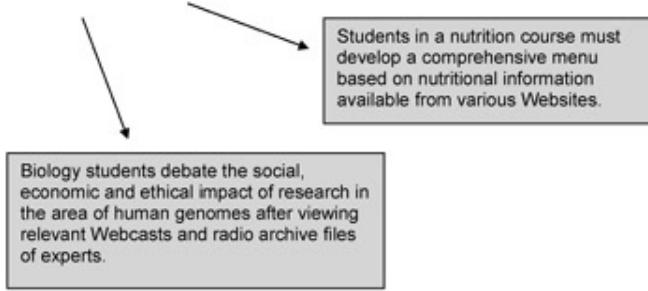


Figure 4.12: Group Work

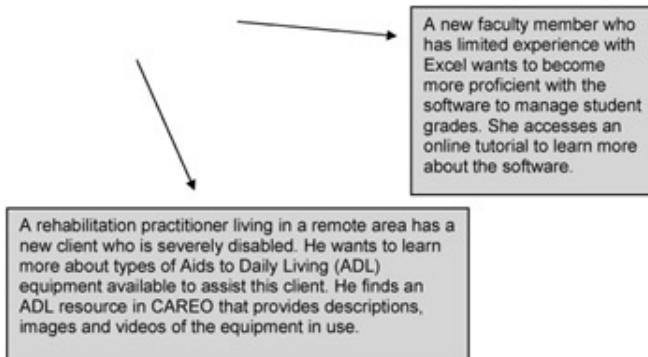


Figure 4.13: Self-Directed or Remedial

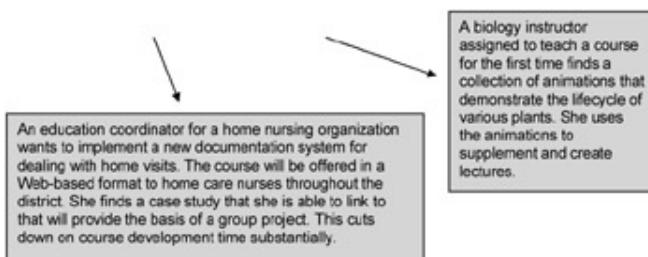


Figure 4.14: General Course Development

Future Directions?

Learning objects have been identified as a major development in the field of technology enhanced education.

use, reuse, flexibility and interoperability In idealized visions of virtual education, learning objects present a solution to the time-consuming work of online learning resource development. Learning object repositories present a model that allows for economies of scale through reuse, flexibility and interoperability.

All innovations depend on widespread integration among educators and institutions. In order for repositories to be successful, educators need to make contributions to the collections. Sizeable collections allow for variety, choice and momentum in online course development, teaching and learning. Continued momentum allows for more sophisticated communities of practice, rights management tools, professional development and co-creation projects.

We hope that as these repositories continue to grow, their value is demonstrated to instructors, learners and educational institutions.

Practice

Think of online materials in your discipline that you or other colleagues have produced. In what other disciplines might there be an overlap?

What other disciplines might you look towards for materials to supplement your instruction?

Team LiB

 PREVIOUS  NEXT 

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Wiley,D.A.(Ed.) (2000). *The instructional use of learning objects*.Association for Instructional Technology. Retrieved September 14, 2002, from the World Wide Web:
<http://www.usability.org/read/>

Williams,D.D.(2000).Evaluation of learning objects and instruction using Learning objects. In D.A.Wiley(Ed.),*The instructional use of learning objects*. Retrieved September 14, 2002, from the World Wide Web:
<http://www.usability.org/read/>

Resources

For more information on learning objects:

Alexandria - A digital content repository. Retrieved on August 15, 2003 from the World Wide Web:
<http://careo.ucalgary.ca/cgi-bin/WebObjects/Repository.woa?theme=alexandria>

Campus Alberta repository of educational objects (CAREO). Retrieved on August 15, 2003 from the World Wide Web: www.careo.org

Merlot (Multimedia educational resource for learning and online teaching). Retrieved on August 15,

2003 from the World Wide Web: www.merlot.org

Team LiB

[◀ PREVIOUS](#) [NEXT ▶](#)

Recommended Activity

The IMS Global Learning Consortium develops and promotes meta-data specifications to describe learning resources so that they can be easily located across platforms regardless of the operating systems and user interfaces used. IMS also promotes the inclusion of these standards in products and services to create interoperability in various learning environments. For more information on meta-data, the supplied link from the IMS website supplies a highly readable article on what meta-data, its definition and its importance. Check out:

<http://www.imsproject.org/drtommeta.html>

Note The *Handbook* for this chapter contains four checklists for evaluating learning objects for use in your e-Learning environment. Consolidate these lists into one list that meets your needs.

Chapter 5: From Text to e-Text - Message Design

Overview

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In [Chapter 4](#), you were introduced to the idea of learning (or educational) objects and repositories. [Chapter 4](#) emphasized the identification, retrieval, and **reuse** of learning objects that reside in repositories around the world.

This chapter assumes that:

- You have **original** content that you want to redevelop for the Web
- You intend to develop **new** content expressly for the Web

This chapter continues to expand on the idea of usability. You will learn more about making your e-Texts accessible to all readers. You will explore:

- How to write texts to maximize readability
- How to incorporate media into your texts
- The idea of e-Texts as genres
- And how to adapt existing electronic formats to e-Learning environments

You will be encouraged to think differently about designing your message. Key ideas include:

- Linear vs. hypertext
- The language of interactivity
- Engagement
- Writing for clarity, coherence, and efficiency
- Structuring e-Texts through interface
- Minimizing the e-Reader's cognitive load

Key Terms

Note This chapter introduces a number of terms and phrases that you may not be familiar with.

These terms are listed in the *Handbook* ([go to Key Terms in Chapter 5](#) of the *Handbook*).

Check off the terms you know. Then, use this list to guide your reading of the chapter.

- Semantic linking
- Converging technologies
- Instructional wrap-around
- Message design
- Cognitive load
- Hit and run
- Downloading
- Keyhole problem

Plan Your Progress

Note A concept guide for the ideas presented in this chapter is provided on in the *Handbook* ([go to Concept Guide in Chapter 5](#) of the *Handbook*). You can use this outline to help guide your exploration.

Note There is additional space for you to write the questions for which you need answers. Record your own information or learning needs in the *Handbook* ([go to Questions and Goals in Chapter 5](#) of the *Handbook*). If you have questions about e-Text message design record them here.

At the end of the chapter, check your list of questions to determine whether you need additional information and use the chart to organize an action plan.

Note A "[To do list](#)" has also been provided for you in the *Handbook* for you to record what needs to be done, who needs to do the task, and when the task should be completed by ([go to To Do List in Chapter 5](#) of the *Handbook*).

Developing Effective e-Texts

In *Designing Business*, Clement Mok says, "Because of its age and maturity, print has the power to validate just about anything in print is readily accepted as genuine." Do you think this is a fair statement?

Mok, 1996

power of print In higher education, print has tremendous power. The printed page - in the form of papers in academic journals, textbooks, and source texts - has long been the trusted source of intellectual authority for both teachers and learners.

However, in a hypertext environment print does not always convey your instructional message most effectively for a moment and think of several reasons why this might be so.

vocabulary of print Print has a vocabulary with which you and your learners are very familiar. This vocabulary includes, for example:

- Page numbers
- Footnotes
- References
- Paragraphs
- Chapter titles

...and many more terms that you can think of.

carrying the message But the vocabulary of print has been reinvented for the computer screen. In the early days of interactive media, writers treated this almost as a literal process. Remember the endless screens of text that looked like they'd been lifted directly from the original text?

Some of the print conventions have survived this rebirth into new media, while others have not. Not only do we use images, moving pictures, and sound to help carry the message, but we also have the possibility of interacting with the reader and the reader with the text.

Effective e-Writers analyze, define, and structure the relationships among ideas. They represent these relationships visually, by deciding what information will be conveyed by what medium, where the reader will find it, what the reader can do with it, and how the reader is enabled to semantically link ideas together.

4 key questions Learning to write effective e-Texts requires you to think fundamentally differently about how to structure information. Restructuring of information challenges you to think about the following questions:

1. The reader
 - a. How do individuals read online?
 - b. Who are your readers?
2. Roles
 - a. What is your role as a writer?
 - b. What is your relationship to the reader?
3. The content
 - a. Does the form support the learning function?
4. The environment
 - a. How will the environment support the reader's goals?
 - b. How will you structure the environment to reflect learning outcomes?

This latter question will be explored in [Chapter 7, Structuring the e-Learning Environment](#) and [Chapter 8, The Reader](#).

Earlier you validated your reasons for "going online." In the remainder of this chapter, you will address each of these questions as you evaluate your existing content and view it from the perspective of information or message delivery.

Thinking About the Reader

In [Chapter 3](#), you encountered some ideas to help you write inclusively and to increase accessibility. Apply them to this section to your improved understanding of your own target audience.

How Do We Read Online?

Think about how you read a book. How do you use the vocabulary of print to organize or cognitively structure information? What tools do you use to navigate the text? How do you sequence the experience? Where can a typical reading scenario might go something like this...

A Case Study Emille studies on the bus

Emille protects the time between 2 p.m. and 4 p.m. everyday to prepare readings for the next lecture. Today she had to postpone her reading time and decides to make efficient use of the time she has to spend on the bus home.

When a seat becomes available, Emille sits down with relief and retrieves her textbook and a highlighter from her backpack. She has marked the page where she left off reading yesterday by turning down the upper right corner of the page.

Many text passages have been marked with a combination of bright pink and bright yellow highlighter. Some highlighting isn't enough: Emille makes notes in the margins when she wants to pursue an idea or she wants to make a connection with other texts she's reading in the course.

For the next hour, Emille carefully reads every sentence from start to finish, then backs up and applies her pen. Because the chapter is quite long, she refers frequently to the running headers at the top of the page and the page numbers at the bottom, which follow a numbering scheme reflecting the chapter number, main section number, and smaller sub-section numbers (3-2-1.1).

The text is quite dense, but black and white photographs occasionally break it up. The images often have captions. Emille tends to look at the images before she reads the accompanying text. She finds that visual representations help her understand the concepts better than textual explanations or examples. Perhaps this is because Emille has always struggled with reading comprehension.

dyslexia.

When her vision begins to blur, Emille closes the book and rests her eyes for 10 minutes. When she is reading, she checks her progress in the chapter. She sees that she is more than 3/4 of the way through the chapter.

Compare Emille's reading experience with Shawna's. In what ways do the experiences differ? Does Shawna use different strategies or skills from Emille to complete her e-Reading assignment?

Shawna Studies Online

Shawna's course in African history meets regularly during the week, but the instructor has created a Web site that supports and enhances the class. The site contains readings, notes, images, several audio clips that accompany PowerPoint™ slide shows that were used in the last class, and a class bulletin board.

Living at home with two brothers and her parents, Shawna has difficulty accessing the household's iMac. Out of frustration she has used the student computer lab in the basement of the Humanities building. She can work on the course site after her morning class at 10 a.m., but it's almost impossible to get access to the site anytime before 4 p.m. Even then, students are restricted to 30 minutes online before they are expected to leave their station to another user.

The course site has a home page with a main menu along the right side of the 15" screen. The site has many sections. Each section is three levels deep. Although the content is mostly text, the instructor has embedded a number of hyperlinks so that readers can explore some of the ideas more deeply or follow the links that interest them.

In addition to the text passages, there are graphic images, some of which are layered. One image is a reconstruction of the Holy Land in the 10th century. Shawna can click on "hot spots" - usually cities, the boundaries of states, or other points of interest. She clicks on a city name and a map of the city's streets pops up. When she clicks on a street, she sees an artist's sketch of how that area of the city might have looked - the house styles, locations of landmarks, and places of worship. Several of these drawings are also hot, displaying artifacts, short text explanations, even music.

Shawna returns to the section she was in the day before, but can't find the precise location in the text where she forced to shut down. She scrolls through several pages of text before she recognizes the passage she is looking for. Her first impression of the page is that it is very dense, covered in text from top to bottom and from side to side. She quickly scans the page, pausing at text that is bolded and clicking on several of the hyperlinks. One link takes her to a different site, which in turn contains multiple links. In five mouse clicks, she is three sites away from the original site. If she didn't know how to use the "Go" button in Explorer™ she'd be in trouble.

Although Shawna has 30 minutes, she needs to stop and rest her eyes every few minutes. She finds the text blurring a bit. It's hard to concentrate on the passage and she re-reads certain sections several times without comprehending. She has no sense of the length of the text because she has to keep scrolling down the page.

book interface	You can see that the reading experience is quite different in a hypertext environment. In the case, both the process and the form of the information (i.e. print) are supported by the form of the book. The book is portable. It can be used anywhere and whenever Emille has a small chunk of time in which to read. It is easy for her to locate herself by turning down a corner, noting the position of the passage in relation to the whole of the book, using the well-known interface features.
bookmarks	Shawna, on the other hand, must read in a particular, anchored setting. Although she knows the conventions of bookmarking (e.g. bookmarking a site), she is not as comfortable in this format as she is with a textbook. Besides, public computer labs often clear bookmarks at the end of the day. In the campus context, she must pace herself differently - there are long periods of time in which to work. Some of that time must be devoted to orienting herself at her assigned workstation, such as powering up the computer, authenticating on the Internet by using a login and secure password, finding the right folder, and re-locating the page she needs.

vocabulary of print

Her reading is interrupted with hyperlinks embedded in the text, which she is tempted to follow. She tries to use the vocabulary of print to guide her, but the e-Text has a different vocabulary. There are many links, pop-up windows, pull-downs, etc. Accustomed to reading sequentially, or in a linear process, and in a one-dimensional format, she doesn't have a good sense of the hyperspace, which is different in depth and breadth.

Finally, consider the process of reading online itself. Consider the reading tools - a keyboard and a mouse to move around the screen. Consider the light source... Shawna is also looking at pictures, listening to sounds, watching animation, and linking chunks of information together. Is your experience when reading online similar to Shawna's?

Implications for e-Writing

79% of users scan the page instead of reading word-for-word

Reading from computer screens is 25% slower than from paper

Web content should have 50% of the word count of its paper equivalent

Try a small experiment. Read a textual passage online. Do you have a sense of the information architecture? Do you understand the hierarchy and relationship of ideas? Do you read every word on the screen? Do your eyes sweep steadily from left to right and top to bottom? What attracts your eye?

Note The Handbook contains the table, *The Reading Experience*, to help you compare the "reading" environment and process in several formats. Fill in the cells as you think about "reading" from this perspective. *Reading Experience* in [Chapter 5](#) of the Handbook).

In 1997, Nielsen and Morkes published the results of a series of studies they conducted in the SunSoft laboratories in Menlo Park, CA. They wanted to study the reading behavior online of technical and non-technical users.

They found that:

onlinereading behavior

- Users want to search
- They don't like to wait
- Simple sentence structure was preferred
- Informal was preferred to formal style
- Scanning is the norm
- Text should be short (or at least broken up)
- Users like summaries and the inverted pyramid writing style
- Hypertext structure can be helpful
- Graphical elements are liked if they complement the text
- Users suggest there is a role for playfulness and humor in work-related Web sites

information seeking

Information seeking as a process may require new skills and strategies as well. Chun Wai Choo, Brian Detlor, and Don Turnbull compare how "knowledge workers" seek external information from traditional print and Web sources. [Figure 5.1: Information Seeking on the Web](#) is an adaptation of the work of Aguilar and Ellis and other information scientists.

	Start	Chain	Browse	Differentiate	Monitor	Exit
Literature Search Moves	Identify sources of interest	Follow up references found in given material	Scan tables of contents or headings	Assess or restrict info. according to usefulness	Receive regular reports or summaries from selected sources	Syst work to id mat inter
Anticipated Web Moves	Identify Web sites or pages that contain or point to info. of interest	Follow links on starting pages to other contentrelated sites	Scan top-level pages: <ul style="list-style-type: none"> ■ Lists ■ Headings ■ Site maps 	Select useful pages and sites by using: <ul style="list-style-type: none"> ■ Bookmarks ■ Printing ■ Copying ■ Pasting Choose preselected sites	Receive site updates using e.g. - Push -Agents -Profiles Revisit 'favorite' sites	Syst sear site infor inter site

Figure 5.1: Information Seeking on the Web— An Integrated Model of Browsing and Searching
http://firstmonday.org/issues/issue5_2/choo/index.html

differences in design Nielsen and his colleagues and other usability and educational experts have concluded that reading on the Web is not the same process as reading from a printed text. They have found that, while the guidelines for "good content design," or writing, prevail in many forms that Web design and print design have some fundamental differences.

The vast majority — over 3/4 — of e-Readers scan a Web page, searching for "nuggets of useful, credible information amid the info-torrent." This means that instead of reading most of the text, from right to left and from top to bottom (as in English and other Western European languages), their eyes sweep the screen, alighting on words that are meaningful to them. They are seeking out differences in fonts or font sizes, reading one sentence in each paragraph, looking quickly for a key statement, etc.

why users scan There are reasons why many Web users prefer to scan rather than read systematically. Can you think of additional possibilities besides those suggested?

- Reading from a screen is 25% slower
- The screen resolution of current monitors is too low (in some cases, only 10% of a printed page)
- Screen size can be smaller than a page of printed material.
- Light sources are different and screens consistently refresh, causing eyestrain
- e-Readers are more active in the process - they want to move on, to interact
- Awareness of the vastness of information encourages e-Readers to move quickly and seek quick semantic answers
- Reading text online requires spatial and relational processing abilities
- e-Readers tend to alternate between multiple sites, or interlace, sometimes keeping multiple windows open

Implications for e-Writing

The Web is a different reading environment. Reading on the Web may require both writer and reader to adapt to this environment.

themselves to a different information experience, which uses different tools, vocabularies, and conventions.

The e-Reader encounters a space in which he/she must organize the reading task to take advantage of relational skills in a format that does not make reading easy or comfortable. Issues of access, temporal and perceptual requirements, and process combine to encourage a less structured, "shallower," more open approach to information retrieval.

The e-Reader tends to *scan* a text rather than read it systematically and deeply. Research shows that readers have difficulty finding a specific piece of information when the page contains edge-to-edge text, so they will try an alternative. Very often, they will read only the first sentence or look for links on the page. Links will attract attention because of the colour contrast.

The e-Writer, then, has a new task - to write in a different style and sometimes with a different purpose. Writing for scannability and readability requires new skills and knowledge. These ideas will be expanded in chapter 2.

links attract attention The e-Reader, especially sophisticated Internet users, also expect something quite new from the e-Writer - interactivity. As the e-Reader expects to become more actively involved in co-creating the experience, the e-Writer might need to adapt to a role in which reading and writing is a more equitable partnership.

Thinking about Roles

What is the role of the writer in the new digital world?

- Do you see yourself as bringing order out of the chaos of the Internet?
- Are you writer-as-researcher - of content, of audience, of structure?
- Are you a designer as well as writer?
- Or has your role changed at all?

In [Chapter 2](#), you evaluated your reasons for deciding to develop an e-Learning environment. We suggested five reasons to build a Web-based course:

1. Multiple perspectives

To provide access to a wide range of perspectives, information, and current, authentic representations

2. Semantic linking

To provide the learners with the opportunity to make personal sense of information through organization and categorization (semantic linking)

3. Diverse learning needs

To support a wide range of learning style preferences and perceptual modalities

4. Communication

To overcome barriers of time and place promoting communication and reflection

5. Global access

Global access to a learning environment

interaction

Each of these reasons assumes that you expect your learners or readers to become active participants in the experience. In other words, in choosing the Web as a medium for instruction, you know that there is the use of end, content on the other, and that interactivity is the cornerstone. Interaction implies that at least two individuals are involved with each other (and the content), creating a unique information experience. In e-Writing, the writer

embedded in a process that is fluid and collaborative.

Domenic Stansberry, 1998

An effective writer will design the e-Text so that learners are provided with advance organizers, questions that encourage higher-level thinking, opportunities to communicate, activities that require the use of many modalities and in and the freedom to make decisions about their own paths to understanding.

Think about the intended goals and outcomes of an e-Learning experience. If these outcomes do not support the reader to actively shape the learning, you should rethink moving to Web-based instruction, if a more unidirectional, print-based environment is more appropriate for the task.

Compare these two Web sites. Which one is designed to encourage co-participation? What design or style reflects this goal?

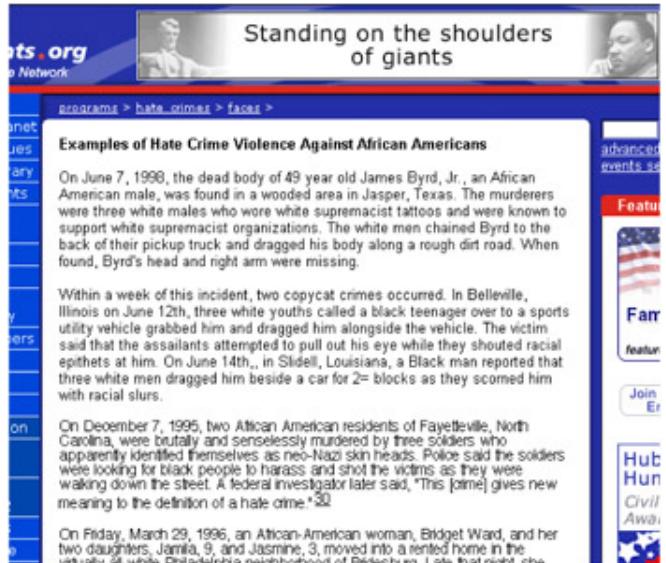


Figure 5.2: Examples of Hate Crimes Against African Americans Civilrights.org (http://www.civilrights.org/programs/hate_crimes/faces/black.html)

A screenshot of the Black History Month Treasure Hunt and Quiz website. The title "Black History past to present" is displayed prominently in green and red. Below the title, it says "an interactive Treasure Hunt". There are links for "Instructions", "The Questions", "The Internet Resources", and "The Big Question". A link "Return to the main Black History Month homepage" is also present. The "Instructions" section provides details on how to use the treasure hunt, mentioning a resource list and feedback options. The "Big Question" section is described as a part where users create an opinion/thesis statement about Black history. A note at the bottom states that the point of the page is not to take a test, but to learn information.

Figure 5.3: Black History Treasure Hunt and Quiz Black History—Past to Present (http://www.kn.pacbell.com/wired/BHM/bh_hunt_quiz.html)

Now examine this piece of text. Can you rewrite it to encourage reader interaction?

Note When you are satisfied, compare your rewrite to the example in the *Handbook*([go to Rewrite for Chapter 5](#) of the *Handbook*).

Sample Text

Susan B. Anthony, a powerful speaker and writer, campaigned for temperance and abolition as well as rights. Like many suffragettes, she saw parallels between the lack of rights and opportunities for women and the bondage of slavery. When the Fourteenth Amendment to the Constitution granted the vote to black men, it fought unsuccessfully to have women included. In this speech from 1859, Miss Anthony urged her audience "make the slave's case our own." She further entreated, "Let us feel that it is ourselves and our kith and kin who are despoiled of our inalienable right to life, liberty, and the pursuit of happiness, that it is our own backs bared to the slave-driver's lash... that it is our own children, that are ruthlessly torn from our yearning mothers."

Summary

Effective Web writers:

attributes of the e-Writer

- Address a worldwide audience
- Are graphically and technically literate
- Are able to determine the most appropriate medium for presenting information
- Are particularly specific and succinct, because readers require immediate and understandable information
- Understand and support the uniqueness of the e-Reading process
- Are able to design texts to actively involve the reader

Adapted from [Korolenko, 1997, p.89–90](#)

Implications for e-Writing

Web-based texts can provide an opportunity for interaction or for co-participation in the reading experience. You can increase interaction with your readers in several ways. Can you add to this short list?

- Include hyperlinks
 - Use questions to guide the reading
 - State the expected learning or information outcome
 - Specify a higher-order cognitive goal
 - Provide an opportunity for two-way communication
-

Thinking About the Content

"The presentation of information provides the foundation for online learning. The physical layout of online content is a key component in the overall presentation. One aspect of layout is the arrangement of text, and given that current online content is textual, this factor is fundamental in determining the effectiveness of a presentation."

[McMullin, Varnhagen, Pheng Heng & Apedoe, 2002](#)

Any time spent on the Internet will support the observation that most content is textual. Unfortunately, most content is presented in a linear, sequential manner, which is not typical of the original and has not been adapted to a spatial, hypertextual environment. Once again, ask yourself the question:

Will my content support an interactive information or learning experience?

Your content may not currently reflect this Web requirement, but you can learn to repurpose it effectively for other purposes. In the first two sections, you were introduced to the e-Reader's expectations. You saw that most e-Readers expect content to be presented in a linear, sequential manner.

to read hypertext very differently from print. In this section, you will explore how to support this process by turning linear texts into e-Texts.

Linear vs. Hypertext

In the digital writing world, e-Writers do not all agree that traditional texts are linear, although most agree that they are not! Will Shetterly argues that all writing could be seen as non-linear. He says:

We, the reader/observers, receive information from the artist and put the pieces together in our own way. It is true that comics allow the reader to choose the order in which information within a panel is received. Is it better to read the words first, or look at the art, or scan one, study the other, then study the first again? But readers can have different ways of receiving information; some read every word, some scan; some scan a work or read it again more slowly. Either all art is "nonlinear," or none is.

Korolenko, 1997

We do expect e-Learners to be effective readers of traditional texts. However, there can be fundamental differences between these texts and hypertexts. Essentially, hypertext is a computer-based system for retrieving text that allows the reader to extend the text through linking to other texts and e-Texts.

Unlike linear texts, in hypertexts information is organized spatially.

hypertext is nonlinear Troffler defines hypertext as interlinked pieces of text or other information stored electronically. An entire hypertext structure forms a network of topics and links. Through hyperlinks, readers actively determine the order or sequence of topics that they will follow by browsing or navigating.

Compared to linear print documents, in hypertext the reader has more options or control over the process. They should know how to structure the hypertext so that these options are included and that the reader is able to use them to accomplish the information task.

reader control Try this. Break your text content into single ideas or concepts. Write each on a file card or a "sticky note". Now pin the cards up so that main ideas are in proximity to all their related sub-concepts. Connect the families of ideas to each other, then connect the main ideas to other main ideas. In the end, you should something that looks like this:

A semantic web can be a metaphor for hypertext - ideas are related to many other ideas on different levels in different ways. The semantic web in [figure 5.4](#) was created using Inspiration™. Inspiration™ is one mapping tool that helps you develop hypertext content.



Figure 5.4: Semantic Web

[Figure 5.5. Linear Compared to Hypertext](#) shows a comparison of linear text with hypertext.

	Linear Text	Hypertext
Medium	Print	Internet
Media	Text, drawings, graphics, photographs	Text, drawings, graphics, photographs, video, communications
Context	Contained	Spatial network
Structure	Sequenced by chapters, etc.	Nodes and links
Orientation	Within confined document	Entire Internet
Size	By document (page number)	Unknowable, infinite
Navigation	Indices, chapters, page numbers	Menus, links
Reading tools	Eyes (or assistive technology)	Eyes (or assistive technology), keyboard, mouse
Reading process	Sweeping	Scanning
Control of text	Reader control	Reader control, possible disorientation

Figure 5.5: Linear Compared to Hypertext

When To Use Hypertext

Although an effective e-Learning environment encourages and supports the use of hypertext, you should first consider whether this format meets your e-Learning goals and intended outcomes. There are many ways to increase the effectiveness of hypertexts. One approach is to use hypertext to support learning objectives.

Nielsen suggests three idea uses for hypertext:

1. There is a large body of information organized into numerous fragments.

3 uses forhypertext

2. These fragments relate to each other.
3. Readers need only a small fraction of this information at any time.

A text document should go online unaltered only if there is an advantage over making the document available for example, if the information in a document needs to be revised frequently and the most recent version must be available to a large audience in a short period of time. In this case, a linear text made available in a PDF for a long, scrolling document online is appropriate. Can you identify another example from your own experience?

A Case Study

PallCare

PallCare is an online course designed for health care related professionals involved in end-of-life care. Participants include doctors, nurses, pharmacists, social care workers and spiritual advisors. The learning design reflects a problem-based approach, in which multi-disciplinary palliative care teams work collaboratively through one or two cases over the length of the course, involve increasingly complex medical and affective issues.

For the pilot delivery of the course, the instructor planned to make all the resources available from the course website: case descriptions, all patient artifacts (charts, orders, etc.), medical articles, supporting documentation, learning assignments, additional references, etc. Most of the materials were in linear text. The participants were expected to either read these materials online or download them and print them to read in paper format.

Although the course evaluations were positive, participants indicated that it was difficult to read such a quantity of material online; and those who encountered problems downloading and printing all the materials were frustrated. This led to a range of technical and access problems associated with downloading the materials and thought that the materials should have been provided in course packages as part of the course fees.

The course was re-designed to address these concerns. All textual materials that were linear were pulled out and included in a course pack with additional papers, artifacts, and cognitive learning tools (e.g. outlines to be completed). Any materials that would be more effective as hypertexts were re-purposed and left on the site. The new materials included interactive activities, links to related sites and online databases, and computer conferencing.

In the second course evaluations *both* participants and conference facilitators were happier with the format of the materials.

The story of this course is online at <http://www.atl.ualberta.ca/whatisatl/newsletter/fall2000.pdf>

Note *Checklist: Using Hypertexts* helps you decide whether you should redesign your linear text into a hypertext. This checklist can be duplicated from the *Handbook* to help in your decision-making.

Use hypertexts to provide:

- q Documentation
 - q By general or specialized references
 - q By topic
- q Short, self-contained topics
- q Background information
- q Extended or supplementary information
- q Multimedia (e-Texts)
- q Three-dimensionality
- q Multimodality
- q Online communications
- q Multiple paths to a topic
- q Active links to alternative information sources

Reading Hypertext

convergence The e-Writer will probably depend on text to convey a message. But, with new converging technologies and with improved bandwidth, you now have information elements that can carry or extend the message. As Emma Bull points out, you have new elements that have emerged directly from the digital writer's need to involve the reader. These elements include sidebars, pop-up and pull-down menus, rollovers, drilling, visualization, and so on

In this section you will learn the vocabulary of hypertext or the *language of interactivity*. Creating these elements will require that you learn to use the necessary tools. Even if you are working in a Learning Content Management System and don't plan to use more sophisticated tools, it is useful to be able to understand how readers carry out online information experience.

controlling presentation and depth of experience In the previous sections, you were inundated with the notion of interactivity. One aspect of interactivity is human - the reader and the writer in a "dialogue" with each other. The second aspect, the reader interacting with the content through functions built into the Text, increases his/her control over presentation and depth of information.

Let's take a look at some of the elements that are somewhat unique to digital texts. A partial matrix has been provided for you in [Figure 5.6](#). A short explanation and an example accompany each "language term." Think about where you would use these elements.

Element	Function	Example
Hyperlink	Takes the reader to a different location in the site or to another site.	Nuclear Power in Seaside http://powayusd.sdcoe.k12.ca.us/mtr/TreasureHun
Hot spot	A clickable spot in a picture or text.	Ask Jeeves http://www.ask.com/
Drill down	An image that has many underlying layers. Clicking on the hot spot allows you to "peel back" a layer.	National Gallery of Art http://www.nga.gov/
Pop-up	A small window superimposed on top of a hot spot or link.	MSNBC www.msnbc.com
Roll-over	When the mouse is moved over the screen, various hot spots containing additional information are revealed.	Woof! It's a Dog's Life http://www.pbs.org/wgbh/woof/home.html
Dialogue box	A window that Contains fields, buttons, and often layers.	Online forms, e.g. contact forms http://www.lynnfeatherstone.org/contact.htm
Menu	Menus show a hierarchy of choices to make. Menus come in many forms (e.g. pull down).	Compare Consumer Reports and Consumer Repo Map http://www.consumerreports.com/main/home.jsp
Pull down	The menu will stay stable if the mouse button is depressed.	Epicurious: The World's Greatest Recipe Collector http://www.epicurious.com/
Scrolling	Equivalent to page turning.	Essays on the Philosophy of Technology http://commhum.mccneb.edu/PHILOS/techessay.htm
Keying in	The reader uses the keyboard to provide information	Ask Jeeves
Image map	A type of menu where hot spots are hidden under related images. Sometimes a metaphor.	Fashion Planet http://www.fashionplanet.com/
Sidebar	Contains additional information or links that extend the text. Is usually placed to the right of the text.	CLDLN: Learning Resources and Technology http://cndl.s.georgetown.edu/learning.htm
Plug-in	An application that must be downloaded or added to the reader's machine to allow him/her to play video, read Javascript, etc	Planet Earth: A suite of web-based activities http://powayusd.sdcoe.k12.ca.us/projects/MT&R/D

Figure 5.6: The Language of Interactivity

Note An extended version of this matrix, *The Language of Interactivity* is in the *Handbook* ([go to The Language of Interactivity in the Handbook](#)). As you learn each term, try to complete the chart. When you have it completed, you will have a partial guide to help you decide how to use these elements.

Note Hypertext can easily disorient readers. Have you ever been disoriented when visiting a site or as you move between multiple sites? Can you think of some ways to reduce the likelihood of this happening? A short paper discussing this topic, *Adult Learners and Hypermedia Environments* is contained in the *Handbook of Adult Learners and Hypermedia Environments* in [Chapter 5](#) of the *Handbook*.

If you feel confident that your content can be redesigned into hypertext, ask yourself an additional question:

What kind of content works well (or best) in hypertext?

Since the early nineties, the Internet has functioned primarily as an information repository. Many authors have used HTML (Hypertext Mark-up Language) much like a word-processor and the Internet as a publishing medium. As the book metaphor is so familiar to e-Writers and readers, it is no wonder that a large proportion of the millions of sites resemble books - page after page of text, organized how a book would be organized.

form/function However, the book has endured for centuries for good reason: the form follows function. The book is efficient, portable, linear, easily interruptible, static, dense...and flat, stable form. These characteristics support the book's function. For information presentation like print and photographs are supported. Because the Internet has a different function, to be effective its form has some fundamental differences. Interactivity is one key difference in online environments; customizability is another. The content form must support these two characteristics. Consider the following questions:

- Is the content in your discipline structured in a particular way?
- For example, are new concepts built inductively or deductively?
- How are texts analyzed?
- Is the content often problem-based or is it highly didactic?
- Does content in your discipline work best in a textual and linear format?

The content will work best in a textual and linear format, think again about moving the content from your content into a spatial, hypertextual environment. Instead, think about creating "instructional wraparounds" such as an interactive online discussion centered on a specific text. Continue to provide the flat texts *offline*.

Clement Mok, in *Designing Business*, synthesizes the form/function, content/structure concept by comparing the intended purposes of various "[genres](#)" and related content structure and writing elements. [Figure 5.7. Goal-Information Design](#) is based on, and expands, some of his ideas.

If you want e-Readers to:	Then the site will need...
Learn and retain	<ul style="list-style-type: none">■ To clarify■ To simplify■ To be direct■ To provide repetition and reinforcement■ To provide authentic examples and practice■ To be modularized■ Include assessment and remediation■ To present information in a variety of modalities

Have fun	<ul style="list-style-type: none"> ■ Variety and surprises ■ Randomness and wit ■ Unpredictable events that change each time the 'product' is used ■ Ways to interact ■ Media
Understand	<ul style="list-style-type: none"> ■ Conceptual explanations ■ "How it works" illustrations and videos ■ Graphs and charts ■ Simulations ■ Practice with feedback
Experience	<ul style="list-style-type: none"> ■ A high level of interactivity ■ Learner control ■ Realistic sights and sounds ■ Authentic experiences (e.g. role play)
Join	<ul style="list-style-type: none"> ■ Well-defined features ■ Clear explanations ■ Current events and archives ■ Toll-free numbers ■ Interactive order forms
Get answers	<ul style="list-style-type: none"> ■ Reference-style organization ■ Fast access ■ Searchable index of contents ■ Site map ■ FAQs ■ Live response to queries (e.g. Ask Jeeves)

Figure 5.7: Goal-driven Information Design

Note This table is repeated in the *Handbook* as a checklist ([go to Checklist: Goal-driven Information Design Chapter 5 of the Handbook](#)).

The effectiveness of your *message design* depends upon decisions you make about your goals, the forms of discipline and content, and the learning contexts of your audience.

In the next section you will begin to think of your texts in these terms.

Message Design

design for learning Think about the word *effective*. What does this mean to you as a designer/ writer for e-Learning? How will you know that your message is effective?

In Chapter 2, you explored your own reasons for "going online." You saw that you cannot *design* learning, yet design for learning. Good message design is a case of designing for learning. And, designing the message in optimal way for learners to be able to achieve defined learning outcomes.

Haughey, 2002

Compare Figures 5.8 and 5.9. One site been designed for a hypertext environment; the other has not. What form distinguish one from the other?

The screenshot shows a yellow header bar with the text 'Abeleto' and 'Web usability, design & learning'. On the right, there's a sidebar with 'Tutorials' and 'other resources: Overview of tutorials, In-depth articles, Links'. The main content area contains text about web writing, followed by a section titled 'How to write usefully for the Web?' with a 'Content' heading and a bulleted list of topics.

This is a practical tutorial to teach you some of the special requirements of usable writing for the Web. We will discuss and practise ways to present your ideas to the best effect for this medium and why this takes a different approach from other media. The tutorial contains examples and tasks to make the experience interactive. Suggestions for improvement are always welcome. I assume that you are already familiar with the World Wide Web and email at the level of a non-specialist end-user. An introduction to these topics is available in this section.

How to write usefully for the Web?

Content

We will look at the following issues:

- What makes the Web different from other media?
- What do readers want and how do they read? (exercise 1)
- What do you want and how do you make it into effective writing?
- Three features of good web writing:
 - Be concise - never waste words (exercise 2)
 - Apply structure - be a good guide to your readers. (exercise 3)
 - Stay informative and objective - rather than persuasive and provocative. Avoid hot air.

Figure 5.8: How to Write Usefully for the Web©asper Sprengers, 2003 How to write usefully for the Web (<http://www.abeleto.com/resources/tutorials/webwriting.html>)

Usability = Engagement

The second reason usability is not opposed to fun is that the greatest joy of using computers comes through user empowerment and engagement. It's very enjoyable to visit a website that works, where everything just clicks for you. In contrast, a user interface that doesn't do things the way you want feels sluggish, unpleasant, and possibly even hostile, despite the designer's no doubt sincere attempt to invoke positive emotions. A user's personal experience trumps anything the designer is trying to communicate. In talking about a design's "look and feel," feel wins every time.

As an example, Amazon.com uses associative links to create a fun and rewarding experience for users. Each book page offers associative links to five books frequently bought by other people who purchased the book you're interested in. Following these links can lead to a powerful feeling of discovery. As a result, you can easily spend much more time shopping on Amazon than is dictated by the simple efficiency metric of buying the book you came for as quickly as possible.

Such engagement requires usability. If users can't master the interface, they'll feel oppressed rather than empowered, and are unlikely to explore or use anything beyond the absolute minimum. On the Web, this "minimum" often turns out to be one or two page views, and then users are gone -- never to return.

There is certainly more to an enjoyable activity than the mere ability to complete it. At the

Figure 5.9: User Empowerment and the Fun Factor— Jakob Nielsen's Alertbox© Jakob Nielsen, 2003 empowerment and the Fun Factor— Jakob Nielsen's Alertbox (<http://www.useit.com/alertbox/20020707>)

Keep in mind the following:

scanning characteristics

- Remember that the e-Reader will scan the content rather than read it as a "page."
- He/she will find it more difficult to read from a monitor and might need to take frequent breaks.
- He/she is looking for clues about the relationships of ideas, where the most important ideas are located; where the eye needs to go.
- Hyperlinks will attract the eye, as will other elements that provide a key about information hierarchies.
- The tendency is to read quickly then move on, perhaps keeping many web sites open at once and moving back and forth among them.
- In a hurry, the e-Reader might scan only the top third of the screen.
- He/she needs an idea of the structure and depth of the site so progress can be measured.
- The e-Reading experience needs guidance and direction - map of how to navigate through it.

In this section, you will see how to improve readability by supporting these needs. As you read, have one of texts in front of you to try these ideas.

Guideline #1

Enhance scanning by providing clear links, headings, short phrases and sentences, and short paragraphs.

From Print To Web

screen resolution

The computer screen is a hard medium for readers. Sentences in dense text passages are difficult to read. Screen resolution is 1/3 of that of the printed page. The actual readable area is roughly 75% of this screen. The monitor also refreshes many times per second creating eyestrain.

decreasing cognitive load

Remember that about 3/4 of users scan a screen page. When you scan, your eye moves rapidly around the screen, searching for clues about the structure and importance of information on the page. The e-Writer's job is to make it as easy as possible for the reader to obtain the key information in this space. Part of this task involves decreasing the cognitive load for the reader.

There are several ways to accomplish this. First, try this experiment. As with Web sites, many readers tend to scan newspapers, then return to stories of interest to read them through. Hold the front page of a newspaper far away from you so that you cannot read the print. What print elements provide clues to the reader about the structure of the page?

How many of these elements did you think of?

- Size of heading
- Relationship of headings to each other
- Use of sub-headings
- Type of emphasis (e.g. italics)
- Use of color
- Placement of story on the page
- Whether story is contained on one page or continued on another page
- Use of whitespace
- Use of captions
- Use of images
- Size and placement of images in relation to the story
- Nature and placement of navigation clues (e.g. index)
- Others?

Each of these elements helps you decide how to organize your reading experience, without even reading a word. You can use the same elements and more for the same purpose in hypertexts.

Headings

The location, size, and style of heading tell the e-Reader how information elements relate to each other in a document. For example, a heading in a

Times, 22 Point, Bolded, and Uppercase

font suggests that the following text is more important than the

Times, 14 point, normal, lowercase, sentence format heading.

Guideline #2

Use many, carefully selected headings, with names that conceptually relate to the information or function they describe.

Well-designed headings provide strong cues that inform e-Readers about a page's organization and structure. They also help classify information on a page. The reader will scan the screen for headings before reading text. You can use headings to draw the reader's eye to the key points in your text. Sometimes readers may fail to read past a heading if it is not descriptive. In such cases, the use of summary paragraphs in a larger font may retain them a bit longer.

In general, e-Writers do not use enough headings or enough variety in headings to carry part of the information message. Look at your own text and note where you can insert headings that carry meaning, even out of context.

But headings alone do not improve scannability. Many headings provide no information about the content to the reader. For example, which of these headings is more informative?

- a. Inviting Ideas

or

- b. Designing Exciting and Engaging Party Invitations

Although heading "a" is more creative and shorter, heading "b" provides more precise information about the accompanying story. The e-Reader may read *only* the titles or headings on the screen before moving on. C may not even slow this reader down enough to read the first sentence!

Guideline #3

Increase the number of headings.

Guideline #4

Use a variety of forms and levels of headings (style, font size, etc.) to convey information hierarchies.

Guideline #5

Write simple, straightforward headings that contain information about the content.

Style Elements

The standard font size for e-Text has been 12 point, reflecting research on type size for print. While 10 point might slow reading performance. Even 12-point may be an accessibility problem, especially for users with visual acuity (e.g. middle-aged or older readers).

Tullis, Boynton & Hersh, 1995

Experiment with the font size. You might find that 14-point text is more readable on a computer monitor. Using font size will also limit the number of words on the screen (that's a good thing). Finally, a larger font size will catch the eye and can be used to signal importance.

Guideline #6

When appropriate, increase the font size.

Certain fonts work better online than others. Some experts suggest using a screen font that is sans serif, to increase reading speed. Fonts that are familiar to the e-Reader, for example Times Roman, Georgia, Helvetica, and Arial, also enhance readability.

Boyarski, Neuwirth, Forlizzi & Regli, 1998

An exception: if you expect a long scrolling piece of text to be printed, use a font recommended for print.

Compare a serif font with a sans serif font.

A. Times Roman
(serif)

B. Helvetica (sans serif)

Guideline #7

Use familiar fonts, sans serif if possible.

Guideline #8

Use fonts consistently.

Killian, 1999

Bernard, Chaparro, & Thomasson, 2000

Lynch & Horton, 1999

font style

Finally, use style elements carefully. Font style can either improve or reduce readability. For example, italics difficult to read online. Underlining has little effect on retention and, like italics, is difficult to read online. All t while signaling significance, is also quite difficult for the eye to track, and slows down reading, both online a. Bolded text reflects significance and in some cases improves the visibility of text on the screen. But what im a screen full of bold text give your readers?

McMullin, J., Varnhagen, C.K., Pheng Heng, & Apedoe, X., 2002

Newby, Stepich, Lehman, and Russell, 2000

Horton, 1999

Garcia, 1997

Guideline #9

Use style elements carefully and only to carry meaning (clues to the nature of the content). Don't use u emphasis.

color The e-Reader often enters through a visual element on the screen. This element could be the lar visual mass (e.g. a heading), the arrangement of text, or the use of a color, which alters the eye's trajectory. Elements in bright color such as red may immediately create attention. Muted colors dc have this same effect. Remember, however, that color should be used with caution, as color itself carry symbolic meaning.

Of course, you would never use blue, underlined text for emphasis unless it was a hyperlink!

Guideline #10

Use bright color to attract the eye.

Figure 5.10, All Things Web: Re-visioning Document Structure, shows the use of headings, color, emphasis sidebars. Do you find these elements to be effective in enhancing the e-Reading experience of this text?

The screenshot shows a web page with a green sidebar on the left containing links: 'HTML Watch', 'Webmaster's Corner', and 'About ATW'. The main content area has a grey background. At the top, there is a red header section with the text 'Everyone's an editor'. Below this, a large block of text discusses how every page on the Web becomes a potential target for hypertext, noting that search engines already allow users to create their own ad hoc virtual documents. A sub-section titled 'With the advent of the Web, a document is no longer a clearly definable entity with recognizable boundaries and limits.' follows. Further down, another section titled 'Fundamental Transformations' discusses the implications of this shift. The overall design is minimalist and focuses on the text content.

Figure 5.10: All Things Web— Re-visioning Document Structure ©Terry Sullivan, 1998. All Rights Reserved with Permission. All Things Web— Re-visioning Document Structure (<http://www.pantos.org/atw/f-3542>)

Follow these guidelines to improve the readability of your own text.

Whitespace

Dense text on a screen may relate to search performance, but poorer comprehension. The physical layout of the screen is a key component in the presentation of information in e-Learning environments. Non-text blank space separating different units of information, reducing line lengths, and providing clues to the organization of content. By applying the informal rule, "divide" your page into three columns, a wider column "bookended" by two narrower ones. The central column should be approximately half the width of the screen. Use this space for your text.

vertical and horizontal whitespace	With its wide margins and uncluttered format and spaces 'around' chunks, whitespace facilitates reading, reviewing, and note taking. Whitespace may be vertical or horizontal. Vertical whitespace represents a comma, letting the readers "breathe" as they move from one information chunk to another. Horizontal white space provides a sense of visual relief, reducing crowding. This enhances legibility.
---	---

Effective use of whitespace can be a very important screen design element for enhancing readability because:

- May help decrease the need to scan across the entire monitor
- May increase reading speed
- May prevent the influence of distracting or unimportant information
- Can play a role in spatially organizing associated information
- Separates elements and creates a feeling of openness

Compare the use of whitespace in these two Web sites. How does it enhance the reading experience?

The screenshot shows a web page titled 'TEACHER HELPERS CRITICAL EVALUATION INFORMATION'. The page features a sidebar on the left with a purple background containing links like 'Teacher Store', 'Favorites', 'Brain Boosters', 'Clip Art Gallery', 'Puzzlemaker', and 'Science Fair Central'. The main content area has a white background with a large amount of white space around the text. It includes a heading 'Critical Evaluation Surveys', a list of survey links, and a section 'Information by the Author' with a link to an article. The overall layout is clean and spacious.

Figure 5.11: Kathy Schrock's Guide for Educators. Used with permission of Kathy Schrock and DiscoverySchool.com Kathy Schrock's Guide for Educators (<http://school.discovery.com/schrockguide/>)

e-Learning obstacles

Content delivery:

Effective online materials and content and learning environment

- + Lack of support for the collaborative and dynamic nature of learning
- + Lack of standards for locating and operating interactive platforms- Independent materials
- + Lack of incentives and structure for developing and sharing content

Methodology

Very often technology based decisions are made by technical personnel who base their decision on personal use, attendance at vendor sponsored workshops, reading about it in trade publications, or having used other products from the same vendor

Privacy & Security

The recent and current attacks on major internet sites have a lot of us Educators questioning the impact on e-learning. If major websites are vulnerable to hacker attacks, does that raise issues of security for learning and training sites. Could a disgruntled ex-employee bring down the learning portal at a company with a hacker attack?

Watch for three levels of Digital Filtering to be placed into action in the years ahead. Personal, organizational and Environmental. Personal Filters will be actions or formulas for preferences activated by an individual. Organizational Filters will be activated at the enterprise level. And Environmental Filters will even take the shape of "cloaking" devices that block intrusion into certain concert halls or conference rooms.

Evaluating e-Learning

Figure 5.12: Online Education at the Teaching Portal Online Education at the Teaching Portal (<http://www.teachingportal.com/#define%20e-learning>)

Using the newspaper exercise as a guide, re-organize your text to make use of whitespace. When you have hold it away from you to assess the impact of whitespace. Is the information structure more clearly revealed

Guideline #11

Use vertical and horizontal whitespace to enhance readability.

Guideline #12

Use about the half the screen width for the text area.

Chunking

hit and run Many e-Readers take a "hit and run" approach - visiting a site, scanning the first screen quickly clicking on a link, then moving on.

In order to interest these readers, large sections of text should be broken up logically. At least one *complete* information should be contained on one screen. In nonlinear writing, one piece of information is a "chunk." A Writer, you will link these discrete ideas, or chunks, together in a rich, contextual web so that they may be in sequence or in combinations that the e-Reader creates. Think of a chunk of text as a stand-alone idea, perhaps with clarity and coherence.

In an earlier section you created a hypermap of your content. Each card contained one chunk of information. Some chunks were super-ordinate, and others were subordinate. If you want your reader to read on or go deeper, the challenge will be to link these chunks to each other in an associated segment, or stack.

Implications for e-Writing

Mapping is a valuable process for e-Writers, because it helps you see the semantic connections between

For the academic writer, chunking text may feel unnatural. But effective academic writing is not the same than effective e-Writing. Your task in this section is twofold:

1. To break your writing into chunks
2. To use page design elements to represent the organization of these chunks

To begin, think of a typical screen page as "online real estate," which provides a limited view of a long document. Web pages tend to disorient readers because they require them to scroll long distances and to remember where they were on the screen. Remember that one goal of the effective e-Writer is to reduce unnecessary cognitive load.

genres Chunking can help reduce the load by helping the reader *predict* how an unfamiliar section of a site will be organized. This style element of e-Writing is similar to the style elements of effective expository writing, or narrative writing, or the writing of a play. In fact, every genre of writing has conventions that are consistent and meaningful. In each case, the known conventions help the reader understand the underlying structure of the content of a specific discipline.

chunk size Within these limits, one to two pages (as printed) of information are about the maximum size for a discrete chunk of information on the Web. William Horton believes that readers will follow a maximum of three screens to find an answer to a question they have. Some experts suggest that a chunk should contain about 100–150 words, about the number of words contained on one computer screen. Within those words, every word within the chunk should be visible at once on the screen. This helps the reader grasp all of the information on one page.

Guideline #13

One chunk answers one question about one subject for one purpose.

Note Creating short, contained chunks takes some practice. Troffer recommends creating short, self-contained topics, using tools that help you storyboard or map your content. You have seen an example of mapping a topic. Think of a cartoon strip as an example of a storyboard. A storyboard also helps you use your screen estate effectively. An example of a storyboard template is contained in the *Handbook* ([go to Sample Storyboard in Chapter 5](#) of the *Handbook*).

Guideline #14

Each topic contains only one-third to one-fifth of a page of paper.

You can also make effective use of whitespace as a visual, organizing element by separating each chunk by space.

Guideline #15

Separate chunks by a double-space.

Because e-Readers will scan and create their own semantic links, each chunk should make sense by itself. In other words, the logical conclusion, a series of chunks might not even require a particular sequence to be understood. Each contained chunk contains one main idea. Use sideheads, marginalia, sidebars, or hyperlinks, to elaborate on the topic, define unfamiliar terms, provide references - to layer the topic. These elements support the reader's control.

Guideline #16

Use sideheads, sidebars, and key words in the margin to enhance learner control and to provide additional context.

Cutting out unnecessary text is essential when adapting printed text for the web. Archive a large document, or summarize it in a chunk. Since print relies heavily on transitional phrases that don't belong in hypertext or in a chunk, a good rule of thumb is to cut *half* as many words as print text, but even one-quarter or even one-tenth is appropriate.

Even if you're creating original text, "writing long and cutting short" will keep your text tightly focused. If the writing makes sense when cut in half, great; leave it short. If you need more text, add it word by word until you have enough.

Guideline #17

Reduce text to a maximum of 50% of the word count of the printed version.

The following piece of text has undergone the chunking process. This content is from a handbook that acco online workshop for faculty who are developing a course for flexible delivery. The original passage contains

Session 1: Pedagogy

In a traditional view of learning, complex skills can be broken down into simple skills. Each simple skill c mastered independently, out of context, but only when all components are mastered can more complex skills develop. In this view, the teacher is the active agent, imparting knowledge to the passive learner a filling an empty vessel.

In a constructivist view, however, learners are not passive vessels, but active participants in their own le Learners actively doing, trying, making mistakes, and trying again are important parts of learning.

Knowledge is acquired from experience with complex, meaningful problems rather than from practicing and learning isolated bits of knowledge. Humans want to understand things and pull them together. Lea prior knowledge and experience with them to class. The instructor does not write on a blank slate, but w learners to confirm, critique, modify, replace, and add to what is already there. Skills and knowledge are acquired in context. Context is critical, for it provides meaning to learning. People do not easily or predic learning from school to real life, from real life to school, or from one subject to another. We should thus transfer."

Why do we like the constructivist view and use it in this workshop? Active learning is more a process tha in which internal meaning is made through the building and reshaping of personal knowledge through ir with the world ([Jonassen, 1994](#)). This requires learning environments that support collaboration, autono reflection, and authentic interaction with the **real** world.

Grabinger and Dunlap (in [Bostock, 1997, p. 226](#)) identify seven features of active learning: 1). student r and initiative to promote ownership of learning and transfer of ideas; 2). intentional learning strategies, e methods of learning, reflection on learning processes; metacognitive skills; 3). goal-driven, problem-sol and projects generating learning products of value; 4). teachers as facilitators, coaches, and guides, no knowledge, requiring discussion between teachers and learners; 5). authentic contexts for learning, anc real-world problems; 6). authentic assessment strategies to evaluate real-world skills, and finally; 7). co learning.

The Web has often been described as an environment of convergence, in which all media, communica opportunities, flexibility of access and platform, and open constructionism come together and are integr place. The Web-based learning environment provides the richest opportunity to date to bring these elem the features of active learning together.

Session 1

PEDAGOGY

Views of Learning

A traditional view

The teacher structures content so that a learner can:

- break complex skills into simple skills
- master simple skills out of context
- develop more complex thinking skills

Teacher is active

Learner is passive

Aconstructivist view

Learners actively

- Doing
- Trying
- Making mistakes
- Trying again

Learners are active

[more on views of learning](#)

How is knowledge acquired?

The learner brings prior knowledge and experience to the task. The instructor works with learners to:

- Confirm
- Critique
- Modify
- Replace
- Add new knowledge

Teacher as guide, coach; mentor

[Jonassen, 1994](#)

[more on cognitive learning theory](#)

Why is context important?

Context provides meaning to learning. Context helps the learner transfer new knowledge to real life situations.

Why we like the constructivist view

Active learning is a process. Meaning is made through building and reshaping personal knowledge through interactions with the world. Effective learning environments support collaboration, autonomy, critical reflection, and authentic interaction with the **real** world.

7 features of active learning:

1. Student ownership of learning; transfer of ideas
2. Learning is:
 - a. Intentional
 - b. Explicit
 - c. Reflective
 - d. Metacognitive

Grabinger and Dunlap (in [Bostock, 1997, p. 226](#))

3. Goal-driven, problem-solving tasks and projects
4. Teachers as facilitators, coaches, and guides
5. Authentic, real-world contexts for learning
6. Authentic assessment strategies

7. Cooperative learning

Why we like the Web

The Web is open, flexible, multimodal, and networked. Web-based learning environments provide the opportunity to date to bring the elements of active learning together.

Note Read the long text passage (454 words) below. This text, intended to be printed and is provided in on the MASIE site. Try chunking it. Create main topics and subtopics (with links, etc for additional can stand alone, and reduce the words by at least 1/3. When you have finished, check your work example in the *Handbook* ([go to Chunk This Text in Chapter 5](#) of the *Handbook*).

Text Sample

MASIE Center eLearning CONSORTIUM

http://www.masie.com/standards/S3_Guide.pdf

Making Sense of Learning Specifications & Standards: A Decision Maker's Guide to their Adoption

A simple working definition of the term e-Learning is "learning or training that is prepared, delivered, or used using a variety of learning technologies and that can be deployed either locally or globally." The promise of Learning is that it provides leadership with powerful new tools for improving capability development, specifically performance whether their organization operates in one geography or many. Just as the rise of information technologies fundamentally changed the nature of how work gets done in organizations, the emergence of new technologies is fundamentally changing the nature of how people learn to do that work.

The fundamental learning model hasn't changed: Learning professionals still help others learn how to do things they couldn't do before. In non-academic settings, this means they remain focused on providing leadership and guidance to build organizational capacity and improve performance. Learning technologies are simply a sophisticated tool that enables each learning professional to be more productive at helping others learn.

Understanding the Standards Concept

As we have seen historically with battles over such things as railway track gauge, telephone dial tones, file formats, e-mail protocols, and the platform battles between Microsoft, Apple, Sun, HP, and others, common standards start out with proprietary technology that will not work well with others. However, these technologies often meet the needs of end-users, and thus, the market typically drives the various leaders from business, a and government to work together to develop common "[standards](#)." This allows a variety of products to converge. The convergence of technologies is very important for the consumers of these technologies because products that adhere to standards will provide consumers with wider product choices and a better chance that the products which they invest will avoid quick obsolescence. Likewise, common standards for things such as content packaging, content sequencing, question and test interoperability, learner profiles, run-time interfaces are requisite for the success of the knowledge economy and for the future of learning. Fortunately, the first of these standards and specifications are now arriving.

The question is this: How are we to integrate these standards into our plans for the future as well as into our projects?

Why should an organization care about the emergence and convergence of learning standards? The answer is down to the organization protecting and increasing the return on its investment in the learning technologies it purchases and in the learning content and services it develops. Thousands, if not millions, of dollars will be spent on these technologies, content, and services to improve knowledge and skills. If the systems cannot grow, be sustained, maintained, and delivered to the learners, the investment will be wasted or seriously less effective in achieving results.

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To counter the loss of context, repeat contextual information each place it is needed and provide links to information.

Summary

Strategies for improving readability of text include chunking and using layout cues such as number and level headings; style elements like emphasis, font size, and colour; and judicious use of whitespace. There is no research as to what is better: using whitespace and other cues to segment one long page or breaking the content into separate documents. Ultimately, the nature of the content and the purpose for presenting it as hypertext will determine how it is best structured on the Web.

McMullin et al., 2001

In the [next section](#), you will continue to improve readability by writing hypertext for clarity and coherence.

Writing for Clarity

So far, you have encountered the term "[readability](#)" numerous times. You probably know intuitively what is involved in making your content more "readable." You also have *tools* to help you assess how readable the text is, for example Microsoft Word's *Readability Index*.

In *Microsoft Word*, a readability tool is found in the Tools menu. You can turn on readability statistics when you click *Options for Spelling and Grammar*.

Readability checkers are based on a number of factors, including:

- | | |
|----------------------------|--|
| readability factors | <ul style="list-style-type: none">■ Passive voice■ Number of syllables per word■ Number of words per sentence■ Number of sentences per 100 words■ Complex sentence structure |
|----------------------------|--|

Remember that e-Learners tend to be a diverse audience, with a range of learning needs and preferences, background and experience, accessibility issues, and language facility. Your text should support as many of these factors as are appropriate and feasible. For example, although you may be writing for a very specific group, say, so-called experts in a required History course, the group may include one-third or more learners from different cultural and language backgrounds, several individuals with reading challenges (e.g. dyslexia), several older adults, and a number of non-native English speakers. In addition, all of these learners will find reading online more difficult, will tend to scan, and may be less likely to "read" under conditions that are not optimal.

Guideline #19

Aim for a readability level no higher than Grade 10 for post-secondary audiences; Grade 8 for general audiences.

Implications for e-Writers

Writing for clarity includes:

- Eliminating complex sentences
- Replacing ambiguous terms

- Eliminating jargon
 - Using simple rather than complicated explanations
 - Using the active voice
 - Writing less formally
 - Restructuring paragraphs
 - Layering texts for learner control
-

To maximize the reading experience you should write original texts or re-purpose your existing texts for a range between Grades 5 and 8, or Grade 10 at the highest. This does not mean "dumbing down" the text; it does writing for clarity. This text has a readability index of 10.

Guideline #20

Archive long, complex academic or technical papers.

Simple Sentences and Active Voice

Because they are writing to a controlled, professional audience, writers of original sources of content in many fields are notorious for using complex sentence structures, the third person, and the passive voice. Particularly "bad" include:

Kilian, 1999

- Academic writing
- Scientific writing
- Bureaucratic writing
- Historical writing

increase engagement By contrast, the e-Writer's goal is to increase engagement with the text. The text is more accessible to the e-Reader if it is less formal and more direct, involving the e-Reader as an active partner in the information experience. Because the e-Reader is a scanner, shorter active sentences may have a better chance of being absorbed. The third person and the passive voice add complexity, decrease readability, sacrifice clarity, and tend to use more words for the same chunk!

For example, compare these two passages for clarity and ease of reading. Sentence A, with three clauses, is the original text. Passage B contains the same ideas, but in three shorter, more active sentences. Has the original meaning been lost in Sentence B?

-
- A. Technology will allow instructors to reach new learners, in new learning contexts, and potentially yet academe has been slow to address the enduring issues of marginalization based on inappropriate learning designs, and exacerbated by questions of access and intellectual authority (43 words).
 - B. With technology we can reach new learners in new ways. Yet we are slow to address the problem of marginalized learners. Access, presentation of ideas, and learning design are all barriers for some (34 words).
-

Return to the example Session 1: *Pedagogy*. Note how the use of shorter, simple sentences structures, bullet points, and the active voice both clarified and shortened the text.

Now return to the chunking exercise *Making Sense of Learning Specifications & Standards* and review it for you improve your rewrite by simplifying sentence structure?

Guideline #21

Replace complex sentences with shorter, simple sentence structures.

Guideline #22

Sentences should be no longer than 20 words; paragraphs no longer than five sentences.

Compare these two sentences. Which sentence has a direct tone? What effect might a more direct tone have Reader?

-
1. After the tornado, the destruction was described by the media who were present.
 2. After the tornado, the media present described the scene of destruction.
-

Try rewriting these two sentences:

-
1. The redesign of PSYCE 104 for Web-supported, distance delivery was intended by the instructor guided learning experience in which students were encouraged by their coaches to plan and evaluate own learning.
 2. Millions of dollars were lost after the decision made by the major shareholders.
-

Note Check your rewrites with the examples in the *Handbook* ([go to Writing for Clarity in Chapter 5](#) of the *Handbook*).

Guideline #23

Use the active voice wherever possible.

Guideline #24

Change from the third person to the first person where appropriate.

Finally, a hypertext chunk can be made more active by replacing serialized lists with bulleted lists. Using bullet help you clarify sentence structure and reduce words in the chunk. In certain contexts, a bulleted list can also act as the e-Reader scans for visual clues to the information structure. For example, the list makes effective use of whitespace.

Compare these two treatments of the same passage. How have simple sentences, active voice, and a bulleted list enhanced readability?

- A. Three key issues were raised by the candidates. They included old age pensions, the tax rate, and school vouchers.
- B. The candidates raised three key issues, including:
 - Old-age pensions
 - Tax rates

-
- Private school vouchers
-

Bailey, Koyani & Nall, 2000

Try this example. This passage is from an academic paper published in a peer-reviewed journal.

The instructor for this course in the fall of 1997, Dr. Ehud Ben-Zvi, was unhappy with the typical course which saw a change of instructors for the winter term. Among his concerns were the class size (**74** students), difficulty in providing access to source materials, amount of content to cover by didactic means, lack of context in which to learn, diminished classroom interaction, and lack of personal contact with students.

Note Compare your rewrite with the example in the *Handbook* ([go to Writing for Clarity in Chapter 5](#) of the *Handbook*).

- Can you see how to use bullets for more than one purpose?
 - Can you think of any disadvantages of bulleted lists?
-

Guideline #25

Convert serialized lists to bulleted lists

From Paragraph To Pyramid

In academic or formal writing, the author depends on devices like transitional sentences to achieve an effect from one paragraph or section to another. Given what you have learned so far about scanning, will you be able to depend on this device in your hypertext?

e-Readers may read only one segment or small chunk on the screen page before moving on. You have seen them attract their eye to an important piece of text; now you must give them key information before they "jump" to the next segment.

Good writers know about the importance of effective topic sentences. The e-Writer can take that further by placing essential information in the first sentence or, in the case of a screen page, in the upper portion, or top one-third of the screen. Think of this as an inverted pyramid:



Czerwinski, Larson & Robbins, 1998

Experienced e-Readers usually scan a Web page from top to bottom, spending about 80% on the top of the page. They generally look at the top center of a page first, then look left, then right, and finally begin systematically moving down the total page. All critical content and navigation options should be at the top of the page.

Implications for e-Writing

Given the typical scanning pattern, if the key information is placed lower down on the page e-Readers may skip that what they see at the top of the page is not of interest and not bother scrolling down to see the rest of the page.

Bailey, Koyani & Nall, 2000

Examine this screen page from a Web site. Note the architecture of the page - the conclusion comes first, followed by the most important information, followed by more subordinate information. Also, compare the number of lines in the top third of the screen and the bottom two-thirds.

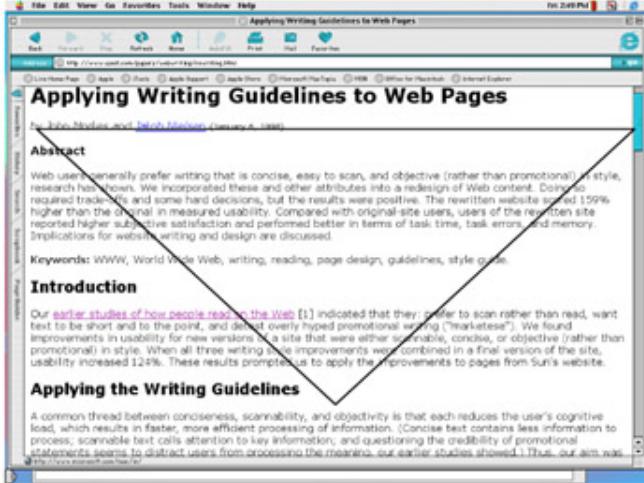


Figure 5.13: Applying Writing Guidelines to Web Pages ©Jakob Nielsen 2003 Applying Writing Guidelines to Web Pages (<http://www.useit.com/papers/webwriting/rewriting.html>)

Are there other clues to the information architecture on this site?

Note Return to the *Making Sense of Learning Specifications & Standards* example in the *Handbook* and consider the structure. Should it be re-organized into an inverted pyramid ([go to Chunk This Text in Chapter 5](#) in the *Handbook*)?

Guideline #26

Place important information at the top of the page, or "above the fold" (in the first screenful of information) for scanning.

Layering Texts

Think back to [Chapter 2](#), when you assessed your content against your intended goals and outcomes for developing an e-Learning environment. Determining your goals and relating them to your audience ([Chapter 3](#)), provides guidelines about the amount, the depth and breadth, and the structure of information to include on your site.

Your audience will evaluate the effectiveness of the site partly on whether it has the right amount of information and is relevant to their needs. Your site should have enough breadth to be relevant to an audience with diverse needs. However, if the subject matter is too broad, the goal of the site may be unclear. Layering information is a strategy that increases learners' control of the amount and complexity of the content. Layering may be especially important for skill development and for professional readers.

Bazerman, 1985

McKnight, Dillon & Richardson, 1991

Links, sidebars or sideheads, and/or archives can help balance the amount of information presented in terms of depth and breadth.

layering elements	How can you provide the optimal amount of content on your site? Earlier, you practiced re-chunking, and potentially re-organizing your text. In this section, you will see how to "add breadth" to content that you feel is important or that will enrich the e-Reading experience.
links	Links are a familiar way to give e-Readers control of the text. Links improve content breadth by: <ul style="list-style-type: none">■ Connecting to additional high-quality information in topics■ Linking the e-Reader directly to relevant content in a site (for example, additional background information) rather than the front page of an information resource■ Providing a consistent icon or motif to notify people when a link will take them off your site■ Providing enough content breadth to appeal to a non-niche audience.

Implications for e-Writing

Links can be embedded in the text, pulled out of the body of the text into sidebars, listed after the text, or placed in sidebars. Icons or images. Links should be obvious. Use mouseovers or images with hot spots with caution. Consider a strategy to the increased use of meaningful headings to enhance learner choice.

Compare the following two screen captures to see how links enhance readability. Note how the link text itself provides context.

The screenshot shows a portion of the Fulbright Program website. At the top left, it says "THE FULBRIGHT PROGRAM" and "UNITED STATES DEPARTMENT OF STATE Bureau of Educational and Cultural Affairs". Below this is a sidebar with the following sections:

- Fulbright Student Program**: Describes Post Baccalaureate (B.A., B.S.) Fellowships, noting IIE has worked with the U.S. Government on behalf of the Fulbright Student Program since it began in 1946.
- Fulbright Scholar Program**: Describes Postdoctoral Fellowships, noting they are administered by the Council for International Exchange of Scholars. CIES is a division of IIE.
- Fulbright Related Programs & Sites**: Lists Hubert H. Humphrey Fellowships, Fulbright Teacher Exchanges, and other Fulbright-related programs.
- For U.S. citizens**: Describes the Fulbright American Scholar program, which sends faculty and professionals to over 140 nations.
- For citizens of other nations**: Describes the Fulbright Visiting Scholars program, which brings mid-career professionals to the U.S. from developing nations, East and Central Europe, and newly independent states of Eurasia.
- Hubert H. Humphrey Fellowships**: Describes the program for professionals to the U.S. from developing nations, East and Central Europe, and newly independent states of Eurasia.
- Fulbright Teacher Exchange Program**: Describes the program for qualified educators to exchange opportunities.

Figure 5.14: Institute of International Education Institute of International Education (<http://www.iie.org/Tech&Template=/programs/fulbright/default.htm>)



Figure 5.15: ThinkQuest. Used with Permission ThinkQuest (http://www.thinkquest.org/library/lib/site_sum_outside.html?tname=26634&url=26634/awards.htm)

Format is an important component of linking effectiveness. Linking conventions by themselves provide cues Reader about their information retrieval strategy. For example, clicking is such an intuitive response to blue, text that many users expect blue text in any format to reveal a link.

Links must be clearly designated so that there is no uncertainty on the part of the users as they click on a link. If links are missed because the links are not obvious. When users are given visual cues to locate links, for example, cursor changing to a pointer, they are able to find the information seven times faster.

Lynch & Horton, 1999

Note The *Handbook* contains a *Checklist for Using Links Effectively* ([go to Checklist for Using Links Effectively Chapter 5 of the Handbook](#)).

Marginalia are additional layering tools that increase user control of text. Throughout this book, I have used sidebars, or sideheads in the right margin to indicate that a topic can be extended. Additional examples are available, by:

- marginalia**
- Accessing a Web site
 - Following up a reference
 - Providing an elaboration of an idea in the main body

Note In the left margin, key words are used to help you locate topics more easily and to cue you to the structure. I have also used the left margin to point to additional information in the *Handbook* and to indicate the type of information (e.g. "theory").

Reader preference plays a part in evaluating the effectiveness of these text strategies. You may find that marginalia interrupts your reading process as your eyes sweep across the page. Usability testing will help you evaluate the advisability of using these techniques with your own audience.

- archives**
- Finally, you may control the amount of content on your site, without losing important background information, by structuring the site so that the most recent content is near the "top" level (no more than three mouse clicks away). Instead, consider dating and archiving older content and indicating location by using any of the marginalia techniques in this segment.

Linking is one of the most common ways to layer texts. Effective links are clearly described and provide for the user. Other techniques include the use of sidebars, key words, and pull-quotes to increase the user over the amount of information being retrieved.

Navigating Hypertext

You have examined and practiced strategies for enhancing readability by restructuring your print texts into e-hypertexts. In this section, you will consider how your audience might prefer to access and use these texts.

Crawford Kilian describes two kinds of information retrieval on the Web:

- Hit and run
- Downloading

Which of these terms best reflects the idea of *scanning*?

In this section, you will analyze the differences between paging and scrolling texts. In addition, you will consider whether your content should be available entirely online, primarily in print, or in a combination of the two. Before this decision should be made in the context of learner control of the e-Reading experience.

Look at these two pages from Jutta Degenera's site *Hypercybersupercali fragilisticexpialidocious!* One presents information in separate segments, or chunks, that can be retrieved and read independently, as pages. Chunks of information increases learner control of text.

The other presents information as one long, multi-page, *scrolling* text. From a reader's perspective:

- In which site do you have most control of the process?
- What are the advantages of scrolling?
- What are the advantages of paging (chunks)?
- What are the disadvantages of each?

As with other readability decisions, ask yourself "Does the content structure and presentation support the goal of the site?"

keyhole Problem

The depth of information in a site is not always obvious to a reader, who may become disoriented by a long scrolling screen page. However, an e-Reader will likely prefer to scroll to continue reading a single unit of content like an article, an entire report, a skit, or a short story, rather than click from page to page of an article. To reduce the likelihood of reader disorientation, provide contextual information to help readers more easily navigate your document, e.g. by writing effective link text.

This format may be more efficient for distribution printing, although it has little interactivity. You might decide to use a comprehensive, linear scrolled text:

- For distribution reasons
- Because the information won't stay current long enough for the conventional publishing route
- Because the information needs constant maintenance
- If it contains a long list of links that form one conceptual unit

e-Readers should be able to move from page to page by selecting links (paging) without always scrolling to find information. This is particularly true for home pages and menu pages - navigation pages.

One study showed that users spent about 13% of their total time scrolling *within* pages. Although each scroll takes little time, taken together the e-Reader can spend a considerable amount of time scrolling. Consequently, it can improve performance by scrolling should be made as long as necessary. As a rule, three screens of information is the most effective.

Dyson & Kipping, 1999

Guideline #27

Most navigation pages should not scroll.

Guideline #28

If reading speed is important and response time is reasonably fast, use links, or paging, rather than scrollable pages.

Finally, some content would be more effective if re-purposed as hypertext, incorporating all the readability standards we have encountered in this chapter, and yet the e-Reader might want the option of printing it as one long scrollable document. In cases like this, you can design the content to meet both needs by providing a choice:

1. Develop the content as hypertext
2. Include the same content as one long scrolling text with a print option

The site represented in [Figures 5.16](#) and [5.17](#) provides a good example of this strategy. The lessons are chunked by topic (left margin) and each topic is one screen of information. Choosing **Print** produces the entire tutorial (all the chunks) in one scrolling document.

Jutta Degener Hypercyber... What is good hypertext writing?

What is good hypertext writing?

There is more to writing than putting words next to each other, and there is more to writing hypertext than throwing together a bunch of links. When writing text, I have certain goals, when I come across text I dislike, there are certain reasons why I don't like it. You're about to read an attempt to describe these reasons and goals, it is incomplete, subjective, and honest.

Writing hypertext copy

The two pitfalls of writing hypertext copy are links and emotions. Links are a new stylistic element that writers often seem to have trouble with. The emotional problem is harder: we must snap out of the "host" or "provider" role, must get away from the excitement of guiding another person through the text, and get back to - just writing.

Editing and publishing

Editing doesn't necessarily happen after the first text has been written, but it deserves to be thought of as an independent discipline. Most of what people do on the World-Wide Web is really editing, not writing.

Maintenance

"This document is under construction." Of course it is. The World-Wide Web is changing, new browsers appear, new languages, HTML changes, people change jobs and homepages, and writers learn more about their subject.

Appendix: Dangerous words

Figure 5.16: Hypercybersupercalifragilisticexpialidocious. Used with Permission Hypercyber-supercalifragilisticexpialidocious (<http://kbs.cs.tu-berlin.de/~jutta/ht/hypercyber.html>)

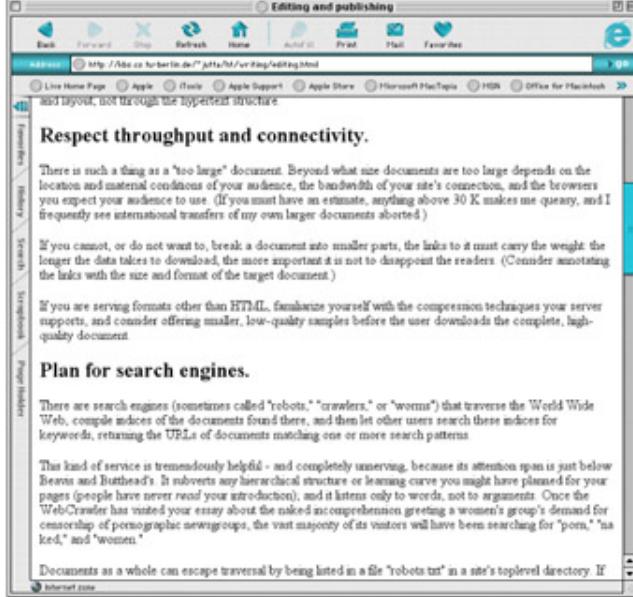


Figure 5.17: Hypercybersupercalifragilisticexpialidocious. Used with Permission Hypercyber-supercalifr
expialidocious (<http://kbs.cs.tu-berlin.de/~jutta/ht/hypercyber.html>)



Figure 5.18: webmonkey (<http://hotwired.lycos.com/webmonkey/98/28/index0a.html>) Used with Permis

Summary

11 guidelines for e-Writers

In this section on writing for clarity, you have looked at issues of accessibility, readability, and information ret techniques. In *Writing for multimedia: A guide and sourcebook for the digital writer*, Korolenko provides elev guidelines for effective e-Writing:

Korolenko, 1997

1. Avoid simple page turners, don't create an on-screen book
2. Keep the written text simple
3. Communicate clearly and concisely - simple sentences and verb structures
4. Use the active voice, use concise, declarative sentences

5. Keep process visual
6. Use consistent screen formats
7. Provide feedback to users
8. Make sure users know what they have to do
9. Provide help
10. Keep users engaged without frustration
11. Make sure the content meets the goals and objectives

learning preferences In this chapter, you were introduced to the concept of message design. To this point, we discussed writing effective hypertexts. However, text alone does not meet the learning needs and preferences of a diverse audience. For example, text **privileges** a highly verbal e-R while other users may learn better with visual representations of information.

In the [next chapter](#) you will consider ways to meet the needs of more learners by either replacing or extending other e-Texts.

Practice

Find a short piece of linear text. Apply what you have learned in this chapter and rewrite it using techniques of clarity and readability, including:

- Style elements
- Headings
- Active voice and simple sentences
- Bullets
- Whitespace
- Paragraph structure

...and other techniques you have discovered by exploring the references and resources.

References and Resources

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<http://info.med.yale.edu/caim/manual/>

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<http://www.december.com/works/wwwu.html>

For information on writing for the Web:

Web Writing Style Resources. <http://www.cio.com/central/style.html>

Will-Harris, D. (2000). Writing for the web. Retrieved on August 19, 2003 from the World Wide Web:
http://www.efuse.com/Design/web_writing_basics.html

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<http://www.capcollege.bc.ca/dept/magic/cmns/Webwrite.html>

For more information on teaching and learning on the Web:

Ritchie, D. & Hoffman, B. (1996). Using instructional design principles to improve learning online.
Retrieved on August 19, 2003 from the World Wide Web:
<http://edweb.sdsu.edu/crlit/learningtree/DCD/WWWInstrdesign/WWWInstrDesign.html>

Teaching and learning on the web. Retrieved on August 19, 2003 from the World Wide Web:
<http://www.mcli.dist.maricopa.edu/tl/index.html>

Thinking through language. Retrieved on August 19, 2003 from the World Wide Web:
<http://www.ed.gov/pubs/InstScience.chap3a.html>

Ten Selected Journals and Lists

Canadian Journal of Educational Communication (1973–2000)

Canadian Journal of Learning and Technology (2000–)

Educational Technology

Educational Technology Research and Development

Journal of Interactive Learning Research

Journal of Instructional Technology in Teacher Education

Journal of Hypermedia and Multimedia Research

Tech Trends

DEOS-L list

AMTEC@camosun.ca

Recommended Activities

At the beginning of the chapter, you were asked to identify a course that you have already, or now intend to, develop for e-Learning. At each stage of the discussion you returned to your course content to apply the ideas.

To prepare for the [next chapter](#), ask one or more colleagues or, better yet, target e-Learners, to review the content that you have re-purposed. What elements do you want them to evaluate? Use of whitespace? Headings? Chunking? Develop a checklist for them to use as they experience your improved e-Writing skills.

Note A sample checklist, to which you can add your own items, is provided in the *Handbook*.

Chapter 6: From Text to e-Text - Resisting Print

Overview

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In [Chapter 5](#), you were introduced to the idea of message design, a concept that integrates the research in text design and screen design. Many of the Web design guidelines developed through the last half of the 90s were heavily grounded in research done in print design and reflect this work.

This research, combined with studies beginning in 1950 in media attributes, continues to evolve as delivery technologies improve. In the early days of the Web, text was the standard format - it was familiar, we knew how to design effective print resources and using text increased accessibility for most users who were restricted by bandwidth.

However, we now know that users have diverse needs and characteristics, text-only environments can constrain accessibility, and that text is not always the most effective medium for conveying information. With faster computers, increased bandwidth, and better tools, hypermedia environments promise to support more users, in more ways, with more choices than uniform text resources.

Key Ideas

As in [Chapter 5](#), this chapter continues to expand the idea of accessibility and usability. You will continue to explore:

- Using different e-texts to carry the message
- How to incorporate media into your texts
- How to adapt existing electronic formats to e-Learning environments

Key Terms

Note This chapter introduces a number of terms and phrases that you may not be familiar with.

These terms are listed in the *Handbook* ([go to Key Terms in Chapter 6](#) of the *Handbook*).

Check off the terms you know. Then, use this list to guide your reading of the chapter.

- Animation
- Sensory Modality
- Multi-channel
- Mental Model

Plan Your Progress

Note A concept guide for the ideas presented in this chapter is provided in the *Handbook* ([go to Concept Guide in Chapter 6](#) of the *Handbook*). You can use this outline to help guide your exploration.

Note There is additional space for you to write the questions for which you need answers. Record your own information or learning needs in the *Handbook* ([go to Questions and Goals in Chapter 6](#) of the *Handbook*).

At the end of the chapter, check your list of questions to determine whether you need additional information and use the chart to organize an action plan.

Note A "[To do list](#)" has also been provided for you in the *Handbook* for you to record what needs to be done, who needs to do the task, and when the task should be completed by ([go to To Do List in Chapter 6](#) of the *Handbook*).

Resisting Print with e-Texts

In [Chapters 2](#) and [3](#), you were introduced to the idea of user-centered design (UCD) guidelines. Various tools, such as a needs assessment survey, help you create an audience profile upon which you can make evidence-based decisions about content, presentation, delivery, and assessment. The previous chapters started you thinking about how to support the diversity of needs and characteristics of e-Learners.

learning modalities	For over a dozen years most content has been presented to post-secondary students via text. These students have had to become skilled at reading and interpreting print or texts. However, only a portion of these individuals is actually composed of verbal learners — those who prefer to learn from texts and lectures. Others prefer knowledge presented visually or aurally. Some learn better by manipulating objects or by performing a physical activity.
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[Figure 6.1](#) Perceptual Modalities, compares four sensory modalities for receiving information — verbal, visual, aural and tactile-kinesthetic. Generally, e-Readers prefer one mode, although most use a combination of perceptual strategies for selecting and processing information. A key strategy involves presenting information and activities in more than one modality to increase choice and control.

Modality	Description	Strategies	e-Texts
Verbal	This learner prefers to see, i.e. <i>read</i> the information and works well with text. Most academically successful learners fall into this category.	<ul style="list-style-type: none"> ■ Put together a package of readings ■ Provide notes outlines and other organizing tools ■ Used to didactic approaches 	<ul style="list-style-type: none"> ■ Slides ■ Overheads ■ Print
Visual	This learner needs visual information to support text or lectures.	<ul style="list-style-type: none"> ■ Opportunities to represent own learning visually (e.g. by creating visual models) 	<ul style="list-style-type: none"> ■ Graphics, pictures ■ Diagrams and models ■ Video

Aural	Hearing is the preferred sensory modality. However, if audio is available it should be optional.	<ul style="list-style-type: none"> ■ May study by reading aloud ■ May repeat key concepts after hearing them ■ Wants to hear thinking "out loud" ■ Benefits from presentations that can be replayed 	<ul style="list-style-type: none"> ■ Narration accompanied by transcripts or captions
Tactile-Kinesthetic	The kinesthetic learner learns best if given the opportunity to work with new information in a "hands-on" way.	<ul style="list-style-type: none"> ■ Manipulating real objects and/or ■ Acting on them in a simulated environment ■ Using body to learn 	<ul style="list-style-type: none"> ■ Simulations ■ Drag and drop ■ Object manipulation

Figure 6.1: Perceptual Modalities**8 intelligences**

As you learned previously, Howard Gardner describes eight intelligences or modes in which individuals might choose to learn. There are innumerable models and theories of learning styles and preferences, yet they all have one message in common: People have a rich and complex range of learning needs, characteristics and preferences; and possess a repertory of learning skills and strategies that increase and are refined with experience.

Gardner, 1993

alternative representations In this section, you will explore ways to support these individual characteristics through alternative representations of information - alternative, that is, to text. One assumption in the design world is that we will teach to our own strengths - a verbal learner will tend to design learning experiences that strongly support verbal learners. It is helpful to be aware of your own learning needs and preferences for this reason.

As one of my *personal* guidelines I try to present information in at least two forms, whether I'm teaching in a face-to-face classroom or designing a course for the Web. Although not always possible, or appropriate, this guideline always reminds me that I am writing or designing for individuals with needs or challenges that may be different from my own or from those of others.

For example, if it makes good pedagogical sense, I will try to include an image that carries the key meaning of accompanying text or will suggest an active way to learn the information. Throughout this, book I have been referring to these alternative representations as **e-Texts**. And, naturally, the guidelines for using them can be complex and even contradictory.

Clark (1994) vs. Kozma (1991): A classic debateNathan & Robinson, 2001

In this section, you will look at four types of e-Text besides print:

1. Still images
2. Audio
3. Video/animation
4. Slide shows

Often these types are combined. For example, video often has an audio track (sometimes two audio tracks). A video clip might be accompanied with text, such as closed captioning. Decades of research on the effects of media in the traditional classroom have been inconclusive, although through usability and other kinds of research we are learning more about the effective use of media - e-Text - in the Web environment.

Still Images

While text is a one-dimensional form, visuals offer 2-dimensions, which can include verbal as well as graphic elements.

Visuals can increase effectiveness by highlighting information that increases viewers' comprehension and memory. Graphics contain additional cues, for example, spatial relationships, that help learners decode (interpret) new information. They can also increase efficiency by representing, in a single form, what may take hundreds of words to explain.

Newby and others, 2000

Yang & Moore, 1996

Graphic images can have a very positive effect on e-Readers, who expect a "richer" information experience on the Web. If used properly, visuals also increase appeal by attracting attention and stimulating critical thinking.

Teng-Mei Chao, Cennamo & Bruanlich, 1996

Recall and retention of information can be enhanced when graphics are used to:

- Depict information central to the text
- Represent new important content
- Represent structural relationships mentioned in the text
- Provide a detailed example of original source materials such as old documents

Graphics, when used appropriately, can enhance an e-Text's readability. The use of graphics may be particularly helpful for poor readers. Conversely, remember to apply the ideas in this chapter (for example, the use of whitespace), to the presentation of images.

Guideline #29

Provide balance for visual and verbal elements so that they are equally distributed vertically and horizontally.

Misanchuck & Schwier, 1995

It is difficult to cite research on screen design when it is taken out of the instructional context that it serves. For example, some learners may find that pictures and graphics are counterproductive to learning when they are excessively elaborate or *too* realistic. They will tend to bypass complex illustrations such as graphs unless they appear immediately relevant to the body of material. If you have this kind of e-Text, think about breaking it up or layering it into a series of illustrations.

Kanuka & Szabo, 1999

Guideline #30

Break complex visuals into smaller, simpler visuals (chunking).

Guideline #31

Avoid excessive detail.

The way that images are presented is important. For example, a line drawing or a diagram may be superior to a photo or highly detailed color image. Color will attract attention and help the reader focus on key elements. However, you must consider issues such as colour blindness, cultural implications for colour, and so on.

Some research studies have found that colour does not increase or enhance learning and may even get in the way. However, e-Readers tend to prefer colour to black and white. So, when making a decision about colour, you might want to consider motivational aspects.

Durrett & Stimmel, 1987

Graphics should only be used to support the message being presented by the text and should not be used merely for decoration, as it will distract attention away from the key information. Also, combined text and graphics, or any other *multi-channel* communication, should be avoided unless high redundancy exists between the information.

Hannafin & Hooper, 1989

Guideline #32

Present an image in close proximity to related text.

Guideline #33

Redundancy is essential. The visual should not present a different concept than the text.

Dwyer, 1978

If you include visual e-Texts on your site, you must consider:

attributes of images

- The amount of realistic detail. How much is necessary?
- The presentation method. How much user control should you build in?
- Learner characteristics such as spatial intelligence, prior knowledge, etc. For example, concrete concepts should be learned before abstract.
- The type or level of learning you expect. Which format best conveys the message?
- The technique you use to focus attention on key information elements. For example, should you use an arrow to point to a detail?
- How you will assess the learning. For example, if information is presented visually it should be tested visually.

If you decide to extend or layer text with visual information, remember that the message in the image

must be consistent with and near to the text message.

Implications for e-Writing

Graphical images can enhance learning by presenting abstract, complex ideas in an alternative form. They also support the visual learner, the learner with less facility in the language of the text, etc. However, graphics must be redundant, not too complex, and placed well on the screen. You must also think carefully about your target audience's access to technology.

Will an image require too much time to download on a dial-in modem?

Consider using graphical images:

- To attract the eye to a focal point
- To lead the eye to appropriate text
- When motion is not important
- To provide detail
- To provide a context
- To layer meaning
- To meet different learning challenges
- As a navigation device, e.g. thumbnails

reasons to use visual images

Note The Handbook contains a checklist for *Incorporating Graphical Images* ([go to Incorporating Graphical Images in Chapter 6](#) of the Handbook).

Audio

Although the oldest medium of communication, the use of sound in learning has not been studied extensively. Audio is a very intense e-Text. This is apparent when you think about the popular music of your adolescence and the memories evoked by songs from that era. What response does a baby's high-pitched cry elicit in almost all adults? Audio engages our emotions.

Think about when and how you might use audio e-Texts effectively in the design of your e-Learning activity.

Audio seems to be best for:

- Providing informal overviews of topics
 - Natural sound effects related to instruction
 - Providing opinions of model or peers (e.g. if tone of voice is important)
- reasons to use audio**
- Emotional texture/immersion/immediacy, for example in a real event (e.g. the voice of Churchill; to add drama)
 - Simplifying version of content
 - Simulation of a social process involving conversation
 - Supporting an international audience (translations)

Audio must be used very cautiously, for both technical and pedagogical reasons. Always provide learner control: your audience should be able to turn audio on and off as desired. Consequently, never use audio as the only source of important information, as it will exclude various learners - those with hearing impairments, learners who do not have technical access to the audio, a learner who has difficulty with the language, and verbal learners.

Alessi & Trollip, 1991

As with graphics, audio should be supported with other e-Texts, although narration with full displayed text may impede learning. In this case, text should be used to summarize main points.

Guideline #34

Audio should support other texts

Other cautions include:

- Be subtle and restrained; audio is very powerful
- Avoiding repetition - avoid using the same sound over and over
- Don't use sound for negative feedback
- Consider whether learning will occur in a public space - are headphones available?

Video

Video combines moving, visual images with audio, and sometimes text. As an e-Text, it may be the most complex, the most powerful, and the most problematic. In this section, animation is included as one form of video.

Many outcomes can be facilitated by video, using the following techniques:

Koumi, 1994

**video
techniques**

1. Composite-picture techniques. Split screen and super-imposition, can aid synthetic, analytic and discrimination skills. For example, three-dimensional graphics can be grafted onto archaeological sites to recreate original architecture.
2. Visual metaphors to represent abstract process. For example, the splitting of an atom.
3. Modeling a dynamic process with a simplified version that encapsulates the most salient features. For example, how an engine works.
4. Simulating variable situations/processes: Changing the parameter values can help users explore various versions of the process. For example, on graphs showing numerical values.
5. Illustrating abstract concepts with evocative real-world examples. For example, justice in action.
6. Condensing time by pruning real-world processes, bringing the duration within the viewer's concentration span. For example, time-lapsed photography.
7. Demonstrating technical, logical, or social skills by handling equipment, symbols, or people. For example empathic listening.
8. Narrative power. A story provides some control over what the user experiences in pictures, sound effects and words, pacing and sequencing. For example, an engineer-narrated sequence of the Tacoma Narrows Bridge collapse.

Video is best used for:

best uses of video

- Content which requires motion
- Presentation of actual events
- Realism
- Historical re-enactment
- Representing compressed or expanded time
- Drama
- Simulation of hazardous or expensive events
- Motivational purposes
- Introductory sequences

Note The Handbook contains a short synthesis of using *Video in Domains of Learning* ([go to Video in Domains of Learning in Chapter 6](#) of the Handbook).

animation

Animation is a particular form of video that helps learners form useful mental models.

For example, the direct observation of an abstract and dynamic concept is practically impossible in some disciplines, for example, the concept of velocity in physics. Similarly, animation is ideal to signal relationships between information groups, for example an image dissolving into another, showing a change in state.

However, animation is one of the most overused and poorly used e-Text on the Web. Recall some of your own experiences with sites containing animations that you could not control, turn off, or skip over. In one usability study, users actually covered the animations on the monitor with their hands!

Animation is appropriate for:

**reasons to use
animation**

- Demonstrating procedural actions
- Simulating systems behaviors
- Explicitly representing invisible movements or phenomena
- Illustrating structural, functional, and procedural relationships among objects and events
- Focusing attention on important concepts
- Building up complex information displays
- Illustrating developments over time

Guideline #35

Always design animation for user control

Note Take some time now to practice applying the 35 guidelines for effective message design. A short linear text *Applying Message Design Guidelines* is in your *Handbook* ([go to Applying Message Design Guidelines in Chapter 6](#) of the *Handbook*). Follow these steps to re-purpose it for the Web:

1. Reduce the word count by 1/3 to 1/2.
2. Chunk the remaining text.
3. Reorganize in an inverted pyramid.
4. Edit for passive voice.
5. Rewrite complex sentences.
6. Identify where bulleted lists would improve readability.
7. Add headings.
8. Develop marginalia.
9. Insert links where the ideas can be linked semantically to other resources or activities.
10. Identify concepts that can be extended with e-Texts. Describe the e-Text in a note.

Slide Shows

Finally, an electronic slide show can be an effective e-Text in which other e-Texts may converge. For example, a slide show can contain text, audio, video, and still images in any combination. As with video, for example, the more complex the e-Text the more careful the design in order to be effective.

Electronic slide shows, such as PowerPoint™, are often used in blended e-Learning environments. For example, a face-to-face lecture may be supported with slides containing key concepts in text and images.

Before the lecture, you could provide a notes outline like the one below: This outline was created for a faculty workshop on using PowerPoint™ to support didactic instruction. The structure of the lecture is shown by the numbered points. The lettered phrases are provided to encourage active and critical listening during the lecture.

1. Deciding to use a presentation strategy:
 - a. Appropriate and effective
 - b. Inappropriate and ineffective
2. Keys
 - a. Outcomes
 - 3 domains
 - How is content structured in your discipline?
 - How can you tell when an outcome is achieved?
 - What does *authentic assessment* imply?
 - b. Audience characteristics
 - Perceptual and cognitive styles: how can you present information to meet these diverse needs?
 - How can the learning needs of a group of pharmacists with diverse experiences and educational backgrounds be met?
 - c. Engagement
 - 3 ways to motivate a participant initially.
 - 3 ways to re-engage participants.

Note An example using an actual slide, *Notes Outline*, is presented in the *Handbook*([go to Notes Outline in Chapter 6](#) of the *Handbook*).

The outline provides a cognitive tool to help learners anticipate the structure of the lecture, be alert to key points, prepare questions, pursue an area of interest, etc. Bringing an outline to class helps organize note-taking and encourages critical thinking. And, if the presentation is archived after the lecture, learners can review and elaborate on the content.

A Case Study Using PowerPoint as a Cognitive Tool

Before a lecture, John Boeglin prepares a comprehensive presentation that includes text, visuals, sometimes video, and hyperlinks.

Then, he prepares a second version, which he uploads to his course site. This version is a bare bones outline with missing terms, unfinished phrases, blanks for references, etc.

Learners are expected to visit the course site prior to the lecture to review the outline. Additional resources are suggested to encourage them to identify missing terms, get additional references, communicate with peers, write questions for the discussion period, draw diagrams - preparation for an active learning experience.

Learners print and bring version 2 with them to class and during the lecture, fill in terms, references, notes to themselves for follow-up, etc. Some days after the lecture, John may elaborate the presentation with additional hyperlinks or other materials.

Learners keep their individually completed outlines as study guides when preparing for an exam.

design errors Electronic slide shows have become almost ubiquitous in business and education, but may users do not design effective presentations. Common errors include:

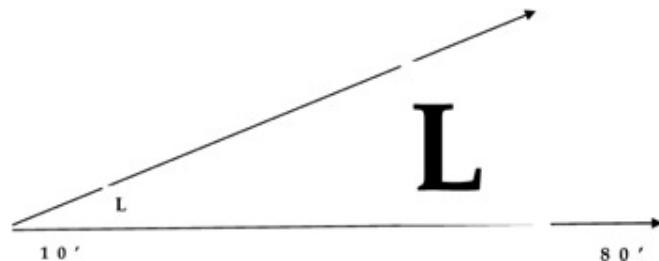
- Too much text on a screen
- Bad colour contrasts
- Inappropriate backgrounds
- Ineffective visual elements
- Overuse of special effects
- Too much detail
- Images that are too detailed (e.g. complex graphs)
- Images or text that are too small

Note A summary of guidelines for good visual slide design is provided. The *Handbook* contains additional information about presentation style and environment in *The Environment*, *Presentation Style*, and *Tips for Good Presentations* ([go to The Environment, Presentation Style, and Tips for Good Presentations in Chapter 6 of the Handbook](#)).

Text

- Choose fonts with simple designs (sans serif work best)
- Use lowercase for phrases of more than 3 words
- Make letters 1/2" high for each 10 feet of viewing distance
- Maximum of 6 words per line, 6 lines per visual
- Present images simultaneously with text

[Heinrich, Molenda, Russell & Smaldino, 2001](#)



Color

Bergeron summarizes several studies on colour and learning. Among the findings:

[Bergeron, 1990](#)

- Learners recall longer what they see in red
- Blue elements receive less attention
- People tend to look at yellow objects first

- Use brightest and lightest colors to focus attention
- And contrast, from most legible to least legible
- Limit the number of colors on screen to 4
- Avoid: red/green, blue/yellow, green/blue, and red/blue

Implications for e-Writing

Use red for key materials you want learners to remember

Use blue for less important components

Use yellow to highlight important points or key words

When choosing background and text colors, keep the following user ratings in mind:

black on yellow

green on white

red on white

blue on white

white on blue

black on white

yellow on black

Emphasis

- Highlight important ideas so that the learner can quickly locate them
- Do not use uppercase letters for highlighting, because they are difficult to read
- Underlining has little or no effect on retention of content
- Italics are difficult to read online

Summary

You have been introduced to ways to resist text as the only information element on your e-Learning course site. Other data elements, or e-Texts, include still visual images (graphics), video, and audio; and the omnibus electronic slide show.

e-Texts have many advantages in user-centered design, but must be incorporated very carefully, both for pedagogical and technical reasons. The *Handbook* contains several tools (tables and checklist) to help you evaluate both your own site and other sites or learning objects that you might incorporate into your own e-Learning environment.

Note In *Interfacing Media*, Horton proposes six user-centered design guidelines for media-rich web sites. In this list, he relates interface design issues, the next topic in this chapter, to e-Texts. These guidelines are provided here and expanded in the *Handbook*([go to When and How to Use Media, Orientation Elements in Various Media](#), and [Checklist for Message Design in Chapter 6](#) of the *Handbook*).

[Horton, 2000](#)

[Horton's 6 UCD guidelines](#)

Guideline #36

The interface exists to enable user interaction.

Guideline #37

Make sure the media on your web site is relevant.

Guideline #38

Send media to the user only in response to an explicit request.

Guideline #39

Provide information about your media so users can make informed decisions.

Guideline #40

Provide different views for different types of users.

Guideline #41

Leave control in the hands of the user.

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Resources

Examples of effective use of images:

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<http://www.kn.pacbell.com/wired/mission/index.html>

Visions of China. Retrieved on April 28, 2003 from the World Wide Web:
<http://www.cnn.com/PECIALS/1999/china.50/inside.china/>

Examples of effective use of audio:

BBC: Arts & Books. Retrieved on April 28, 2003 from the World Wide Web:
<http://www.bbc.co.uk/arts/books/>

Phonetiques. Retrieved on April 28, 2003 from the World Wide Web: <http://www.ciral.ulaval.ca:8000/>

Examples of effective use of video:

Africa. Retrieved on April 28, 2003 from the World Wide Web: <http://www.pbs.org/wnet/africa/>

CNN.com. Retrieved on April 28, 2003 from the World Wide Web: <http://www.cnn.com>

Tech 2001: Destination Space. Retrieved on April 28, 2003 from the World Wide Web:
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For information on the effective use of animation:

Effective use of animation - Graphics for the Calculus Classroom. Retrieved on April 28, 2003 from the

World Wide Web: <http://www.ima.umn.edu/~arnold/graphics-j.html#bounce>

Additional Resources Available in the Handbook

Note Re-purpose this Text (inChapter 6 of the Handbook).

Team LiB

◀ PREVIOUS | NEXT ▶

Team LiB

◀ PREVIOUS ▶ NEXT ▶

Recommended Activity

Reflect on the content covered in your course. Identify concepts and ideas that would be better represented through the use of still images, audio, video or animation, or slide show.

Ask yourself:

- Do I have the resources to create these supporting e-texts?
- What steps do need to take to produce these e-texts?

Team LiB

◀ PREVIOUS ▶ NEXT ▶

Chapter 7: Structuring the e-Learning Environment

Overview

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You have content. You have learners. How can you put these two components together?

Teaching online involves more than curriculum conversion or reformatting content from one form to another. As you saw in the previous chapters, creating an e-Learning environment raises questions about what and how you will teach. It also raises the following questions: How will the learner experience change? What new learning skills and strategies are required? How will the learner, content, and instruction interact in this new environment?

Palloff & Pratt, 1999

In this chapter, you will encounter some ideas about structuring the e-Learning environment so that your clients/users are able to easily access and use the learning content. The environment is where you reflect the structure of your domain by sequencing topics, showing concept relationships, and supporting reader interaction with the information. The way you organize the environment to support learning and information retrieval is known as *information architecture*. On the Web, the site architecture is revealed in the visual design, elements with which users interact. Visual design and the interactions it reflects are called the *interface*.

Key Ideas

This chapter will help you visualize how your audience can most efficiently and effectively work with your content. You will:

- Think about the diverse ways in which individuals retrieve information
- Compare and contrast interface designs
- See how to help the user find what he/she needs
- Begin to develop the framework or architecture for your environment

Key Terms

Note This chapter introduces a number of terms and phrases that you may not be familiar with.

These terms are listed in the *Handbook* with enough space to define them in your own words or note examples, references, and resources ([go to Key Terms in Chapter 7](#) of the *Handbook*).

- Navigation
- Interface
- Information architecture
- Metaphor
- Genre
- Design shell
- Organizational scheme

Plan Your Progress

Note A concept guide for the ideas in this chapter is provided in the *Handbook* ([go to Concept Guide in Chapter 7](#) of the *Handbook*). You can use this outline to help guide your exploration.

Note There is additional space for you to write the questions for which you need answers. Record your own information or learning needs in the *Handbook* ([go to Questions and Goals in Chapter 7](#) of the *Handbook*). If you have questions about structuring the e-Learning environment record them here.

At the end of the chapter, check your list of questions to determine whether you need additional information. Use the chart to organize an action plan.

As you work through the chapter, apply these concepts to the organization of the content you have developed.

Note A "[To do list](#)" has also been provided for you in the *Handbook* for you to record what needs to be done, who needs to do the task, and when the task should be completed by ([go to To Do List in Chapter 7](#) of the *Handbook*).

Thinking About the Environment

You have seen that learning in an online environment requires a new set of learning skills and strategies for the e-Learner. These skills include learning skills and technical skills. For example, participating in a threaded discussion involves communicating, asynchronously, using a different kind of communication paradigm with new tools, for example WebBoard™.

LCMS and interface Your need to adapt content to this new environment in ways that support the both reader's goals and your own instructional goals. The Web allows for hyperlinking, layering content, interactive practice (e.g. with a simulation), time-shifted and real-time discussion, video and audio conferencing, and many other learning tools. How will you blend these possibilities for an optimal learning experience? In this Chapter, you will conceptualize the architecture for your site. In [Chapter 8](#), you will add opportunities for interaction.

The online environment is where the e-Learner engages with content. The interface is the avenue into that content. LCMS have made the task of interface design almost painless for the e-Writer, providing menu structures, standardized navigation tools, and templates for visual design and site architecture. However, even in a highly structured LCMS you will need to make decisions about the ways that users will access information.

A good interface reflects the structure of the content and does not impose an additional cognitive load on the e-Reader. In fact, a truly excellent interface gradually becomes transparent to the e-Reader, who is able to interact almost effortlessly with the information.

3 concerns

Planning the e-Learning environment involves three primary concerns:

[Stansberry, 1998](#)

1. The content or the raw material to be navigated
 - What is the nature of the content?
 - How is content structured in your discipline?
 - What forms will it take?
 - Do you need to create it or is it available from another source?
2. The task or what users will do with the content
 - How will the content be sequenced?
 - Will they use it or simply view it?
 - How will they interact with the content?
 - What methods of interaction best support the goals?
3. The navigation or how users will get around in the program
 - How might users' situations change as they move around in the content?
 - How much control do they have over the environment?

To some extent, you have answered these questions by the decisions you made in [Chapters 3](#) through 6 to develop content in ways that reflected your goals and learners' needs. This chapter will focus on the first task and, to some extent, the second.

Content

The discussion of message design in [Chapters 5](#) and [6](#) emphasized the concept of readability in re-purposing e-Texts for a hypermedia delivery.

In this section, you will apply the conceptual work you have now done to the way you think about how content is structured in your discipline. Introduced briefly in previous chapters, the idea of genres provides one framework for this discussion.

Writers and readers on the Internet may fall into the information traps described by Wurman in *Information Anxiety* (1990):

The information traps...exist because people take them for granted - looking good is being good; if it's accurate, it's information; an expert opinion is an objective opinion. We accept that tax forms should be confusing, legal documents written in legalese, and that we should spend hours everyday trying to decipher charts and graphs. A lot of these conceptions cloud our understanding of information because we accept them as givens. If we questioned them, we would see them with different eyes. In this way, we wouldn't be such easy victims of them and we might begin to see the new paths around them to understanding.

p. 135

If you structure your content to represent clearly the conceptual model of your discipline, you will find it easier to avoid the information traps lamented by Wurman and other information architects.

To begin, compare how stories are structured in other media:

- On a TV newscast, in the first 15 seconds several brief items may be read on air as a "hook," followed later by a full report that includes video
- Newspaper stories emphasize brevity to expedite readers and scanners who are moving rapidly through pages
- Magazine story structures tend to be leisurely paced, with headlines, subheads, longer texts, and more images
- A slide show in a business seminar may start with a title slide with special effects, to which the speaker links the motivating introduction, followed by a slide detailing the agenda, then a series of slides with main topic bullets, ending with a synthesis slide that issues a challenge to the audience. The speaker controls the pace of the presentation, and may time the content by the number of slides (e.g. 1 minute speaking per slide).

Garcia, 1997

Think about the structure of online instructional text that you have encountered.

Discipline as Genre

The novelist John Gardner says that as soon as the first sentence of a novel is written, the writer has invariably placed the content inside a genre or literary form. The genre brings with it expectations, limitations, and conventions. e-Writing, like any other writing, involves an interplay of form and function. The form is represented by the functional design and by the kind of content representation — such as e-Texts — that reflect them.

If you think of your discipline as a genre, you can begin to see how the information is organized to support the purpose of that form. For example, a script for an interactive mystery will look very different from a hypertext poem.

[Figure 7.1](#) is an excerpt from an interactive mystery story with multimedia components, hints, tips, etc. What can you identify as writing conventions? How do these conventions support the genre of "interactive exploratory experience?"



Figure 7.1: A Bad Case of Film Noir (<http://www.actualreality.co.uk/filmnoir/>) © Alexa Robinson, author and interactive Web builder, 2003. Used with Permission.

Now compare [Figure 7.1](#) with [Figure 7.2](#). Do the same analysis of the form. The underlined text represents hyperlinks.

The Garden

why wonder where this wander garden go or not unravel old worn paths earth clods
enigmas dogmas made by men or gods that serpentine such paradise we know as
knots kibbutzing freedom flowers bed in seeds whose seasons syncopated scents allure
inquisitors demonic sense or others butterflies like us who tread bedazzled boundaries
of rainbows mused around the tree with time sufficient for creations curiosities to trace
the weavers webs between by ways amused inconsequence of light and dark to store
experience or mitigate disgrace.

© Neil

Figure 7.2: Paradise Flossed - An Exploration
(http://ourworld.compuserve.com/homepages/neil_wendy/page7.htm)

Genres have a unique information structure. For example, an interactive script might begin with staging directions. The mood and tone are described. Characters' voices are defined, with accompanying dialogue. The delivery of the dialogue is suggested. The script is broken into acts or major scenes that require transitions one into another.

What information structure underlies a:

- Hypertext poem
- Travel diary
- Game?

Think about a television sitcom as a genre. A typical sitcom has several commercial breaks. How is the story structured? What happens in the first segment? What happens just before a commercial break?

The newspaper genre structures information in very specific ways. Characteristics include:

- Major international and/or local stories on the front page
- Images (perhaps color) accompanying major stories
- Images are captioned
- Different levels of headings
- Stories continued on another page, for example, the back of the first section

- Minor stories are not usually accompanied by images
- An editorial page or section
- A financial section
- A sports section
- A "city" section
- Classified advertisements
- Major advertisers have from one-quarter to full-page ads
- What else?

Do newspapers have "profiles"? Does a small community newspaper follow the same format? Tell the same stories? Have information which is not included in large major daily newspapers?

How does the form adapt to an online delivery? And how will readers intuitively use newspaper conventions to understand the structure of the hypertext version? Search for two online newspapers. Compare them to each other. Compare them also to a print version.

Find a text in your discipline and study it for the following characteristics:

- How the information is usually conveyed.
- The kind of language used to convey the information. For example, both musical notation and chemistry equations are a language.
- The structure of the language. For example, historical writing is often expository, in the past tense, and quite often in the passive voice. Is the same true for psychology texts?
- How ideas are conveyed. For example, legal content is often presented through cases, which provide a context for discussing statutes. Engineering content might be taught through problems to be solved. Other disciplines might take a didactic approach, working from the mastery of facts to concept attainment.

Some disciplines, for example, art history, convey content and concepts primarily through images. Another discipline, for example zoology, involves learners in laboratory experiments that are discovery-based.

- How the reader or learner, is involved with your content. As a receiver of information? As a problem-solver? As an apprentice?

Answering these questions about your discipline gives you an idea of how to shape it for a hypertext or an e-Learning environment.

Organizational Schemes

On the Internet, in print or media, or in life, information is organized in standard frameworks that are understood internationally.

Try this mental exercise. Organize the items in your refrigerator. How many ways can you think of to accomplish this task? For example, you could organize by optimal storage temperature - diary keeper vs. freezer vs. top shelf. Or, you could organize by "best before" date. Or type - fresh produce, condiment, meat, etc. Or....

Check your two or three schemes against the five finite ways of organizing information, described by Wurman:

1. Category
2. Time
3. Location

4. Alphabet
5. Continuum

Wurman, 1990

As you look at these schemes think about the most appropriate one for your own content.

Category

Organizing by category is recommended for objects of equal importance, for example, lab instruments. This scheme is appropriate for organizing models, types of artifacts, questions to be answered, etc.

Rosenfeld & Morville, 1998

Wurman suggests that a category scheme be cued by color, rather than by sequential numbers. Why?

Amazon is an example of an information site organized by category.

Time

Time is an easily understood framework for events that happen over a duration, for example, events in political history. This scheme works well for museums, exhibits, and some processes in a discipline, although to be useful learners must agree on the chronology. The time principle supports comparison, for example, cooking times and temperatures in food science.

Figure 7.3 is an example of information organized by time.



Figure 7.3: National Geographic Pearl Harbor Multimedia Timeline
(<http://plasma.nationalgeographic.com/pearlharbor/>)

Location

The location scheme supports examining and comparing information from different locales, for example, plants that survive well in one region, but not another. It is also useful for organizing information pertaining to travel, climate, and for information on political, social, and economic issues.

Figure 7.4 is an example of information organized by location.



Figure 7.4: BBC World News (<http://news.bbc.co.uk/>)

Alphabet

An alphabetical organization is an easily understood convention and works very well for a more general audience who may not recognize the significance of other schemes. An alphabetical organization often serves as an umbrella scheme for other structures. This scheme is also appropriate for large bodies of information with different fields, for example books in a library or animal species within a (what?) (mammals: cat, dog, elephant, human, lion, rodent, tiger, etc.).

The *Yahoo Entertainment Directory of Actors and Actresses* is an example of information organized alphabetically.

Continuum

A continuum expresses magnitude and assigns value to information within a set. For example, psychological theories like Lawrence Kohlberg's five stages of moral development are described along a chronological continuum of cognitive growth.

Kohlberg, 1971

An organization scheme can be nested or embedded in another. For example, in the refrigerator example the category of fresh produce can be further organized into categories (fruit and vegetable or even further by fruits with pits vs. berries); time (immediate, purchased last week and getting limp, fresh and crisp from the market this morning); location (local vs. imported); alphabet (fruit - apple, banana, cantaloupe, grapes, pears, watermelon); and continuum (price).

Figure 7.5 is an example of a nested organizational scheme.

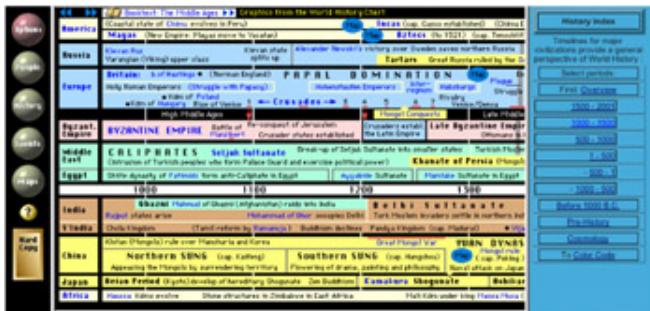


Figure 7.5: Hyperhistory Chart (http://www.hyperhistory.com/online_n2/History_n2/a.html) Used with Permission, 2003

Earlier, you were asked to think about the most effective scheme for your content. *Did you think of a scheme not represented by Wurman's work?*

Ambiguous Information Organization

Rosenfeld and Morville propose a different way of thinking about information organization, which they describe as "ambiguous." In their view, ambiguous schemes are useful because they can enhance **associative learning**.

Rosenfeld & Morville, 1998

Individuals often don't know what they are looking for, although this is less true of a focused audience like learners in a specific course or program. An ambiguous scheme provides an alternative to users who are not familiar with the structure of the discipline. To work, this type of scheme must include a hierarchical classification scheme in which content is assigned accurately and consistently.

Examples of ambiguous schemes include:

- Topical
- Task-oriented
- Audience-specific
- Metaphor-driven
- Hybrid

Once again, think about your own content as you explore these schemes.

Topical

Appropriate for research sites, a topical organization defines the breadth of coverage for the user. For example, the chapters of a non-fiction book and an academic calendar are both organized topically.

Figure 7.6 is an example of a topical organization.



Figure 7.6: © MSN (<http://www.msn.com>)

Task-Oriented

In a task-oriented scheme, content and applications are organized into collections of processes, functions, or tasks. This scheme is appropriate for functional environments in which a series of tasks must be learned and performed. For example, the content in productivity software is organized by task.

Figure 7.7 is an example of a task-oriented organization.



Figure 7.7: MSWord 2000™

Audience-Specific

If there is value in customizing information or experiences for a user, an audience-specific organization is appropriate. Based on a clear definition of the target audience (for example, fifteen-year old hockey players) an audience-specific organization reflects the user-centered design guidelines approach outlined in this book.

More than one audience can be supported in the same site. For example, one professor at the university has developed an online interactive French grammar text. French language learners, from beginners to native speakers, can use the text. The environment is designed for open-access. Learners at a beginning level for example can retrieve information on verb conjugations and learners at an intermediate level can access activities on the use of reflexive pronouns. Closed-access would control the movement of these users, perhaps by the mastery of one concept as assessed by an online quiz.

This type of scheme is excellent for the development and organization of an environment that is content-heavy, for example, using a database framework. One Web site can be developed to support information for a required course that also serves as pre-requisites or review for other courses in the program.

Metaphor-Driven

A metaphor-driven organization presents new information in old and familiar ways. But therein lies the rub. If the chosen metaphor is not familiar to the user, he/she will be confused by the scheme. This is of particular concern when designing for international audiences. For example, a sports metaphor based on North American interests such as football might not make sense to a learner from Western Europe, where soccer prevails (and is known as football in some countries).

Some metaphors may be controversial or insensitive. For example, I used an image from the American Cancer Society's wonderful Web site supporting the 1998 *SmokeoutCampaign* to discuss the use of metaphors with a group of instructional designers in Malaysia. The image, a string of sausages off the barbecue, represented the concept "hot links" and was highly offensive to my Muslim audience.

A meaningful metaphor, however, helps reduce the learner's cognitive load because they can understand content organization intuitively. [Figure 7.8](#) is an excellent example of a metaphor-driven organization. The metaphor is very familiar to readers of women's fashion magazines, in which the cover titles relate to the stories, features, interviews, and photo spreads inside the magazine. Each title on the cover or homepage of this site is a hyperlink to the content of the site.



Figure 7.8: Fashion Planet (<http://www.fashionplanet.com>) © 1995–2003 - Digital Fashion, Inc.

If a metaphor is too customized or mismatched, you have broken out of the familiar and are introducing some degree of inconsistency and uncertainty. The same problem occurs when the metaphor is too flexible or inconsistent. Imagine what would happen if you rented a car whose

dashboard was in the backseat or whose gas gauge was out of your view. Would you understand intuitively how to drive the car?

Are there powerful metaphors available to you in your own discipline? Will a metaphor-driven organization enhance access to your e-Learning materials?

Hybrid

Finally, a hybrid scheme blends or nests two or more organization schemes, as discussed earlier. If more than one scheme is presented on one page, you might need to provide extra information to the user on how to approach information retrieval.

A Third Scheme

Kilian describes a third organization scheme that includes presenting information narratively and logically.

Narrative Organization

A narrative scheme tells a story; describes a process through time. For example, a discipline that lends itself well to cases that unfold over time will be well supported by this approach.

PallCare

For example, in the PallCare course described in [Chapter 5](#), a patient case anchored the learning activities, which were based on a multidisciplinary healthcare team approach.

The patient's condition became more complicated as the course progressed, and the case became more complex to work with as the team had to interact with the patient's family, support his spiritual needs, bring in a lawyer to help him settle his estate, and involve additional physicians for more specialized diagnoses, etc.

Every two weeks, another episode of the narrative was posted, along with new charts, test results, letters from other physicians, information about pain medications and other resources the learners needed to revise the care plan.

Kilian suggests that a long narrative be made available without breaks as a scrolling document to be printed in one piece. If the narrative breaks logically into sections, however, it might work better presented in chunks. The patient case was chunked as time elapsed in between "episodes."

Logical Organization

In a logical scheme, an assertion is backed up with documentation and followed by a conclusion. This scheme supports argumentation. Content organized in this format, for example a research report, is often left intact as one document with hyperlinks to supporting information (e.g. evidence) pulled out of the text.

The Shell

[Horton, 2000](#)

[Stansberry, 1998](#)

Having thought about the conceptual structure of your discipline and ways to organize information to reflect that structure, your next step involves developing the course framework or, as Stansberry terms it, the design shell.

What sequence of content will support your instructional goals and the user's learning goals?

- From essential to optional?

- From general to specific?
- From whole to part?
- From part to whole?
- From theory to application?
- From example to concept?
- From novice to expert
- In layers of core material through extended material?

For example, a learning sequence may be structured like this:

contentstructure

- Introduction
- Presentation
- Practice
- Review
- Assessment

Or, it might make better sense to present a problem to be solved, along with a choice of resources to help with the process. This latter design framework has been adapted very well to (and some would say created by) medical education.

Flyn, 1992

Gagne's *Nine Events of Instruction* is a well-known model for presenting learning content. Much of the computer-based training or computer-assisted instruction developed over the past two decades has been based on this approach. The events are:

1. Gain attention
2. Inform the learner of the objectives
3. Stimulate recall of prerequisite learning
4. Present stimulus material
5. Provide guidance
6. Elicit performance
7. Provide feedback
8. Assess the performance
9. Enhance retention and transfer

Will this kind of presentation effectively reflect the structure of your content? Can you see how a lesson or module could unfold using this framework?

Tip You can also use this framework for planning a slide presentation.

Problem-based learning, illustrated by *The Virtual Field Trip*, is another model used to promote collaborative learning and higher-order thinking.

problem-based model A WebQuest is a good example of a problem-based model. A WebQuest is an inquiry-oriented activity in which most or all of the information used by learners is drawn from the Web. WebQuests are designed to use learners' time well, to focus on using information rather than looking for it, and to support learners' thinking at the levels of analysis, synthesis and evaluation. Bernie Dodge, with Tom March, developed the model in early 1995 at San Diego State University.

Designing the learning space is based on a number of decisions about the content, the user, and the task. The framework, or design shell described in *Building Learning Communities in Cyberspace* contains:

- A welcome area
- A community area for personal interactions
- Course content areas, organized by topic or concept
- An area for reflections
- An evaluation area
- A discussion area

Palloff & Pratt, p. 102

Horton, 2000

Horton breaks the shell into smaller components:

- Welcome page
 - Purpose: Motivational
- Introduction page
 - Purpose: To indicate the title, context, goals, requirements, preparation, contents in lesson, links, etc.
- Resources page
 - Purpose: To provide instructions for accessing to learning support including e-Texts used in the course, virtual library access, how to contact tutors, etc.
- Summary page
 - Purpose: Occurs before each lesson, helps with scannability, levels of learning
- Content pages
 - Purpose: Provides texts, supporting media, and activities
- Review page
 - Purpose: To synthesize main concepts, prepare for assessment
- Assessment pages
 - Purpose: To test for comprehension, mastery, and for diagnosis of problems
- Enhancement pages
 - Purpose: To elaborate concepts, go deeper, provide additional practice
- Communications page
 - Purpose: Provides tools and space for discussion or collaborative workspace

Tip This organization lends itself to many LCMS.

A learning space may contain some or all of the following information:

Horton, 2000

an e-Learning space

- Introduction
- Course announcements
- Objectives/goals
- Resources (e.g. library)
- Course description/syllabus
- Audience description
- Prerequisites
- Style of instruction
- Expectations for participation (e.g. participate in discussions once a week)
- How to prepare for course
- Course length
- Grading policy, etc.
- Copyright statements, disclaimers
- Policies (e.g. cheating)
- Content
- Assessments

Note These elements are extended in a *Course Information Checklist* in the *Handbook*([go to Course Information Checklist in Chapter 7](#) of the *Handbook*). Compare the list with the components of Palloff and Pratt's and Horton's design shells. In which shell component(s) would you place the information?

Tip If you are using a LCMS, you may already have templates or style sheets available. Your institution or organization may also have standard content that you can use. For example, the LCMS we use at our institution has a course Information icon and template, into which instructors can drop a "canned" text on plagiarism, grade appeals, and so on.

The shell can be organized in many different ways, depending on your outcomes, the nature of the course, the structure of your discipline, and other factors. For example, the shell may reflect a topic organization.

Other organizational schemes include:

schemes

- By weekly discussion thread
- By readings
- By problem or case
- By method or steps in a sequence
- By skill set
- By theory
- By guest lecture
- By assignment
- By order of presentation

Analyze the content structure and sequencing represented by [Figure 7.9](#). Compare this framework to the one represented in [Figure 7.10](#). Notice how each instructor has conceptualized the e-Learning domain.



Figure 7.9: Oyez Baseball (<http://baseball.oyez.org/>) The OYEZ™ Project © 1996–2003 by Jerry Goldman and Northwestern University

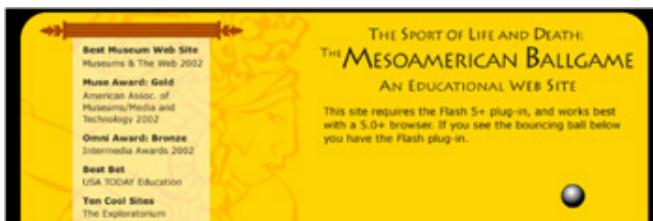


Figure 7.10: Welcome to the Mesoamerican Ballgame (<http://www.ballgame.org/>). The Sport of Life and Death— The Mesoamerican Ballgame, Mint Museum of Art, Charlotte, North Carolina Project Supported by— The National Endowment for the Humanities, The National Endowment for the Arts, TheRockefellerFoundation Website Design and Production by— Interactive Knowledge, Inc. ©

Note A comparison of different strategies based on domain, *Selected Domains and Organizing Frameworks*, is included in the *Handbook* ([go to Selected Domains and Organizing Frameworks in Chapter 7](#) of the *Handbook*).

Whatever you settle on for your content organization, you should have a very clear understanding of the kinds and purposes of the information/learning tasks and activities that the structure will support.

The [next section](#) provides an overview of techniques and strategies that help learners remember, process, and apply new information.

Summary

The structure of information and concepts in your domain or discipline will strongly influence how you present content in an e-Learning space (of course, your e-Learning content will reflect good message design guidelines). Many instructors also want their materials to model or represent expert thinking in their domains.

Although content organization might be quite well defined, room for flexibility also exists, for example, in hybrid schemes. What is important is that learners understand how to access the content. The organization scheme must be relevant, meaningful - even intuitive, and supported by the interface.

In a contained learning environment, especially on a secure site, external readers are not likely to access your site through external links. In non-secure environments, however, users may not ever see the homepage, which orients the user to the content organization in a hypermedia environment. To support these users, Kilian suggests applying three basic principles for every single page of Web content. These principles are relevant for hypertext content even on a secure site.

[Kilian, 1999](#)

Three Principles for Each Page of Content

1. Provide an orientation to the content on each page
 - Background information and navigation information
 - Supply only what the reader needs to proceed
 - Be coherent and consistent with organization, transitions, etc.
 2. Evaluate the content for:
 - Clarity, accessibility, and readability
 - Correctness and quality in language, syntax, references, etc.
 3. Be active
 - Users should do something with the information
 - Keep the task descriptions positive
 - Design activities based on learning or information needs
-

Note For guidance in planning and structuring your e-Learning environment, see the *Checklist for Planning Steps* in the *Handbook* ([go to Checklist: Planning Steps for e-Learning Environments](#) in [Chapter 7](#) of the *Handbook*).

Content Management

Content management is a challenge for educators and trainers. Content is fluid and dynamic. In e-Learning environments, especially, content should be relevant, current, and accurate. In this knowledge economy where information development continues to accelerate, it can be difficult to think strategically:

- What should be included and excluded?
- What is the balance between breadth and depth?
- How can complexity be decreased while maintaining academic integrity?

- How can content be easily updated?

Information architects, for example the developers at Yale Medical School, make recommendations about content management and sustainability of a content-rich site. The initial planning phase, in which you think through the structure of the content and the space are key.

If you expect your site to grow, be conservative initially in depth. The number of layers of information or menu choices (or mouse clicks) that a user must drill down into to retrieve the information he/she seeks defines site depth. Frustration tends to increase after 3–5 levels. Don't make your reader/learner follow too many links before the content is accessible.

Implications for e-Learning

This rule implies that you increase the breadth of the site instead of the depth as you add new content. For example, in a domain where new content must be added frequently, lean towards a broad and shallow rather than narrow and deep hierarchy, because the content may be added without major restructuring of the environment. Instead of adding a new leaf on the tree, add a new branch.

Over time, your users have developed a mental model of the information and conceptual structure of the learning space and a change will confuse them and increase their cognitive load unnecessarily. Consequently, if you add new content, try to maintain the familiar organization structure represented on your first page or home page.

hierarchical vs. semantic structure	Some Web architects feel that a hypertext organization is not ideal for a first or primary level of the space, but that the organization should be more hierarchical. LCMS support a more hierarchical approach. However, some domains, in which information is not hierarchical, may lend themselves well to more of a "semantic mapping" architecture approach. For example, a site that explored many interrelated conceptual models - adult education - may have a hypertext structure inviting users to forge their own paths through the content. The concept map in Chapter 5 is an example of this kind of organization.
content repositories	In the field of knowledge management, content repositories have become an effective way to contain and access information rapidly. A repository is a kind of database, in which records (objects) are defined by multiple associated fields (metadata), for example, by objective, grade level and related topic.

Content management is made easier with a database approach, which supports global search and replace, facilitates distributed content management, or management by various individuals at various locations, and allows many people to modify content.

Saving your content in files that can be shared among colleagues in your discipline community, perhaps through the Internet, efficiently adds extra value to the objects as they are retrieved, modified (re-purposed), re-deposited, and reused.

On a course site, learners retrieve content matched to the task, their learning profile, or other criteria. This approach to content management allows you to keep your space relatively shallow and consistent, while increasing the learning options.

Summary

Taking time to reflect upon and think about the organization and structure of your e-Learning environment is extremely important. Ultimately the structure of your e-Learning environment must support your learners and your educational objectives. Ask yourself:

- Does the organization support the goals of my site?
- Are the goals of the site appropriate given my specific audience?
- Does the site authentically represent the structure of my specific domain?

As you receive feedback from users/learners through formative and summative evaluations you may begin to rethink initial design decisions and make revisions to better support the learners' experience. The development and planning of an e-learning environment is an ongoing and ever changing process. This is the joy of being a reflective practitioner!

Practice

Collect a "scrapbook" of Web sites and other resources that have well-designed interfaces. Try to find a set of these environments that represent your own discipline.

- What works well?
- Why have you chosen these examples as exemplars of good design?

As you evaluate the information architecture, start a list of elements that are effective. Share your choices with other colleagues or target learners and begin to refine your list.

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Team LiB

◀ PREVIOUS ▶ NEXT ▶

Recommended Activity

Explore two or three educational sites in your field of interest/study. This will provide you with a sense of the ways in which the learning experience has been structured.

Given the suggestions in this chapter can you think of different ways the learning experience may be structured to better support the learners?

Team LiB

◀ PREVIOUS ▶ NEXT ▶

Chapter 8: The Active e-Reader

Overview

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The e-Learning environment can be enhanced through the dynamic, interactive, and visual capabilities of hypermedia learning, which are then supported and extended, for example, through the use of online conversations or discussions.

[Crosby & Stelovsky, 1995](#)

[Jonassen, 1996](#)

[Schank, 1993](#)

[Yaverbaum, Kulkarni & Wood, 1997](#)

Reading and memorizing information is one learning task or activity. This kind of cognitive task is at the lower end of Bloom's taxonomy. Pulling textual content into a Web site for distribution or delivery purposes is less a learning design strategy than a publishing decision. All of the previous chapters have emphasized the importance of *interaction* with e-Texts in order for learning to occur. In other words, "learners should be doing something, not just watching something."

To a great extent, the nature of this interaction will be defined by your discipline and the structure of your content. In this chapter, you will encounter some very general ideas about learning interactions that you can adapt to your own environments.

Key Ideas

This chapter will help you develop interactions that reflect your discipline and actively engage the reader. You will:

- Explore techniques for enhancing cognitive processes
- Look at goal-based scenarios and problem-based learning shells
- Discuss tools for presentation and communication
- Examine interface designs that support learning outcomes

Key Terms

Note This chapter introduces a number of terms and phrases that you may not be familiar with. These terms are listed in the accompanying *Handbook* with enough space to define them in your own words or note examples, references, and resources ([go to Key Terms in Chapter 8](#) of the *Handbook*).

- Semantic networks
- Cognitive tool
- Mind tools
- Transfer
- Goal-based
- Webcast

Plan Your Progress

Note A concept guide for the ideas in this chapter is provided in the *Handbook* ([go to Concept Guide in Chapter 8](#) of the *Handbook*). You can use this outline to help guide your exploration.

Note There is additional space for you to write the questions for which you need answers. Record your own information or learning needs in the *Handbook* ([go to Questions and Goals in Chapter 8](#) of the *Handbook*). If you have questions about active e-Readers record them here.

At the end of the chapter, check your list of questions to determine whether you need additional information. Use the chart to organize an action plan.

As you work through the chapter, apply these concepts to the organization of the content you have developed.

Note A "[To do list](#)" has also been provided for you in the *Handbook* for you to record what needs to be done, who needs to do the task, and when the task should be completed by ([go to To Do List in Chapter 8](#) of the *Handbook*).

Supporting Cognitive Processes

The learning task helps students make connections between what they *already* know and what is new. Computer-supported tasks such as the retrieval and reorganization of information from the Web may require reconceptualizing existing semantic networks, a process of active learning. You can support active learning by using cognitive tools or Jonassen's *[mind tools](#)* that help learners develop a deeper understanding of key learning concepts in your course. These include tools for:

- Organizing and re-presenting information (e.g. in outlines or study guides)
- Annotating and elaboration (e.g. asking questions)
- Building on experience or scaffolding
- Self-assessment (e.g. online quizzes)
- Reshaping knowledge or representation (e.g. collaborative problem solving)
- Critical reflection (e.g. conferencing).

Tip For more on instructional or learning design, see the *Resources*.

[Table 8.1](#) describes cognitive activities as learners move from organizing information through to the complex skill of representing their learning in a new form. Learning (and teaching) for [transfer](#) is another way of thinking of this process.

Table 8.1: Cognitive Activities Continuum

Organizing	Annotating	Scaffolding	Representing
Label issues	Create notes guide	Build on evidence	Outlining
Gather evidence	Create study guide	Find new cases/stories with similar issues	Develop schemes or models of action or processes
Develop database of evidence	Develop hypotheses	Complete charts or concept maps showing new understandings	Charting or graphing, ordered trees
Index evidence	Relate new evidence to existing knowledge	Compare understanding to expert model	Develop timelines, workplan
Classify or categorize knowledge items	Sequencing steps to resolution	Consulting/querying experts	Develop timelines, workplan
Concept mapping	Compare to previous maps or to others in group	Self-assess strategy and outline next steps, or revise	Write memos
Outlining	Include cases with related rules and elaborate	Develop metacognitive activities, embedded opportunities	Make recommendations

Techniques that Enhance Organization and Retrieval

You can help learners retrieve and organize new information by making the scheme explicit. Think about including or embedding techniques that encourage the cognitive processes of attention, encoding, and retrieval. Some techniques that support these processes are illustrated below.

Advance organizers are tools that motivate and help learners organize new information by suggesting a scheme or framework into which new concepts can be "slotted." An advance organizer could be an outline of the content, a preview of activities, or other pre-instructional information.

advanced organizer

For example, by providing pre-session access to lecture outlines highlighting the key concepts to be covered, learners can organize the material for learning as well as use a guided, note-taking strategy during face-to-face lectures.

Ausubel, 1968

Posting a question via e-mail or the class conference that requires a personal reflection is another strategy that motivates and prepares for new learning. For example, to prepare for a civics class you might ask participants to complete the statement:

To me citizenship means...

Other examples of advance organizers include:

- Requesting a response to a controversial statement
- Issuing a challenge
- Asking that several key terms be defined before class
- Prompting a memory from childhood or adolescence
- Asking that a television program be viewed, with a key question in mind, in advance of the learning task
- Posing a riddle or problem

Focusing Questions

Use focusing questions at the beginning of the lesson or the beginning of each new segment of the content module. These questions draw learner attention to the important points and help them organize their thinking around these ideas. In this book, I've used focusing questions throughout each chapter, very often to introduce a paragraph that leads a new section.

For example, this question, from the course PSYCE104 *Procédés psychologiques de base*, focuses learners on the concept of altered mental states.

Have you ever had a vivid dream that you remembered clearly? What are dreams?

Highlighting

Providing emphasis directs the learner's attention to a specific aspect of the information that you want them to retain. As you saw in [Chapter 5](#), highlighting signifies importance.

Newby et al., 2000

Emphasizing techniques include style elements like bold or italic text, visual techniques such as color, text elements like labels, and arrows. In verbal communication, a change in intonation signals emphasis. For example, you may speak more loudly to introduce a new topic.

Verbally or in text you might use signal phrases. Nothing gets attention like the ubiquitous "Now this will be on the exam." Another example is: "This is the key concept in this module."

What signal question can you embed in your content to indicate high importance?

Analogies

An analogy likens something new to something familiar. An analogy accomplishes three important goals by:

- Making abstract information more concrete
- Helping organize complex information
- Providing a retrieval cue

For example,

The interface is the bridge between the learner and the content.

Mnemonics

Mnemonics are devices that help learners remember new information. Examples include rhymes and acronyms. Mnemonics are often used to support the learning of formulas or a sequence of actions. For example, here is a mnemonic for remembering the order of planets in our solar system:

Mark'sVeryExtravagantMotherJustSentUsNinetyParakeets.

Imagery

Images are mental representations of new information. Images can serve as cues for recall of new information and can represent ideas that would require a fair amount of text to describe. Learning attributes of images was discussed in [Chapter 5](#). Remember images that are more effective are often simple and may be layered if illustrating a complicated idea.

Icons are images. Throughout the book, this image has cued you to

a "theory burst." However, when using images remember the cultural concerns identified in [Chapters 3 and 5](#).

Activities that Support Scaffolding Through Representation

Learning results from making personal meaning out of information and experiences, and applying that learning in new situations. Strategies that support these cognitive processes include:

- Concept attainment
- Case-based learning
- Problem-based learning

Many other strategies are discussed in the instructional design references contained in *Resources*.

Concept Attainment

A concept attainment strategy uses examples and non-examples in a deductive process. For example, you might use this strategy to teach about a concept in the natural sciences such as the concept **monotreme**, a mammal that lays eggs but milk-feeds its young.

To present examples:

1. Move from simple to complex. Simple examples should contain critical attributes readily identifiable
2. Use different formats
3. Use non-examples (negative examples) to help highlight the examples' critical attributes
4. End with difficult examples that approximate real-world cases

For example, you might sequence the process like this:

1. Present images of different animals.
 - a. Include a few non-mammals

- b. At least two should be monotremes
 - c. Explain each with "This is an example of the concept" or "This is not an example of the concept"
2. Repeat this sequence until the learners have correctly identified "Mammals"
 - a. Elicit the critical attributes of "mammals" as you repeat the process
 3. Continue presenting images and discussing critical attributes until the concept is identified
 4. Assess by presenting new images or examples
 - a. Require learners to identify them as examples or non-examples of the concept
 5. Assign practice activities (e.g. research project)

Case-based Reasoning

authentic contexts In case-based learning, learners acquire knowledge and critical thinking skills by studying cases and preparing case summaries or diagnoses. Cases are anchored in authentic contexts, encouraging learners to manage complexity and think like practitioners. Recollections of *prior experiences* are key to learning. Learners build on these experiences as they seek solutions. Cases provide multiple interpretations, perspectives and view-points of content with multiple, related cases. In case-based learning, *stories* are the primary content and pedagogical source.

Developing a case-based environment includes:

- Collecting a set of cases
- Identifying lessons in each case (indexable, perhaps in a repository)
- Characterizing contexts in which each case will be most meaningfully used
- Developing an index
- Presenting its features in a way that allows cases to be recalled when needed

Case-based reasoning is a method used in business and other professional domains.

Note A design shell based on case-based learning, called *Goal-based Scenarios*, is described in the *Handbook* ([go to Goal-based Scenarios](#) and [Goal-based Scenarios-Planning Template in Chapter 8](#) of the *Handbook*). A planning template and a checklist for developing good cases are also included.

Problem-Based Learning

In a problem-based approach learners focus on complex projects consisting of multiple cases. They debate ideas, plan and conduct experiments, and communicate their findings. As we continue to emphasize collaborative social learning in higher education we see increasing numbers of e-Courses and programs based on this approach.

community of practice	Like case-based reasoning, the goal in problem-based learning is for students to learn about a discipline by thinking like members of a practice community. For example, in medical education learners approach a problem as a physician or health care worker might. Generally, the learner assumes a role. For example, in the <i>Palliative Care</i> , course teams of health practitioners worked together as a team that included a physician, a nurse, a pharmacist, a psychologist, a social worker, and a spiritual advisor, each bringing a particular perspective to the problem.
PBL shell	A problem-based learning shell contains: <ul style="list-style-type: none">■ Problem/project context■ Problem/project representation■ Problem/project manipulation space■ Related cases■ Information resources■ Cognitive tools■ Conversation/collaboration tools■ Social/contextual support

As you saw before, WebQuests follow the problem-based model.

Note The design framework and a planning template for *Problem-based Learning* are included in the *Handbook* ([go to Problem-based Planning Template in Chapter 8](#) of the *Handbook*).

Tools and Methods that Support Communications and Presentation

distributed communications	The Internet is an excellent medium for distributed communications, wherever participants are located, whether at the same time (synchronous) or at a different time (asynchronous). These communications can be interactive (two-way) or one-way.
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As bandwidth steadily improves, the Internet permits a broader range of communications tools - more reliable synchronous tools, and tools in which many modes have converged, for example WebX™ or Centra Conference™. Webcasting is an example of an approach that has become more consistent and easier to use over the past three years.

social constructivist learning	Communications tools support social and constructivist learning, as well as course management. Groups working collaboratively on a project, case, or problem can use these tools. For example, the tools may be used by a learner seeking academic help from a tutor, an instructor leading a class discussion, or in a myriad of other ways.
---------------------------------------	---

Many LCMS include a set of communications tools, both asynchronous (e.g. threaded discussion forum) and synchronous (e.g. a text chat). The system can usually link out to other Web-based systems.

Tools that enhance presentation include

- Webcasts
- Synchronous conferences

- e-Texts

Tools that enhance two-way communications include:

- E-mail
- Discussion groups
- Screen-sharing (e.g. whiteboards)
- Synchronous conferencing

Note These tools and the advantages and disadvantages of their recommended uses can be compared in *Presentation and Communications Tools* in the *Handbook* ([go to Presentation and Communications Tools in Chapter 8](#) of the *Handbook*).

Summary

Learning tasks are defined by the learning goals and expected outcomes and can range from encoding and organizing cognitive activities to the representation of learning in new forms, for example, an original paper.

[Figure 8.1](#) is an example of a learning design model that we developed with the School of Business and a private financial planning and training organization. In this model, learners move towards expert practice in financial planning.

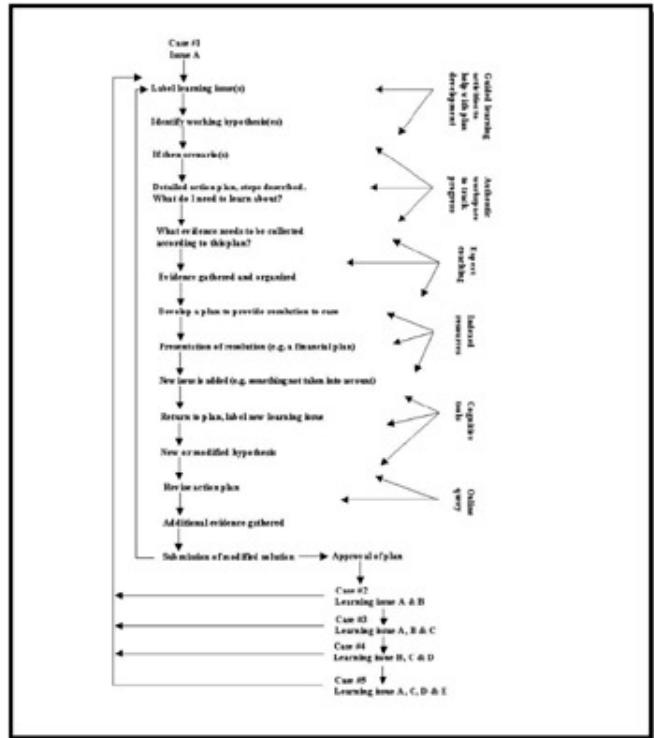


Figure 8.1: Case-based ModelNavigation

Navigation

optimal layout

From deductive through inductive models, the goals of the Web site need to be clearly understood before deciding on an optimal layout. For example, pages may be directive - directing learners to other information or act as navigation or be informative - presenting content for online reading.

McMullin et al., 2000

These examples involve different learning tasks; optimal layout for one type is not optimal for the other. For example, we expect different reading experiences from a romance novel and an anthropology textbook, different viewing experiences from a feature-length film and a newscast, and different participation experiences from a small-group seminar and a lecture to 400 students in a large multimedia hall.

In an e-Learning environment, the nature of the content and the interactions within it are represented and enabled by the design of the interface.

We are very used to dealing with interfaces in our daily lives. A TV guide is an interface to the content on television; the table of contents and index provide the **interfaces** interface to a textbook, a building directory is the interface to the layout and occupants of an office building, a menu displays food choices in a restaurant, traffic signs direct driving decisions, etc.

In *The Media Equation* (1998), the authors demonstrate how media equals real life and how we might think of computers as social actors that influence the experience of our interactions.

While it might be tempting to assign the confusion between media and real life to problems of age, knowledge, distraction, or convenience, our research shows that social and natural responses are remarkably common, and true for every group we have tested, including children, college sophomores, people in business, and technology experts. All people automatically and unconsciously respond socially and naturally to media

Reeves & Nass, p. 7

Well-designed interfaces are coherent, consistent, and transparent. They are also polite, positive, relevant, and clear. In other words, a good interface does not require the user to figure out what to do on each page again and again or make the learner feel ignorant or technically hopeless. Cognitive and emotional effort should be directed towards the learning task.

effects of bad interfaces Poorly-designed interfaces increase the user's cognitive load and can lead to anxiety, frustration, and rejection. The microwave is a classic example of the bad interface. Have you ever encountered two different brands of microwaves with the same control panel?

If you are using a learning content management system, you may have limited options for designing a user interface. However, there are still decisions to be made about visual elements, placement of e-Texts, and relationships of ideas.

As always, interface or navigation decisions should be based on your understanding of your readers or learners and their diverse needs and expectations. Interface design is a key stage in user-centered design (UCD).

Navigation Systems

Earlier, you thought about the architecture and management of your content. Many information architects advise you to keep your Web site shallow and broad. In other words, the user should not have to dig deeper than three to five levels to retrieve the information needed.

[Rosenfeld & Morville, 1998](#)

The "rule of three" suggests layers of related content, tasks, or administration in a site. For example,

- Layer 1 may contain a preview of the learning environment, an overview, links to other areas (e.g. discussion board), access to help
- Layer 2 may contain a complete development of the main, high-priority ideas and related activities
- Layer 3 may contain rarely needed subjects, supporting or additional resources, external links that extend the experience for interested or advanced learners, evaluation or feedback forms, etc.

Horton, 2000

Keeping this guideline in mind, think about three types of navigation systems:

- Hierarchical
- Global
- Local

hierarchical navigation A hierarchical navigation scheme is very useful for information that is conceptually organized in a top-down structure. Textbooks tend to be organized hierarchically, with main topics and related subtopics. Many LCMS systems offer this type of interface, with main choices and management features available on the homepage, through which the specific topics are accessible. This kind of scheme is often represented with a table of contents.

If you have planned a less structured learning space, for example to support problem-based learning, a potential disadvantage of this scheme is that learners tend to consider the modules or topics to be sequential.

global navigation A global navigation system permits greater vertical and lateral movement throughout the entire site and does not suggest information hierarchies. The navigation system may be graphical, with each image the same size. As these schemes are relatively flat, they may have an index. Sites that use image maps represent a global organization, for example, *Fashion Planet*, [Figure 7.8](#), in [Chapter 7](#).

local navigation A local navigation system may organize a sub-site within a larger, more global site. The navigation design may even be different, although it should be coherent. For example, an online catalogue may have a global scheme based on categories of items for sale. In each main item area, there may be many smaller "sites" based on attributes or characteristics of the item.

A site map, in combination with other navigation schemes, is quite common in sites with this organization.

The Navigation Bar

The navigation bar is placed in a consistent place on the screen. For example, if your secondary pages place the bar at the top of the screen, keep it there for every other secondary page on the site.

consistent placement A top placement provides context for the learner. Many sites place the same navigation bar at the top and the bottom of the screen, which supports scanning. *What problems could occur if the navigation bar is placed only at the bottom of the screen?*

A side placement is often used in a table format. Usually the navigation bar stays constant as the user

navigates the site. Rosenfeld and Morville do not recommend this placement, although if supported with a top or bottom bar a side bar may help anchor the learner.

Rosenfeld & Morville, 1998

site maps Site maps provide a graphical representation of the information architecture. Site maps are like mall maps, representing visually, although sometimes in text only, where you are in the site and where desired information can be located. They may also represent information relationships. Site maps may be more difficult for a user to understand than a familiar table of contents, for example. The *Consumer Reports* Web site uses a combination of these strategies.

For practice, surf the Web for examples of these different types of navigation schemes. *Do you think the placement of the navigation bar is effective?*

Metaphors

One way to think about the interaction of form and content is through a metaphor. An icon by itself is usually a metaphor, but the reader needs to understand the symbolic meaning. Remember to constantly challenge your decisions about the use of icons or visual images through the eyes of an international reader.

For example, the trashcan icon was used early in the graphical user interface developed by Apple™ computers. *What symbolic meaning does it represent to the user? Does it work well for the purpose?*

design by metaphor



Look at [Figure 7.8](#). *Fashion Planet* again, a screen capture from an online fashion magazine. Each image and title is a hyperlink to content within the magazine. The interface designer intended for the metaphor to reflect the content domain. *Would you expect all users to be able to navigate intuitively?*

Now compare [Figure 8.2](#) and [Figure 8.3](#) to the *Fashion Planet* homepage. These are both homepages for a teaching methods course in elementary social studies. Remember your elementary school hallway. Do the metaphors work as well here as for *Fashion Planet*?

A screenshot of the 'Welcome to Central Elementary School' homepage from WebCT. The page has a brown corkboard background. At the top, there's a blue header bar with the text 'EDEL 425: Instruction in Elementary School Social Studies (Demo)' and 'Home'. Below the header, the main title 'Welcome to Central Elementary School' is displayed in a blue banner. The page features several pinned-up notices and signs: 'ATTENTION! Student Teachers outlines available', 'NOTICE "Issues in Social Studies" WEEKLY DISCUSSION NIGHT', 'You Are Here' (with a map of the school), 'Professional Development Opportunities' (listing sites for teaching, resources, differences, and connections), 'Student of the WEEK!', and 'Learning Resource Centre Is Now Open!'. Navigation links for 'Course Outline', 'Course Content', 'School Tour', 'Course Tools and Resources', and 'Course Tools and Resources' are visible at the bottom.

Figure 8.2: EDEL 435—Instruction in Elementary School Social Studies © University of Alberta, 2003 (<http://www.atl.ualberta.ca/project/detail.cfm?id=58>)



Figure 8.3: Homepage for EDES501 © University of Alberta, 2003 (<http://www.quasar.ualberta.ca/edes501>)

spatial metaphor

Spatial metaphors — the arrangement of objects in a physical space — are tools for the arrangement, presentation, and experience of information. The desktop metaphor is a well-known visual representation of an operating system. A book is a common organizing metaphor for an information site.

Stansberry, 1998

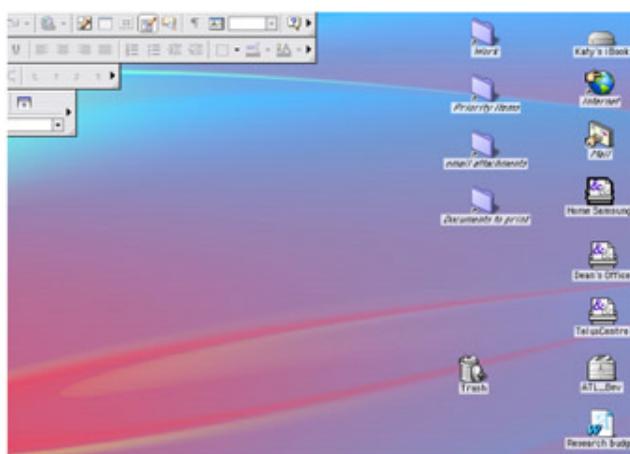


Figure 8.4: The Desktop Metaphor. Katy's Desktop

Think about how various media and genres use an organizing metaphor. What conventions do textbooks use? How do you know how to navigate a dictionary?

Links

Embedding links into e-Text is a very common navigation device. Links were discussed more extensively in the [previous chapter](#).

problems with links Hypertext environments are really shaped by the interrelationships of ideas or the semantic web of ideas that the reader creates. However, hyperlinks are not always used effectively to support readability or the process of semantic linking. Problems include, among others:

- Interrupting the flow of reading in a sentence
- Readers leaving a page and not being able to return
- Distracting the eye from important information
- Broken links

Tip If links are used for navigation, think about pulling them out of the text and presenting them in a sidebar.

Visual Design Elements

In [Chapters 5](#) and [6](#), you were provided with a lot of information about design elements. In the context of content development, these were termed e-Texts. When you choose textual and visual elements for an interface, many of the same guidelines apply.

In [Chapter 7](#), you practiced analyzing the information relationships in your content. These relationships were represented by different schemes. In an interface, this is represented through visual hierarchies through the use of attributes like size, placement, color, and movement.

[Fleming, 1998, p. 64](#)

Note Each of these attributes is represented by an example interface in [Figure 8.5](#). A *Checklist for Visual Elements and Information Hierarchy* in the *Handbook* accompanies this section ([go to Checklist: Visual Elements and Information Hierarchy](#) in [Chapter 8](#) of the *Handbook*). For each example jot notes about the element in the chart.



Figure 8.5: Academic Technologies for Learning © University of Alberta, 2003
(<http://www.atl.ualberta.ca>)

- Tip**
1. Copy the checklist before writing and use this as a design tool or an evaluation tool for designing or selecting learning objects.
 2. For additional information about each element, review the guidelines in the *Handbook*.

Size

The size of a visual element shows the importance of one element over another.

Examine the Web site in [Figure 8.5](#) for the sizing of different elements. What do the relative sizes of the elements tell the reader?

Placement

The placement or position of the elements on the page communicates the importance and sequence of the information.

Examine the interface of [Figure 8.5](#) for the placement of elements. *What does the placement of the elements on the page tell the reader?*

Color and Contrast

Color and contrast shows relationships by drawing attention to the element. Elements that draw the eye first should be the most important.

Movement

As with color, movement immediately draws attention to the element.

Examine the Web site in [Figure 8.5](#) in terms of the use of movement. What does the use of movement tell the reader?

Summary

In this chapter, you considered the two key elements of an e-Learning space: task and environment.

You learned a series of strategies and techniques to organize your content, structure a design shell, and integrate learning activities.

The space in which learners interact with the content is the interface. You explored elements of the interface and some guidelines for designing or evaluating an effective interface, including the use of metaphors. These concepts are presented again in the [next chapter](#), Usability. In [Chapter 9](#), you will develop an understanding of methods for evaluating the effectiveness of your design decisions.

Note The Human Computer Interface (HCI) field, which is about 20 years old, has developed evidence-based, comprehensive guidelines for interface design. A synthesis of a small subset of these guidelines, *Rules of Navigation*, is presented in the *Handbook* ([go to Rules of Navigation in Chapter 8](#) of the *Handbook*). You will learn more about this field as it relates to usability in [Chapter 9](#).

Practice

Return to [Chapter 2](#) to review ideas about learning outcomes. You saw that activities, which are effective in a F2F classroom, could be adapted to an e-Learning environment.

Compare the ideas in [Chapter 2](#) to the ideas for engaging readers with content presented in this Chapter. Find three strong ideas for your own course.

Analyze the ideas you have chosen for their appropriateness for users with diverse needs and expectations. Can each learner find at least one idea that will meet his or her needs?

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Yaverbaum,G.J.,Kulkarni,M., & Wood,C.(1997).Multimedia projection: An exploratory study of student perceptions regarding interest, organization, and clarity, *Journal of Educational Multimedia and Hypermedia*, 6,139–154.

Resources

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Piskurich, G. M. (2000). *Rapid instructional design*. San Francisco: Jossey-Bass.

Reigeluth, C.M. (1999). *Instructional-design theories and models: A new paradigm of instructional theory, Volume 2*. NJ: Lawrence Erlbaum Associates.

For more information on interface design:

User interface design bibliography. Retrieved on August 15, 2003 from the World Wide Web:

<http://world.std.com/~uiweb/biblio.htm>

Additional Resources Available in the Handbook

Note What Makes a Good Case Environment? ([inChapter 8](#) of the *Handbook*).

Design Matrix: Interface ([inChapter 8](#) of the *Handbook*).

Design Matrix: Language Specifications ([inChapter 8](#) of the *Handbook*).

Design Matrix: Visual Design ([inChapter 8](#) of the *Handbook*).

Team LiB

◀ PREVIOUS ▶ NEXT ▶

Recommended Activity

Donald Norman has taken a unique view of interface design in everyday life in his book *Signal Lights are the Facial Expression of Automobiles* (1992). I highly recommend that you read this book before you design interfaces for your own e-Texts.

Team LiB

◀ PREVIOUS ▶ NEXT ▶

Chapter 9: Usability Testing

Overview

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In his book *Designing Web Usability* (2000), Jakob Nielsen names three conditions that would have to happen for him to give up writing books and focus on writing for the Web. The first two, better computer monitors and interfaces, make it as fast, easy and pleasant to read from a screen as from a book.

The third condition relates to the transformation that writers must make in order to support the new e-Reader.

Readers and writers must both adjust to non-linear information spaces, that is, how to *write* in ways that utilize hypertext and how to *read* without the safety of mind that comes from making no decisions beyond turning the page. Nothing but time and plenty of experience and exposure to well-crafted hypertexts will make this change happen. Unfortunately, there is a chicken-and-egg problem in that well-crafted hypertexts will not happen until good writers have become skilled in writing hypertext. I expect good hypertext writing to happen in greater quantities as the Web matures...and the emphasis irrevocably changes from dazzling people with the novelty of a new medium to satisfying user needs.

[Nielsen, 2000, p. 4](#)

Chapters 1-8 focused you on preparing for and developing e-Texts and environments that would result in improved e-Learning environments. In [Chapter 4](#), you looked at the learning object economy and thought about how to enhance your course without having to create original e-Texts. In [Chapters 5](#) and [6](#) you worked with your existing content or created original content for an effective e-Learning environment. [Chapters 6](#) and [7](#) synthesized the previous ideas with guidelines for effective structuring e-Learning environments. Throughout these chapters, you applied research from the field of **usability** to enhance the accessibility and readability of your content.

Web usability	"Web usability" is a subset of the scientific discipline Human-Computer Interaction (HCI). Web usability investigates how different users interact with Web environments. Its goal is to test how effective your site is.
<u>formative evaluation</u>	<u>Formative evaluation</u> is a broader term that describes an iterative evaluation process that takes place during the design, development, and implementation stages of new content, curriculum, textbooks, programs, software, etc. Formative evaluation is an older field than usability, but for the purposes of this chapter the terms are merged to describe how to test your design decisions with real users to make your site more usable.

Key Ideas

In this chapter, you will:

- Examine some usability strategies and tools
- Begin to develop your own usability tools
- Design the usability testing of a Web site

Key ideas include:

- User-centered design guidelines (UCD)
- Testing representative users
- Ethical issues
- Testing at many stages
- Using multiple methods
- Cycles of design
- Types of usability tests
- Using unbiased evaluators
- Appropriate group design for process
- Usability labs
- Usability instruments
- Data collection
- Data analysis
- Writing good reports

Because this text is not designed as an instructional design guide, there is no section on summative evaluation or the assessment of learning outcomes.

Key Terms

Note This chapter introduces a number of terms and phrases that you may not be familiar with.

These terms are listed in the *Handbook* with enough space to define them in your own words or note examples, references, and resources ([go to Key Terms in Chapter 9](#) of the *Handbook*).

- Formative evaluation
- Qualitative data
- Quantitative data
- Triangulation
- Prototypes
- Inquiry
- Inspection
- Diagnostic tests
- Comparative tests

Plan Your Progress

Note A concept guide for the ideas in this chapter is provided in the *Handbook* ([go to Concept Guide in Chapter 9](#) of the *Handbook*). You can use this outline to help guide your exploration.

Note There is additional space for you to write the questions for which you need answers. Record your own information or learning needs in the *Handbook* ([go to Questions and Goals in Chapter 9](#) of the *Handbook*). If you have questions about usability testing record them here.

At the end of the chapter, check your list of questions to determine whether you need additional information. Use the chart to organize an action plan.

As you work through the chapter, test your ideas against the Web content you have refined in the previous chapters.

Note A "[To do list](#)" has also been provided for you in the *Handbook* for you to record what needs to be done, who needs to do the task, and when the task should be completed by ([go to To Do List in Chapter 9](#) of the *Handbook*).

User-Centered Design and Usability Testing

You have thought about user-centered design (UCD) throughout this book. Usability testing assumes that you have analyzed your target audience *before* creating e-Learning content. In [Chapter 3](#), for example, you had some practice in designing a needs assessment survey (or questionnaire) from which you developed a learner profile. Returning to the learner profile will give you a good idea of the questions to ask during a test to determine how well the site is allowing users to meet their goals.

[Chapter 3](#)

If you have not performed a needs assessment or audience survey, usability can still provide valuable information about the learners' experience.

What is Usability Testing?

Usability testing comprises a large set of methods for identifying how your users *actually* interact with your content. The goal, quite simply, is to find out what is working well and what is not working well or at all.

Generally, usability testing is a systematic, iterative process that involves testing your content or site and then using the results to improve the design and content to meet the users' needs. The process is systematic in that it is planned carefully and involves implementing several methods in a logical sequence. It is iterative because ideally you should repeat the process through several cycles as you refine your content based on the results of each phase of the evaluation.

Why Do It?

A professional tailor with many years of experience will have developed a good "eye" for measurements, expertise in drafting patterns and constructing garments, knowledge of the range of fabrics available and how to match fabric type to the purpose and structure of the garment. But a tailor would never create a wardrobe for a particular client without first taking measurements, discussing lifestyle, examining fabrics, determining a price range, and so on.

Many of us designing e-Learning environments believe that we know our learners so well that the decisions we make to meet their learning or information needs are accurate and will result in an effective experience.

content and functionality	The reality is that when you pour blood, sweat and tears into developing your online content, you end up suffering from what Richard Saul Wurman calls the "disease of familiarity." You know this content - this site - so intimately, that you are not able to see the problems that learners will encounter using it. This goes for the content as well as for technical barriers. You need the unbiased, unemotional perspective of others to help you continue to improve the users' experience.
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Who better to provide that perspective than members of your target audience? If you have involved representatives of this group as participatory designers, so much the better: You are ahead of the game. However, in the end, participatory designers will suffer from the same disease as you — you will still benefit from the experience of users who have never worked with your site before.

I've worked with dozens of university instructors starting Web development since 1996. Many of them are not aware of tools that they can use to help them figure out what their learners need and how best to meet those expectations. A typical client interview, below, illustrates the shift in thinking about that large category - undergraduate - that must occur for us to attract and keep new learners. The name, discipline, and department have been changed.

They're Undergraduates...

101, for first-year engineering students. The dean of the faculty of Engineering and the chair of the undergraduate science curriculum committee in education asked Dr. Dobrowski to develop EDENG 101 for a blended delivery.

In our first meeting, I tried to persuade Dr. Dobrowski to perform a needs assessment on the target audience for the course. The conversation went something like this:

K: Do you have a sense of the learners who will take this version of the course? For example, have they ever taken a course through the Web?

Dr. D: They're undergraduates in engineering.

K: What is the average age?

Dr. D: Well, they're undergraduates. Probably around 18–20.

K: In your experience, then, the majority of students in EDENG 101 are right out of high school, in their first year?

Dr. D: Well, as I said, they're undergraduates, so yes, I suppose so.

K: Your department is interested in providing more flexibility for students?

Dr. D: Yes, we think we aren't seeing many potential engineering students because they can't get to campus during regular class hours.

K: Could some of them be older or returning students?

Dr. D: Now that you mention it, yes.

K: What kinds of learning experiences might they have had? For example, will they be comfortable with the Web? Will they be able to work successfully by themselves? How many of them have computers and Internet access?

Dr. D: We're assuming that all the students have computers. I'm not sure about their access, though...

K: Have you noticed any changes in your first-year students over the past five years? Are they all native speakers?

Dr. D: We have noticed that about one-third of our students are from other cultures - I'd say mostly Asian. Some of them don't speak English very fluently...

...In the end, the instructor agreed to take a survey of the incoming 101 class and the exiting 101 class from the term before. We found that about 20% of the learners would be interested in an alternative course delivery, citing reasons ranging from being full-time workers who were upgrading, to wanting to attend part-time, to preferring to work online. The average age of this group was 25, balanced for sex, and about 1/4 Asian and/or Arabic. Although every individual who responded to the survey owned or had access to a computer, 1/3 had no Internet access at home or at work.

In 2003, learners aren't "just undergraduates" anymore. They may have a range of work and learning experiences, comfort levels with technology and with learning online, first languages, family responsibilities, and access to technology.

How will a needs assessment, followed later by usability testing, help the Engineering faculty develop a course in which more learners will be successful?

The Goals of Usability Testing

usability is user- centered	Learning designers, instructional technologists, Web experts, colleagues in your discipline, administrators, professionals in your field - all have opinions about what e-Learners want or need in an e-Course. But only your users can really tell you if your course meets their learning requirements.
major and minor errors	Usability testing helps you focus on the problems that have an impact on the e-Learner's experience and suggests strategies for maximizing learning. Even if you think your course site is working well, usability testing can help you continually improve the content, the interactions, and the interface. Results of the tests can reveal major technical or structural problems, or more minor errors such as broken links, wording, lack of emphasis, and spelling and grammatical problems. Major problems may inhibit access to the learning content, but minor errors irritate your users who may decide not to use your site effectively. At the very least, usability problems, major or minor, can and often do lead to poor course evaluations.

Usability testing is used for:

- Diagnosing problems
- Comparing alternatives
- Assessing accessibility and readability
- Verifying that you have met your design goals and learner expectations

typicalusability questions	Typical usability questions related to the completion of a learning activity might include:
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- Were learners able to follow the directions?
- Did learners complete the activity successfully?
- How long did it take?
- Was the time needed to complete the activity reasonable?
- What decisions did they make?
- Did they encounter problems following through on decisions?
- Did the interface support the activity?
- Were they able to return to their decision points?
- Did they identify any problems with the content?
- Were their learning preferences supported?
- Did the e-Texts download quickly?
- Did learners have trouble installing plug-ins?
- And, many other questions about content and access.

Usability testing will result in a course site that is easier, more efficient, and more effective to use, and will help make the e-Learning experience be a successful one.

The Process of Usability Testing

prototyping Usability testing is a process that can include one or more specific methods and one or more groups of target users. A combination of methods and users is often employed to test a prototype or a completed Web site. If you can, test a prototype of your site before going into "full production." In the post-secondary sector, you can do this by engaging target learners in the initial design of the site, making adjustments as you proceed, or by setting testing milestones in the course development.

learners as stakeholders In our centre, we encourage instructors to describe their course as a "pilot" the first time it is offered. This strategy involves the learners as *stakeholders* in assessing and improving the site, rather than as *judges*.

In industry and training, it is sometimes difficult to convince clients of the importance of usability testing, but a business model may be persuasive. In the long run, the cost of usability testing is recouped by the increased customer satisfaction that leads to increased use of their site. For example, the User Interface Engineering group found that people cannot find the information they seek on a Web site about 60% of the time.

The amount of evaluation you are able to accomplish depends on the resources available and the project timelines. In education, the evaluation is often composed of four major steps, each with several cycles within the step:

1. Expert review
 - Subject-matter experts and designers review materials
 - Content, appearance, and sound learning design are assessed
2. Representative target audience review (pilot)
 - Typical learners use the materials under supervision
 - Detailed feedback is provided
3. Lesson validation
 - Target audience works with materials under normal learning circumstances
 - Effectiveness is evaluated using a variety of tools
4. Revision
 - Changes are implemented based on the analysis of testing results

number of participants Jennifer Fleming advises that all you need to get started with testing is a user, a computer, and a pencil and paper for note-taking. Nielsen says that five users are all you really need - more will merely confirm what the first five told you. In his experience, only five users are needed to uncover 80% of high-level usability problems.

Other usability experts recommend groups of from fifteen to thirty. You are in the best position to decide how many individuals are representative enough of your final target audience, both practically and conceptually.

testing sites Testing can occur in your office, the learning site, or the user's home or workplace. Testing in the environment where learning will actually take place will reveal the most valuable and inclusive information. For example, you may have assumed that users have a high-speed Internet connection and a multimedia computer. In reality, many of them may still be using a dial-up service and an older model computer. Or, certain tools may not work on one platform.

However, if the target audience of e-Learners resides at a distance from you or will be expected to work at home, it may be more difficult to evaluate the environment.

Tip For distance learners, for example at another institution, perhaps those on site can conduct usability tests in the learning environment.

Preparation for a usability test involves several steps:

1. Decide when and who to test
2. Choose the testing method(s)
3. Plan the procedure
4. Develop the instrument(s)

Note Work through the process, below, with your e-Learning content in front of you. At each stage, apply the ideas to your design. A sample usability plan is included in the *Handbook* ([go to Sample Usability Plan in Chapter 9](#) of the *Handbook*).

Decide What, Who, and When To Test

What To Test

You took the first step in the evaluation process when you determined your goals for the site and developed learning profiles that guided the design. At that time, you thought about what a successful learning experience looks like and how you would know when success was achieved. Your goals might have been cognitive, psychomotor, or affective, or a combination of the three.

the learning outcome	For example, your goal for learners in a senior Criminology course is to be able to work with a team to design an optimal corrections facility. As this requires high-level thinking, you design a problem-based learning activity whose "product" or outcome is to present to the Corrections Board a blueprint and a design report describing the facility, the conceptual foundations on which it is based, and the sociopolitical context in which it will be created.
the success criteria	In designing the activity you identified the required learning resources, created workgroups, set up the communications tool, and developed a task description and a timeline. You also taped interviews with corrections officials, politicians, prisoners, academic experts, and community members, which you included on the site. You found a short video sequence of a television documentary on a prison riot. You developed an extensive set of hyperlinks to sites containing additional resources.

In the assessment of the activity you might look at:

- The quality of the research
- Evidence of understanding of the complex issues
- The synthesis of the interviews of key stakeholders
- The collaborative group process
- The quality of the facility design

Who To Test

targetusers	Your design decisions were based on a learning profile of a group with:
	<ul style="list-style-type: none">■ An average age of 21■ 75% majoring in Criminology■ No prior experience in corrections■ A balanced male-female ratio■ 40% of whom had taken Web-based courses within the past three years■ 60% ownership of a computer purchased new within the past two years■ 50% with high-speed Internet access■ 30% non-native English speakers■ Over 50% living within 10 miles of the university, even though it is an online course with no class meetings
test participants	Who will you involve in the test(s)? <ul style="list-style-type: none">■ A 20-year old male native English speaker with a brand new, multimedia computer and a cable modem; who is majoring in Criminology; and who took two Sociology courses online the previous year;■ A 22-year old female Criminology minor who does not own a computer but intends to work in a campus computer facility; and who has never taken a course that is completely online but who does a lot of Internet research;■ A 30-year-old male prison guard who is upgrading from a diploma to a degree; attends university part-time in his city 200 miles away; and who intends to work on the course at his workplace;■ An Asian student on a student visa from China sponsored by a government agency;■ A 66-year old who is taking his first university course in over 40 years and who has to purchase a computer to participate.

Notice that a range of learners is selected to evaluate the degree to which diverse learning needs are met. This group should include a mix of abilities, learning styles, ages, gender, experiences, and skills. For example, will the usability process provide the data you need if you test four target users with the same demographic profile?

usability goals Given the learning goals and outcomes, and target learner characteristics, you will decide what you need to know. For example, are you going to assess, primarily,

- Learners' expectations and affective experiences of the course?
- Whether the content has optimal readability?
- Whether the e-Texts were:
 - Accessible
 - Downloaded without problems and the users knew how to use the required plug-ins?
- If the links were intact?
- Whether the site was navigable?

Suppose you have developed online training resources for a private security firm? What does your client want to know about the site? Will the test objectives be different?

When To Test

You could test at several stages of the design, for example, when:

- The initial activity is developed on paper
- The list of resources, including hyperlinks, is developed
- The e-Texts are identified
- The first version of the site is ready online
- Halfway through the course
- At the end of the course
- Any other times?

stages of testing Some experts break the procedure down into stages of intended outcomes. For example, Jeffery Graham describes three stages:

1. Explorative testing
 - Input is gathered in the early stages of development. Based on the experiences and opinions you can decide on the appropriate direction for form and function of the site.
2. Assessment testing
 - Occurs when the site is nearly finished and ready to implement in this stage, you can get feedback on issues that have the potential to seriously affect the learning experience, but that are easy to fix.
3. Evaluation testing
 - Used to validate the design subsequent to implementation.

Each stage suggests different treatments.

remote test	Testing may be conducted remotely or retrospectively. In a remote session, the participants and the evaluator are separated by time and/or location. The users' interactions with the system can be observed through a computer network and their verbal responses may be recorded through the Internet (voice over IP), telephone, or a remote microphone (same-time). Journaling is another strategy in which the interactions are captured and logged through system software (time-shifted). For example, number of key-strokes, time elapsed, and number of attempts can be captured and analyzed.
retrospective test	A retrospective test occurs after a usability session. The usability session is recorded and the user subsequently watches the procedure with an evaluator, who asks him/her direct questions about their behavior during the test. This procedure may be more practical in some circumstances but will take twice as long for the user.

Answers to the questions "what," "who" and "when" specific to your own environment will help you determine what methods and tools to use and in what context they need to be used.

Plan the Procedure

Once you have identified your usability objectives and have decided what, who, and when to test, your next decisions are:

- Where to test
- Who should conduct the test

You can see how all of these decisions are interrelated.

In *IA/Usability*, Pedrito suggests a few important rules and steps to follow as you plan your usability test:

1. Involve participants who fit the user profile. Do not consider someone who has worked on the site as a target learner.
2. Set up the test site.
3. Provide the user with a small scenario that describes what the site is intended to accomplish.
4. Observe the users' progress.
5. Write down or record everything you observe.

While simplistic, Pedrito's sequence reflects the relatively straightforward approach of usability testing. Based on your own content, you have a fairly good idea **who** you will involve. But before you can develop the instruments you will need to know what resources are available for you to use.

Where to Test

testing environment Just as you have identified target users to test based on a learner profile and what to test based on your intended learning goals, where to test will reflect the typical learning environment for your materials. For example, if the intended audience members are all at a distance from you and from each other, you may want them to evaluate the course from a single user perspective, a user who will work on a home computer. This testing environment will be much different from one that supports on-campus learners that use the Web mainly for course enhancements. In the latter case, you might conduct usability tests with a group of users in a campus computing facility. In general, you should aim to test as many different learning environments as are indicated by your learner profile.

reconstruct the learning environment You will not always be able to "reconstruct" the ideal learning environment, in which case you can maximize the context by making the testing facility comfortable and responsive. You might be able to reserve a conference room or an entire lab for an afternoon. If all else fails, you can test in your own office, although some learners might feel intimidated or uncomfortable in that setting. If the learning environment will be busy, try to recreate that - don't eliminate common distractions such as others using the printer. Also, if media is being tested, find out from the lab personnel whether headphones are provided or whether learners will need to purchase these.

Tip You may consider providing participants with coupons for pizza, movies, etc.

Treat these as thank-yous instead of as incentives.

Centralized computer labs may be set up to require authentication procedures. You may need to acquire temporary computing ID's for example.

- Can users bookmark sites in the lab?
- Can they save work on a hard drive or a network?
- Is their work time restricted in any way - by time of day, time of year; length of access?

Finally, try to put the participants at ease. For example, you might provide refreshments even if it horrifies the lab personnel.

ethical guidelines As a part of the planning process, investigate the institution or company's ethical guidelines. At some institutions, curriculum evaluation is not considered research on human subjects and does not require that an ethics review be completed. It might be termed **quality assurance**.

In our Centre, we are responsible for program evaluation, the results of which may be reported. We are extremely cautious and complete an ethics review for every usability test or evaluation. By doing this we reassure the learners that we are aware of their concerns about confidentiality and anonymity and will take steps to protect them. Undergraduates, in our experience, are particularly worried about their observations being made available to the course instructor and consequently affecting their grades.

Note A sample *Application for Ethics Approval* is provided in the *Handbook* ([go to Application for Ethics Approval](#) in [Chapter 9](#) of the *Handbook*).

prepare the facility Reserve the testing site well in advance and inspect it the day before (and the day of) the test. All equipment should be in working order. Since technology will inevitably fail at the most inopportune time, it doesn't hurt to have a contingency plan. In fact, technology failures, from the toner or paper running out on the printer or a connection failure, are common enough that an event in real time will alert you to the "work arounds" you'll need to include in your course plans.

Finally, depending on the methods of testing and data collection, you might need to find a specialized evaluation facility. For example, with informed consent you could observe someone leading a focus

group on your behalf from behind one-way glass or you might want to videotape users as they work.

Who Should Do The Testing

Which brings us to a difficult decision for you to make: who will conduct the evaluation?

Although you have a personal interest in working with your potential learning audience, as the instructor or developer, you might not be the best person to test the effectiveness of the site.

designer bias	You have thought about and worked on your course for a long time. You know every inch of the site. You know why you have structured it this way, why you included specific learning activities and resources, what sequence of activities are best, how long the experience should take, etc. In other words, you have a set of expectations that may bias your interactions with target users. For example, you may find yourself defending your decisions or explaining how something should work instead of listening to the legitimate concerns of the user. Problems that may prevent learners from completing an essential task may not seem that catastrophic to you, because you may now navigate around these problems without seeing them.
peer evaluators	You will achieve the best results if you involve a facilitator or evaluator with no experience with or emotional attachment to your site. This individual or team might already reside on your campus or in your organization as an evaluation team. Many institutions have evaluation centers that can be employed by private industry. You might be able to trade this process with a colleague who also needs a usability test for his/ her course. Or, you can train student or peer evaluators. This solution has several advantages - test participants might feel more relaxed with a peer, the peer brings a unique student-centered perspective to the process, and the training is an excellent learning experience for the student evaluator.
evaluator characteristics	The effective evaluator has several characteristics. He/she must: <ul style="list-style-type: none">■ Put the participant(s) at ease by being friendly, open and calm■ Be observant■ Ensure that all testing materials are accessible■ Check that the technology is working■ Be impartial■ Be sensitive to diversity■ Create an accurate context■ Know the site well enough to respond to problems■ Be passive enough to encourage honest responses■ Be comfortable with the usability method(s)■ Be able to make quick and accurate notes

Pause now and think about your strategy. *Who can you interest in facilitating a usability study?*

Summary

Planning a usability procedure involves identifying

- Goals of the test
- Participants
- Evaluators

Although you are very concerned about the usability of your own resources, you should ask an unbiased individual or an expert to perform the usability tests. Participants will feel more comfortable providing honest answers and you will resist defending your design decisions and instead really listen to the feedback.

Implications for e-Learning

Nielsen and others recommend testing over five representative users. Nielsen suggests that 15 users are ideal, tested in three separate tests, each involving five users.

Choose The Testing Method

combining methods In this step of planning the usability testing, you will make many significant decisions. The way you structure the process and the items you choose to test should result in data that you can use to improve your e-Learning environment. Testing the "wrong" materials or mismatching the methods to your goals will not provide you with the most useful information to apply to your site design. Because this is so important and requires a depth of understanding and expertise that may not be available to you, you might want to consider combining a number of different methods together or at various phases of design, that will yield a comprehensive "data set." This strategy is called "[triangulation](#)" because overlapping examinations and analyses should reveal results that relate to each other. Triangulation is a test of validity.

This section provides an overview of standard usability methods.

The Methods

cost of usability testing The goals of your evaluation, the number and location of participants involved, and the methods you choose will determine the length and cost of a usability procedure. In industry, usability testing conducted by an outside expert or team may take several weeks and cost upwards of \$30,000. As this is not a viable option for many smaller companies, training organizations or departments, and certainly not institutions of higher learning, planning and performing the evaluation in-house is a better solution and, in the long run, a more effective strategy in which to invest.

As part of this strategy, you might think a little more broadly and begin to develop a "tool kit" that includes a set of good evaluation questions, directions for setting up focus groups, sample surveys, one or more cases, analysis tools, etc. that your organization grows and refines over time.

Tip As you saw in [Chapter 4](#), you can develop a repository of evaluation objects to be re-used by your colleagues.

There are many excellent resources that provide in-depth instruction and guidance in developing usability methodology. Many of them classify methods by the goals of the evaluation.

The *Usability Evaluation* site at the University of Maryland describes three types of usability evaluation methods. Each type encompasses several evaluation methods:

1. Testing
 - Participants use the interface to work on typical tasks. Results reveal how well the user interface supports the learning tasks.

2. Inspection

- A team of usability professionals examine usability-related aspects of the system.

3. Inquiry

- Evaluators seek information about the users' needs and preferences, perceptions, and attitudes as they use the system for *real* work. Participants answer questions verbally or in written form.

Inquiry is the most time and resource intensive type of usability testing.

informal vs. Some experts make a distinction between informal and formal usability testing.

formal In this view, an informal test can be conducted anywhere and at any time.

testing Informal testing usually involves sitting with a user and noting their action and reactions on paper, probing the user to elaborate on or clarify comments.

In a formal test, usually in a fixed location designed for the test, the user is left alone to work while being observed or recorded uninterrupted. The test may include quantitative and qualitative measurements. For the remainder of this discussion, methods will not be distinguished as formal or informal.

Each method is intended for a different purpose, yields either quantitative or qualitative data (or both), and reveals information about effectiveness, efficiency, and/or user satisfaction.

Testing Methods

Testing methods discussed here include:

- Coaching
- Co-discovery learning
- Performance measurement
- Question-asking
- Teaching method
- Thinking-aloud protocol
- Scenario building

Note Each method is described briefly here and elaborated in *Testing Methods* in the *Handbook* ([go to Testing Methods in Chapter 9 of the Handbook](#)).

Coaching is used to discover what participants need in order to provide better training and documentation. This method is also used to improve the user interface so that questions don't arise.

coaching	In coaching, the participant is encouraged to ask any system-related question that will help them complete a task. The interaction is recorded by the evaluator or by a separate observer. Although the questions could be entirely spontaneous, predetermined questions can also be developed. During the test these questions can be recorded on a checklist and then the tester can return later to questions that did not arise.
co-discovery learning	In co-discovery learning, two users work together and help each other complete a predetermined task. The pair is encouraged to verbalize their questions and decisions. This technique is more natural than the think-aloud protocol because it is more natural to respond to a query or comment than to remember to talk about one's mental processing. If the users know (and like) each other they will feel more comfortable during the test.
performance measurement	Performance measurement is used to obtain quantitative data about the participant's actual performance during a task. In this technique, the user and the evaluator should not interact. This technique can be used to assess many issues, for example:
	<ul style="list-style-type: none">■ Time on task■ Time to completion of task■ Number of attempts made■ Number of links followed■ Number of mouse clicks or keystrokes■ Number of user "errors"
question-asking protocol	In a question-asking protocol, users respond verbally to direct questions about the environment. Based on the usability goals, a list of questions is developed and users are asked to explain their responses or their decisions as they work. This method helps the designer understand the mental models that the users have.
think aloud protocol	Thinking-aloud is used to capture a wide range of cognitive activities. For example, the evaluator can obtain an idea of the user's mental model and how he/she approaches and sequences an activity. This technique is a complex cognitive task for the participant because it requires thinking about one's thinking - metacognition.

In a thinking-aloud protocol the evaluator presents a learning scenario and asks the user to describe their thoughts, feelings, and opinions while they work through the tasks. This is also a complex strategy for the tester who must remember to interact.

teaching method	The teaching method involves pairing an experienced user with a novice user. This occurs in two stages: <ol style="list-style-type: none">1. A user interacts with the system to develop a comfort level.2. The "expert" then works with a second user who is not familiar with the system, explaining how to accomplish the task.
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This technique is an excellent meta-cognitive strategy.

scenario building	Scenario building allows users to create an authentic context for their needs and tasks. Consequently, the scenarios may reveal requirements and features that you may not have considered in your design.
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For example, learners are asked to identify a reason for using your environment or content. Next, they

state a learning or information goal that they expect will be met. Finally, they describe specific steps they expect will lead to the successful completion of the task or activity. These steps are ranked in order of significance to the task.

Inspection Methods

Note Inspection methods, described below and in more detail in the *Handbook*, include:

- Cognitive walkthrough
- Feature inspection
- Heuristic evaluation
- Pluralistic walkthrough
- Perspective-based inspection ([go to Inspection Methods in Chapter 9](#) of the *Handbook*)

cognitive walkthrough The cognitive walkthrough does not involve users. Instead, a group of evaluators test the design of an interface by completing a series of tasks and evaluating their "understandability" and ease of learning. The test interface may be in paper outline form, a working prototype, or a fully developed interface. The testers are provided with a learner profile, learning goals, etc.

In the first phase, the testers determine the learning tasks and their correct sequence, as well as the interface components needed to complete the task.

In the second phase, the tester walks through the task telling a "credible" story about why a user would choose that action. By constructing a success story, the tester tries to match an element of design to the action that succeeded. If the action does not succeed, then the tester constructs a "failure story" that describes the reasons for failure and possible solutions.

feature inspection In a feature inspection, each feature of the design is challenged against a "use case." Does this feature support the task activity? Are all the required features available, easy to use, and working? Usually, the anticipated features are listed first and either eliminated or improved. Missing features are also identified. Results can also be used to create a user's guide or help section.

For example, you might list the steps necessary to post a message to a discussion group. The list could include:

- Linking to the discussion board from within the lesson
- Accessing the board from the homepage
- Finding the correct thread
- Clicking on a subject line opens the thread

And other steps and features necessary to construct a good message, post it to the correct thread (and all the steps required to actually post), respond to other threads, archive messages, etc.

heuristic evaluation Developed by Nielsen and his colleagues, heuristic evaluation is a method for developing a framework for a design or system critique, using general usability guidelines. The evaluators work independently to discover usability problems and then compare their findings or aggregate the data to provide a strategy for addressing the issues.

For example, a heuristic evaluation could look at help or documentation, standards, consistency, and so on.

pluralistic walkthrough	A pluralistic walkthrough involves a group with a wide range of characteristics and goals. Obviously, a pluralistic walkthrough increases the probability of finding problems from a range of perspectives and needs.
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A group usually includes the users, developers, and evaluators. This technique is very effective in the design stages of the environment because paper prototypes (of each screen) will provide the information that you need. The participants are encouraged to actually describe their experience or record their observations on the paper, creating comprehensive documentation for the designer. The experience is enriched by a group discussion after the walkthrough.

Inquiry Methods

Note Inquiry methods, described below and in more detail in the *Handbook*, include:

- Field observation
- Focus groups
- Interviews
- Questionnaires ([go to Inquiry Methods in Chapter 9 of the Handbook](#))

field observation	In a field observation, the evaluator observes users in their usual workplace or learning environment. The technique involves both observation and interviews and the collection of actual work "artifacts." For example, the evaluator might collect samples of printed pages. A field observation could also use photos, sketches, diagrams of communication patterns, etc. as evidence.
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focus group	A focus group is used to move a group of users towards consensus about a particular topic. A focus group usually consists of six to nine participants who are brought together to have a moderated discussion about the environment or learning activity. A focus group is an excellent strategy in combination with a survey and/or other usability methods. For example, a user survey may indicate issues that can be followed-up in a focus group session.
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The moderator or facilitator, who should be unbiased (in other words, someone other than you), prepares a list of guiding questions based on the identified goals and outcomes that you have identified. These questions are meant as guidelines: a discussion might take off in an unanticipated direction. A good facilitator will be able to decide whether to allow a discussion to diverge from the original intent or whether to redirect it back to the prepared script.

Many facilitators work in teams, so that as one individual guides the discussion the other takes notes. After the session, the note-taker's observations are compared to the facilitator's reactions and to a taped transcript of the session, if available. This collection technique results in a rich set of data to mine.

If at all possible, organize more than one focus group session as the results of one session may not reflect the experiences of the majority of the group or class. In some cases, focus group results are skewed because one participant dominates the discussion. A dominant voice does not always reflect the opinions of the rest of the group.

Focus groups can be conducted at a distance as well as in person, either synchronously, through an audio or videoconference or asynchronously through e-mail or discussion boards. A traditional focus group allows the evaluator to capture non-verbal as well as verbal responses and to develop a rapport with the participants. The participants also may establish a rapport with each other. With an electronic focus group, non-verbal data is difficult to capture and verbal discussion may be more limited, but it is more difficult for one individual to dominate the discussion.

It may be difficult to schedule a focus group session if a good cross-section of participants is unavailable. A blended delivery course offered on a residential campus has many advantages when planning a focus group: we have had good success in our Centre by inviting students to come early or stay after a class meeting. Providing juice and doughnuts is an added incentive.

Note A sample *Focus Group Protocol* is included in the *Handbook* ([go to Focus Group Protocol in Chapter 9](#) of the *Handbook*).

interviews Interviews may be either structured or unstructured, conducted in person or remotely. Recorded transcripts provide the best results because the rapport and trust between an interviewer and a participant may be disrupted or even jeopardized if the participant is distracted or diverted by note taking.

Tip A peer interviewer may establish a better rapport than an outside expert.

A structured interview is based on a very specific set of non-leading, jargon-free questions from which the interviewer does not deviate. Any additional observations that appear to be not relevant are not pursued. In a structured interview, a relationship is not developed.

An unstructured interview resembles a conversation more than an interrogation. The interviewer may have a set of questions to ask but these provide a broad outline allowing for deeper exploration of issues that are often raised by the participant. In either form, the most effective questions are open-ended and encourage more than a "yes/no" response.

Note Interviewing is an art and a skill that can be learned. For an excellent guide, refer to the *Resources* in this book. In addition, a *Sample Interview Protocol* is included in the *Handbook* ([go to Sample Interview Protocol in Chapter 9](#) of the *Handbook*).

questionnaire or survey A questionnaire or survey can be either paper-based or electronic, administered on site or through the mail. Mailed questionnaires have a much poorer response rate than those administered and collected on site, for example, at the beginning or end of a class.

Questionnaires can be used to collect qualitative or quantitative data or both. For example, one section may involve a 5-point Likert scale, followed by a series of open-ended questions. Or, a questionnaire that collects quantitative results may suggest issues to be probed further in interviews or focus groups. [Figure 9.1](#) demonstrates the use of a scale. Note the clear directions and the structure of the instrument.

Part I

Please answer the following questions. Circle the dot that best describes your answer.
Please do not leave any question blank.

For each word below, please indicate how well it describes the Web site.

Describes	Describes
the site	the site
very poorly	very well

Accurate	* * * * * * * * *
Annoying	* * * * * * * * *
Entertaining	* * * * * * * * *
Helpful	* * * * * * * * *
Interesting	* * * * * * * * *
Likable	* * * * * * * * *

Please circle the appropriate dot for each of the following questions:

How easy is it to find specific information in this Web site?

not at all easy very easy

* * * * *

How satisfied are you with the site's quality of language?

not at all satisfied very satisfied

* * * * *

How frustrated did you feel while working in this site?

not at all frustrated very frustrated

* * * * *

Compared to what you expected, how quickly did the tasks go?

not at all quickly very quickly

* * * * *

Part II

Please answer the following questions. Circle the dot that best describes your answer. Please do not leave any question blank.

For each word below, please indicate how well it describes the Web site you have been looking at throughout the study.

Describes the site very poorly Describes the site very well

Believable * * * * *

Boring * * * * *

Concise * * * * *

Easy to use * * * * *

Engaging * * * * *

Fun to use * * * * *

Frustrating * * * * *

Useful * * * * *

Unpleasant * * * * *

Please circle the appropriate dot for each of the following questions:

How tired do you feel right now?

not at all tired very tired

* * * * *

How easy is it to work with the text in this Website?

not at all easy very easy

* * * * *

How hard was it to concentrate on searching for information (because of distractions)?

not at all hard very hard

* * * * *

How complete is the site's treatment of the topic?

not at all complete very complete

* * * * *

Figure 9.1: Questionnaire

Tip This excerpt is adapted from an instrument developed by John Morkes and Jakob Nielsen at Sun Microsystems in 1997. Online writings about this project are at this URL:
<http://www.useit.com/papers/webwriting>

multiple survey strategy	A survey strategy may involve a series of iterative phases in which the survey is refined based on the preceding results. For example, an initial open-ended survey can be circulated (in person or online) at the beginning of a course to capture first impressions and/or state of readiness. A second survey could look at features and content, while a third could seek comparative data. Each survey can be tied to the completion of a specific task, for example, an end-of-chapter test. As you develop your questionnaire be aware of the life and time constraints
survey length	faced by potential respondents. When will they complete the form? How long will it <i>really</i> take? What is the easiest and fastest way for them to return the surveys? Once you have developed your questions and have obtained feedback on them, do a trial run. Time a typical user taking the questionnaire. A survey requiring much more than 30 minutes is not likely to be completed. In fact, a 10- or 15-minute survey requires much less commitment from a user and may not seem like such a chore to complete. Speaking of feedback, it can be difficult to construct questions that really
pilot a survey	get at the information you need. Have your goals firmly in mind as you develop the form. Pilot test various versions before distributing a final questionnaire. And, because good questions are hard to develop, consider storing them in a database or repository so that they can be re-used, especially those items that are more generic.

Summary

triangulation	A usability test can encompass many methods and individuals. An evaluation plan, based on the goals and objectives you have identified, often includes at least two different methods that complement each other. Using three methods allows you to compare data from one against two other tests to pinpoint gaps in the information or to ensure that you have the information you need and that the data is consistent. This is called triangulation.
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blended strategy	Usability methods can yield either quantitative or qualitative data, be informal or formal, face-to-face or remote, and current or retrospective. A blended, comprehensive strategy will combine methods and tell the most compelling "story." Some methods are more effective during the design and development phase of the e-Learning environment, while others should be administered once the materials have been developed, during mid-course, and/or after the course has been piloted with a class or group of learners.
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A diverse group of users, evaluators, and developers provide the most thorough usability data. A standard guideline is to test with five to eight users, depending on the method. Generally, as the developer, you should not be the evaluator, because you are too involved with the content, the design,

and the learning experience. An unbiased perspective provides a better evaluation outcome and tends to reassure the users that their comments will not "harm" them in any way.

In the [next section](#), you will look at some of the common usability issues that can be evaluated.

Develop the Instrument

In the [previous section](#), usability methods were grouped by type: testing, inspection, and inquiry. Testing tools or instruments reflect the goals of the developer and include testing to diagnose problems, comparing alternatives, or verifying that you have met usability goals.

diagnostic test	Diagnostic testing occurs during development and is meant to identify what is working well and what is not, so that you can fix problems before they become too big to handle easily. A diagnostic test is best done frequently.
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Diagnostic methods include:

- Coaching
- Co-discovery
- Performance measurement
- Question-asking
- Teaching method
- Thinking-aloud
- Scenario building
- Cognitive walkthrough
- Pluralistic walkthrough
- Interviews

A second goal is to compare alternative treatments or designs. You can compare two versions of your own materials or compare your design to another, similar design. For example, you might compare your WebQuest on an environmental issue to a WebQuest from the list provided by San Diego State University. Comparative methods include:

- Cognitive walkthrough
- Scenario building
- Feature inspection
- Heuristic evaluation
- Field observation
- Focus groups
- Questionnaires

Verification testing usually occurs at the end of development to determine how close you have come to meeting your goals. An instrument that measures learning outcomes is an example of verification testing in an educational setting. Other methods used for verification include:

verification testing	<ul style="list-style-type: none">■ Scenario building■ Thinking-aloud■ Heuristic evaluation■ Field observation■ Focus groups■ Interviews■ Questionnaires■ Pre-and post-tests
realistic scenario	A good first step in creating your instruments is to develop several realistic learning or task scenarios. For example, you may have a Web site to support training for responding to customer complaints. After each in-house training session the learners are presented with a case study to be analyzed in a collaborative workgroup. A realistic scenario could involve: <ul style="list-style-type: none">■ Searching for online resources■ Starting a discussion thread■ Timing how long it takes to work through one case■ If media is embedded, downloading a video clip
blended methods	In this case, you might develop a plan that includes co-discovery (testing, qualitative, behavior, and objective); a feature inspection (inspection, qualitative, behavior, objective and subjective); and a field observation (inquiry, qualitative, opinion and behavior, objective and subjective). Which method(s) are diagnostic? Comparative? For verification?

Suppose you have designed an e-Learning environment for a chemistry course. The course contains animations, short problems, and multiple-choice quizzes. What feature (content, etc.) might you evaluate? What kind of scenario would support that goal?

usability issues	Usability tools are developed around issues that can be generalized to almost any environment: <ul style="list-style-type: none">■ Learnability How smoothly and quickly can a user learn the system/interface in order to complete a learning task?■ Efficiency What kind and how frequently are errors encountered, and how quickly can users recover from them?■ Usefulness Is the interface well enough designed to support a sustained learning environment?■ Effectiveness Does the message design support the expected learning outcomes?■ Satisfaction Do users experience success?
corporate vs. educational goals	Much of the usability research has been conducted in the corporate sector, a sector that depends on rapid development and return on the substantial investment made in site development. Higher education and training are also concerned with "customer satisfaction," but the customer is a learner who may have somewhat different needs and goals. Reflecting these learning goals often results in an environment whose design is based on different kinds of outcomes. For example, an e-Learning environment may contain more and denser content, most of it text. Because a learning experience is more controlled, perhaps due to accreditation requirements, the design and related usability issues focus more on the content than the visual appearance. Your evaluation questions should reflect these outcomes.
one test, one issue	Further, since there is so much that you <i>could</i> evaluate, it is helpful to focus on one or two major issues in any <i>one</i> test. For example, in one test, questions could focus on the arrangement of text on the screen (readability), another test might assess the inclusion of other e-Texts (readability, accessibility), a third might look at visual design elements such as use of colour, choice of icons, etc. You can also give each group of users a different "assignment," which is an efficient way to assess multiple usability issues.

- Content organization
 - e.g., Is the content organized logically for the users?
- Learning design
 - e.g., Is this animation sequence effective?
- Interface
 - e.g., Are directions clear? Is this icon meaningful to users?
- User control
 - e.g., Can the user turn the audio on and off?
- Information architecture
 - e.g., Are the headings, subheadings, pull-quotes, etc. being used effectively?
- Breadth and depth
 - e.g., How many clicks does it take a user to retrieve the information?
- Visual design
 - e.g., Is the use of color appropriate?
- Readability
 - e.g., Is the content at the right level for the user?
- Quality
 - e.g., Are there errors in spelling, syntax, etc.? Broken links?
- Accessibility
 - e.g., Do all e-Texts download quickly for the user? At many different speeds?
- Technical
 - e.g., Does the communication tool work?
- Facilities
 - e.g., Can the users get sufficient access to the learning lab?
- User support
 - e.g., Are the help line hours appropriate for professionals who will study during the evenings?

form of environment Finally, you will decide the forms of the environment you will evaluate. The earlier you test, the more potential problems you will be able to identify. Essentially, usability tests in the design stage can be based on content outlines or paper prototypes. Later in the development, a rapid prototype will suffice and will save development time and resources compared to a mostly finished site. In the later stages, for example, a course pilot, you may test a completed design, the exact format in which the course will be delivered or parts of the design, for example the content delivered at a distance.

paper prototype A paper prototype resembles a set of screen storyboards with the multiple learning paths included. For example, one module in your course may contain two learning activities, each with two options. A paper prototype will follow each path (four in total). In this case, the user may work through a set with written directions or might work with an evaluator who presents the screen storyboard based on a user request. Written observations can be made right on the paper.

For rapid prototyping, parts of the site might be developed. In our Centre, we use PowerPoint™ to represent one screen, because we can include all the media (e-Texts) we have developed and PowerPoint™ also has a degree of interactivity, representing hypertext environment. A bonus is that the slide "real estate" imposes logical constraints on the amount of text to be used. We can also provide the slides outline on which to take notes.

For a pilot, you might develop the communications tools and design, plus some links the first term, then add content the second term, incorporate e-Texts the third term, etc.

recording data	The methods discussion included an overview of several tools. If you are able and if the user is comfortable, reusing recording devices will provide the most accurate and realistic record of the test. For example, several different evaluators can view a videotape of a usability session to determine whether there is a consensus about the issues. In addition, a video record reveals users non-verbal responses to the materials, which provide a tremendous amount of information about attitudes and perceptions of the usability.
audiotape and transcripts	Similarly, an audio taped session can be reviewed for information such as tone of voice, number of pauses, etc. A transcript can be made that again can be circulated among several analysts. We always record focus group sessions and ask one or more graduate student psychology interns to observe and take notes. That way we have an audio record and its transcript plus two sets of written notes. This gives us a number of perspectives on the session. A print transcript is a written record. Both video and audiotapes are "snapshots" in time of a site development and can be revisited for comparison purposes.
observation facilities	Some institutions and organizations have access to labs with observation facilities, such as a one-way viewing booth, that might also contain recording devices. In any case, the evaluator(s) or additional observers should make copious written notes.
shared desktops	More sophisticated usability facilities include networked computer labs with electronic tools that capture actual interactions through the keyboard. For example, one kind of tool permits an evaluator to view the user's screen at another station. These tools are very useful for remote usability testing.
tools in LCMS	In educational settings, other instruments include the results of examinations, student projects, etc. Paper and electronic surveys are used in both educational and corporate settings. WebCT has a built-in survey tool, but you can also use its multi-choice exam tool to create questionnaires and its communication tools for online interviews or focus groups. Other LCMS have similar tools. We have always found that one method, for example, using a questionnaire alone, only raises questions that we need to further pursue. For example, if 70% of respondents say that they found a course effective, but then 65% later respond that they would not take another online course, we want to ask them "Why not?" So, we pair survey instruments with personal interviews and/or focus groups.

Many instructors are wary of terms like "assessment" or "evaluation," which implies judgment of their teaching or course design. Many learners worry that a usability test is meant to assess their performance. It is very important for the evaluator to reassure both client and user that performance evaluation is not the purpose of a usability session, but rather the goal of making the experience as effective as possible.

getting stakeholder support	Whether you greet users in person, plan an orientation session, or provide written directions to a paper survey sent through the mail, you need to obtain user involvement by reiterating what you want them to evaluate based on their own needs. For example, you might explain that they are going to help you make your course or site more effective for them or for their peers. The directions and questions should be stated positively - "help us make this better," rather than "help us fix this."
simple to complex	Some user groups may need simple tasks in order to get started. In usability sessions, always work from simple to complex. Jennifer Fleming recommends starting with general questions, balancing set tasks with free exploration, and concluding with focused questions.

What you test, at what stage of development, and with whom, will suggest the methods and instruments to develop. These instruments should reflect your objectives or goals for the environment and the learning experience.

Summary

Developing an effective usability instrument depends on a number of factors, including:

- Nature of participants
- Environments to test
- Format of prototype
- Stages
- Testing facilities

The goal of the usability test will suggest the strategy that is most appropriate in your case. Usually, a blended strategy is preferred.

Applying the Results of Usability Testing

Finally, what can you do with the results of usability tests? Although this seems to beg an obvious answer - use them - you are advised to be selective with the data. For example, although several users may have been quite vocally negative about the inclusion of a group assignment, you may have very sound pedagogical reasons for including it. Should you drop it because some users didn't feel comfortable with that learning experience?

gather a rich dataset	On the other hand if, after three pilot runs, over 80% of the learners were "somewhat" or "very dissatisfied" with an experience, you might want to revisit your decision to include it.
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If you evaluate your materials over several stages and using several instruments, you will have a very rich data set. You need to decide how to organize it, what and how to analyze, how to report it in a useful form, and what of your findings will you actually apply to your re-design.

organizing data	Organizing data can be streamlined if you decide what and how to collect it at the beginning. For example, if you develop an online survey using a tool like ColdFusion™, the responses can be stored in an online database, run through an analysis tool like SPSS™, and reported out quite easily. We have used Microsoft Excel™ in conjunction with SPSS™ and have produced tables, graphs, and charts directly for our reports to faculty and other clients.
tools to organize data	You will likely have both quantitative and qualitative data to analyze and probably more qualitative than quantitative. For example, over time you will have accumulated a large number of written observations. Add to that participants' responses to open-ended questions and data from interviews and focus groups and you can easily become overwhelmed with the sheer volume of information. Creating a database based on the usability issues you are evaluating allows you to complete a "first pass" quite efficiently. For example, you may set up a field in a database tool like Filemaker Pro™ titled navigation . Each user or evaluator comment (distinguished one from the other) can then quickly be pulled into that field. Most of these tools have different formats for reporting and have the advantage of archiving the data for reuse. More sophisticated qualitative data analysis tools include Nudist™, Atlas Ti®, and others.

If an outside evaluator has conducted the usability strategy, ask for a full report with an executive summary, identifying trends, and a list of recommendations. In fact, ask for a prioritized list, with accompanying resource estimates. An issue may have a high priority but may cost too much to fix - hard decisions are a natural outcome of testing.

the formal report	A formal report tells the story of the usability process, including an overview that describes the objectives, methods, personnel involved, facilities, and other information that sets the scene. A section on the actual testing should highlight respondent feedback and evaluator observations, followed by a section on findings and recommendations. This type of document also contains sample questions or copies of the actual instruments, ethics approval and consent letter a selection of the screen shots or other artifacts collected or used.
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If you have conducted your own tests, you should still take the time to write a report documenting the experience and the decisions you subsequently make. This record may be very useful to you as you revisit the materials months later when the course has ended. Send a summary of the findings to your participants. More than just a courtesy, you can use this summary to elicit further feedback, to achieve consensus, and as a check for accuracy.

using the results	What you do <i>with</i> the results will depend on whether you accept the results in the first place, if the suggestions are reasonably implementable and whether the commitment to redesign is sustainable. For example, will you offer this course again within the next 18 months? Know also what you can change and what you cannot. For example, you may have used an object for which you have no source code. You will not be able to revise it or adapt it and you should ask yourself whether you would be prepared to do that amount of work in the end. Instead, you may want to find another object to support that learning activity.
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An LCMS makes it relatively painless to revise or replace content, but it is very difficult to make any substantial changes to the basic interface. If the majority of the participants rejected the built-in navigation scheme, what will you do — especially if your institution supports only one system (which most do)?

revision strategy	This is worth reiterating — do not involve your learners or users in usability testing if you do not intend to revise the learning environment, a little. Participants will look to see if their suggestions are being valued and implemented and will be very unhappy if they see no evidence of this. On the other hand, small changes performed immediately will assure them that they are respected partners in the learning experience.
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Summary

Usability testing is essential to determine whether your content and e-Learning environment have been designed to achieve your instructional goals and to provide the optimal learning environment for your audience.

Usability testing will also potentially encourage support or "buy-in" for e-Learning from users who may be uncertain or resistant. If staged properly, evaluation involves learners as co-designers or participatory designers in their learning experience, giving them a sense of ownership and enhancing learning outcomes.

The results of usability testing can convince you and persuade your colleagues to support additional development and will contribute to the sustainability of your environment.

The results of usability may be surprising and even disturbing to you. However, a triangulation strategy in which you use a range of methods and involve different participants at different stages will reveal the validity of user observations and concerns.

Usability can be complex and resource-intensive and for these reasons alone you should undertake it with integrity. In other words, if you are only seeking evidence of the quality of your design or are not going to use the results of the evaluation, don't waste time or resources or user expectations with testing. Experience has taught us that learners, in particular, are sensitive to the respect with which their feedback is treated and will look for implementation of the (valid) improvements that they have suggested.

Note The *Handbook* contains a number of tools for you to adapt for your usability toolkit, including a planning checklist. In particular look for Alessi and Trollip's *Quality Review Checklist* ([in Chapter 9](#) of the *Handbook*), which is an excellent guide for ensuring that you don't miss something significant as you develop your usability instruments.

You may also find the quality assurance guidelines of other institutions helpful.

Groups That Have Benefited From Usability Testing

Perceptual and Motor Challenges

Note Nielsen estimates that most Web sites are three times more usable for those of us without perceptual challenges or other conditions that challenge our access to information. Perceptual and motor challenges, i.e. conditions that prevent the full use of standard input devices or that need adaptive solutions relate to the challenges faced in aging.

[Nielsen, 2000, p. 298](#)

Currently, only about 14% of Internet users under age 65 have a functional impairment, but 50% of those older than 65 do. As the population ages, this segment of Web users will increase. At the same time, an emphasis on lifelong learning and workplace learning increases the proportion of older learners in institutions and organizations. It is logical to consider designing for usability for "our older selves." In general, this means:

- Using color carefully, to account for colorblindness
- Using high contrast color combinations
- Simplifying background designs
- Supporting video, audio, or still images with another channel, for example, an image with text, or an audio clip with a text transcript, which can be read by screen readers or voice synthesizers
- Using larger font sizes or allowing users to change font sizes
- Avoiding activities requiring precise mouse positioning
- Chunking. For example, dyslexics find long texts difficult to read

Note For a *Usability Checklist*, see the *Handbook* ([go to Usability Checklist in Chapter 9](#) of the *Handbook*).

Challenges for International Users

In 1997, over 75% of total Web users were in Canada and the United States. By 1999, this proportion had dropped to 55%. The trend is obvious - the design of e-Learning environments needs to accommodate the usability concerns of international users.

internationalization vs. localization	Usability experts distinguish between internationalization and localization design guidelines. Internationalization refers to a single design for users world wide, while localization refers to versions that are adapted to specific groups.
challenging Western design assumptions	The Western world is being notorious in representing the Western cultural design perspective as international. As Internet use grows in other countries and regions and we increasingly include international learners with different learning cultures and needs in courses and programs, we must begin to challenge those design assumptions. Fortunately, following sensible guidelines for good, usable design will address many of these concerns. For example, if you are choosing colors, respecting cultural meaning is just one more consideration, along with accommodating the colorblind and the visually impaired.

Examples of usability guidelines for international users include:

- Eliminating sports metaphors
- Eliminating visual puns, icons of body parts, and other visual images specific to western culture
- Avoiding humor based on cultural references, e.g. historical legends; folktales; western authors
- Providing audio or textual translations

Note For a *Usability Checklist*, see the *Handbook* ([go to Usability Checklist in Chapter 9](#) of the *Handbook*).

Gender-Related Usability Issues

Note As with other user groups, designing to support the learning styles and needs of women will make your resources *more accessible* to diverse learners.

Campbell,2003

Some usability guidelines include:

- Avoid arcade-style designs, controlling for:
 - Competition
 - Hierarchical information
 - Violence
 - Women as victim or prize rather than problem-solver
- Stress characterization and relationships
- Avoid male metaphors such as games, sports, adventures, wars, etc.
- Evaluate for bias in language, imagery, design
- Design for:
 - Harmony with nature

- Concern for others
- Empathy and compassion
- Scientific concepts with social value
- Holistic representations
- Gender balance:
 - Female role models
 - References by men *and* women
 - Gender-balanced examples and cases
- Establish online protocols by adopting a zero tolerance policy:
 - For harassment
 - Strong language
 - Sexual innuendo

Children and User-Centered Guidelines

home schooling Home schooling is becoming a popular and viable option in many areas of Canada and the United States. Many sponsoring school districts or authorities have started to purchase commercially developed software, print and media, and Web materials (learning objects), as well as developing online repositories to support home-schooled children. In areas with very mobile or large rural populations, in northern Canada, for example, distance learning schools have been established through which approved curriculum is delivered.

e-Learning environments designed for children require a unique set of usability standards. For example, young children may have trouble manipulating a mouse. This motor issue has an impact of navigation techniques like pull-down menus. Other issues include:

- Too high a readability level
- Too many layers of information
- Too much text
- Long, complicated directions (especially in text)
- Complex tasks requiring too many steps
- No user control

Nielsen's site of usability reports contains a set of **seventy** usability guidelines for children.

Summary

Many usability guidelines have emerged from studies with international, disabled, and aging populations. Following these guidelines, even though none of these groups may be represented in your audience currently, improve the readability, accessibility - usability - for all e-Learners.

Practice

A short case is presented below. Using what you have learned about usability testing, develop a simple evaluation plan and identify at least two methods that will provide the information you need. Follow this blueprint:

1. Read the description of the case
2. Examine the stated objectives of the usability test
3. Determine the stage and purpose of the usability test
4. Identify the user group
5. Choose two (or more) methods of testing, data collection, and analysis
6. Describe the evaluation team
7. Outline the contents of a usability report
8. Make recommendations

Note When you have finished, compare your solutions to *The Case of Accounting Redesign* in the *Handbook* ([go to The Case of Accounting Re-design in Chapter 9](#) of the *Handbook*).

A Case Study Accounting in the Public Sector

The Faculty of Business offers a senior-level undergraduate course in the Accounting and Finance major in the Bachelor of Commerce degree. The course has always been offered once a year in regular term, in a face-to-face setting. The primary mode of delivery is lecture, with one small-group project, a mid-term exam (multiple-choice and open-ended questions), and a final paper. Class size is 15–20.

The learner population is historically in the fourth year of the degree, with an average age of 21, over 75% white males from urban settings. By the third year of the program, the target audience has become more homogenous, high achieving, and highly competitive. They typically have excellent mathematical skills. End of course evaluations rate the lectures high but the group work fairly low on a scale of effectiveness and satisfaction.

A private firm, Financial Planning Educators, Inc. (FPE), has approached the program Chair. The firm works closely with several government agencies, providing paper-based courses to administrative assistants and bookkeepers and other personnel who wish to upgrade their credentials and progress through the ranks.

The faculty and FPE agree to collaborate in re-designing the Accounting course to be offered in an eLearning format. The new delivery format will be an option for full-time business students, but will be the only opportunity for government employees to participate, as they are scattered across the country. The major government department has agreed to establish small learning labs, one or two networked stations, in each office that has more than four employees enrolled in the course. The department has also promised to be the test site for the first version of the course, i.e. the pilot. However, the employees will not be allowed work time to participate; they will be required to study during regularly scheduled leisure and meal breaks. If they successfully complete the course, they may also apply to the institution to have the course credited towards a future or in-progress diploma from the faculty's Continuing Professional Education division.

The professor who usually teaches the course, and another, more junior, faculty member are given release time to develop the course. The chair has also retained the services of a well-regarded instructor who runs his own financial planning company during the day and teaches at night in the MBA program. The Deputy Minister in charge of the department has identified a manager to work half-time with the course development team and the FPE agrees to provide, under a non-disclosure agreement, all of their current course materials and to review the design at various stages.

The team does a needs assessment and discovers that the majority (80%) of the new clients or learners are female, with an average age of 38. They report being comfortable with computer technology for work, but report only moderate experience and comfort with using the Internet. Most work full-time and have families. About 30% have taken a previous course in the diploma or have begun working on an FP certificate from FPE. Of 200 survey respondents, only 10 have had an online learning experience.

The course team designs the course to be a blended delivery over six months. It will be case-based.

There will be an intensive weekend seminar mid-way through the course that all participants will be expected to attend in person. During the seminar the small group project teams will be formed and the case presented. The team will have the opportunity to work together for one day to strategize their work plan. The seminar leader assigns roles.

The mid-term examination is eliminated. Instead, each learner will prepare an individual case assignment. The grading changes to reflect the importance of the collaborative group project, i.e. the case is valued at 50% of the final grade.

The course materials remain heavily text-based. The team decides to make them all available as document sets within the Web course. The documents include the class notes, ten academic papers, and sample cases. No print versions are offered.

However, because the team agrees that interviewing skills are essential, two video clips showing two different interviews (one showing inappropriate interactions) are included on the site. A number of still images of charts, graphs, tables, etc. extend accounting concepts. A class discussion board is available and the groups are expected to communicate using this tool. Their group discussions are worth 15% of the total grade.

The team has 8 months to develop the new course design. The pilot course will run over the winter session in the next academic year. Based on evaluation results, the faculty will decide whether to include this course format in the regular course calendar and whether to continue the relationship with FPE to develop other courses.

Team LiB

 PREVIOUS  NEXT 

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Resources

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Additional Resources Available in the Handbook

Note Data Elements: Some Guiding Questions ([inChapter 9](#) of the Handbook)

Consent Form ([inChapter 9](#) of the Handbook)

Facility and Facilitator Checklist ([inChapter 9](#) of the Handbook)

Recommended Activity

Choose a section of your course or materials you have developed and plan a usability test. If you do not yet have a set of resources, choose one of the following Web sites and develop an evaluation strategy.

WebQuest Collections

http://webquest.sdsu.edu/webquest_collections.htm

Chapter 10: e-Learning Trends — The Mobile Environment

Overview

In the introductory chapter, we identified trends and opportunities for e-Learning in higher education. One of these trends, m-Learning, is the focus of this chapter.

Today, who doesn't own a personal digital assistant (PDA)? A PDA is one example of a handheld device in which several technologies have converged - notebooks, e-Textbooks, online calendars and address books, email, music files.... m-Learning often takes place via a wireless device such as a PDA, but students in Japan use cell phones and any airline traveler knows how many laptops suddenly make an appearance when the seatbelt light goes out.

Recall that Quinn (2001) defined m-Learning as "the intersection of mobile computing and e-Learning." Paul Harris extends that to an "anytime, anywhere learning experience." Anywhere in the world, that is.

Donna Abernathy writes that m-Learning can include anything from job aids to courseware downloaded to your PDA to online Net-based learning. However, she makes the point that the "m" refers only to content delivery. "Learning and performance are still the big stars."

@Work, February, 2001

In this chapter, you will explore the implications of this intersection for message design - the development and delivery of content online.

Key Ideas

m-Learning is a relatively new development in the e-Learning world. Think of this chapter as a survey or overview of the current state of mobile computing in higher education.

- Commercially, there is a strong trend towards handheld devices for retrieving information, communicating, and learning.
- Corporate use may drive adoption of m-Learning approaches.
- m-Learning may potentially increase the digital divide.
- Content development has been the purview of specialist publishers.
- Readability issues relate to screen size and resolution, mobility, text input, multimedia capability, and other unique challenges.
- Higher education projects rely on partnerships with many sectors.
- Handheld devices are used to increase interaction in large enrollment classes.
- Librarians are developing policies and guidelines for use.

Key Terms

Note This chapter introduces a number of terms and phrases that you may not be familiar with.

These terms are listed in the *Handbook* with enough space to define them in your own words or note examples, references, and resources ([go to Key Terms in Chapter 10](#) of the *Handbook*).

- m-Learning
- m-Learning Environments
- Mobile computing devices
- Personal Digital Assistant
- Just-in-time learner
- e-Book
- Virtual reality displays

Plan Your Progress

Note A concept guide for the ideas in this chapter is provided in the *Handbook* ([go to Concept Guide in Chapter 10](#) of the *Handbook*). There is additional space for you to write the questions for which you need answers. At the end of the chapter, check your list of questions to determine whether you need additional information.

Note Record your own information or learning needs in *Questions and Goals* in the *Handbook* ([go to Questions and Goals in Chapter 10](#) of the *Handbook*). If you have questions about trends and challenges in learning organizations, record them here.

At the end of this section return to this list to develop an action plan to locate sources for the questions you did not find answers for. You may need to 'carry' a goal or a question forward with you as you work through the book.

Note A "[To do list](#)" has also been provided for you in the *Handbook* for you to record what needs to be done, who needs to do the task, and when the task should be completed by ([go to To Do List in Chapter 10](#) of the *Handbook*).

The Mobile Computing Scene

Learning organizations are watching the emergence of hand-held learning devices with interest. Portable learning environments address many of the needs of today's learners, workers, and professionals. For example, the health care industry has been piloting the use of handheld devices to support learning at the bedside since the mid-nineties.

Predictions about the use and growth of m-Learning vary widely. As you look over the following numbers you begin to get a sense of the resources that public and private sectors are poised to invest.

Trends

- The average employee had less than two days of training in 2002.
- More than 525 million Web-enabled phones will be shipped by 2003.
- There will be more than 1 billion wireless Internet subscribers worldwide by 2005.
- Multi-purpose handheld devices (PDA and telephone) will outsell laptop/desktop computers combined by 2005.
- Most major US companies will either switch to or adopt wireless networks by 2008.

Empowering Technologies, 2003

Vendors and distributors are talking about a revolution in learning and training. Educators themselves are more cautious.

just-in-time learners We have seen throughout this book that accessibility is a guiding principle in designing any learning environment. As with any new technology, m-Learning may reach readers and learners who were previously excluded, including just-in-time learners like real-estate agents, professional learners like dentists; pre-professional learners like articling law students, and challenged readers like the shut-in. In many areas of the world, telecommunications costs are too prohibitive for many users — wireless access is an improvement. As well, the usual disciplines, science and technology, are likely to get access faster.

However, m-Learning requires what is a relatively expensive device for many users. Users also need digital access — preferably high-speed. At the same time, readability becomes a challenge for e-Writers.

Throughout the rest of this chapter, keep the issues discussed in Chapters 3-8 in mind. *Will m-Learning be an optimal environment for your audience, and you?*

m-Learning Environments

the guiding questions	While not widespread, colleges and universities, training organizations, libraries and the private sector have begun to explore the use of mobile computing in controlled situations. Through these pilots we are able to identify and anticipate both technical and educational implementation issues. Remember that mobile devices are just that - technological devices - and should not drive the design of learning environments. In other words, carefully consider intended instructional outcomes, your target audience, and the learning context <i>before</i> choosing a delivery technology. Ask yourself the same guiding questions you asked about online learning in Chapter 1 .
interconnectivity	Michael Wenger, Senior Director of e-Learning with Sun Microsystems, suggests viewing m-Learning within a total learning context, not merely as a stand-alone solution. For example, is mobility a requirement or a luxury? Is interconnectivity more important than optimal information display?
mobility	

Given the expense, availability and degree of innovation, the corporate and training environments may drive adoption of m-Learning. Collaborative software to support meetings, electronic bulletin boards and applications like navigation software to guide users to meetings in unfamiliar places may enhance productivity for executives.

Advantages of m-Learning

professional learning	Professional learning, especially in authentic contexts like hospitals, at engineering sites, and in the courtroom may also be extended with access to online resources, experts in other locations, and participation in distributed group settings.
floating teachers	One school district reported an experiment that supported floating teachers, those who moved regularly between classrooms, schools, and even districts. Teachers that were supplied with handheld devices were able to check their e-mail regularly for messages from students and colleagues, could stay in contact with parents, retrieve files stored on a remote server, participate in decision-making through electronic bulletin boards, and download resources from libraries in other schools and in other jurisdictions.

Other advantages of m-Learning include:

- Increased efficiency on the work or learning site
- Just-in-time learning
- Lower telecommunications costs (e.g. in Europe)
- Portability
- Many applications available on one small device
- Support for Web-browsing, e-mail, real-time chat, and access to remote computing resources

Can you think of other potential advantages?

On the other hand, m-Learning presents some significant challenges. *Before reading on, list three challenges that come to your mind.*

Challenges of m-Learning

Many of the challenges related to m-Learning are similar to those of e-Learning - content development, message design, cost, accessibility, infrastructure, and technical issues. Currently, it makes better sense to think of m-Learning as an enhancement, rather than a replacement for other delivery technologies.

Screen Display

readability

Anyone over age 40 who has found themselves squinting at the display on a PDA, turning it this way and that in the light to make it more readable, will appreciate the limitations of reading from a handheld device. Screens are tiny, inhibiting both readability and interactivity. Low screen resolution, about one-tenth that of a conventional display, challenges the visually impaired and produces eye strain and fatigue.

interface

A small screen and low resolution pose a problem for interface design. For example, it is impractical to have multiple, small windows open at one time. It is particularly difficult to locate windows and icons when they are stacked on top of each other.

Window title bars and borders either consume significant portions of screen space or become difficult to operate with the pointing device (usually a stylus).

Some devices support color, which may improve the interface readability, but they are usually more expensive than monochrome models.

Forman & Zahorjan, 1994

virtual reality display

Virtual reality displays, supported through headgear, have been developed in various research and training settings to improve the field of vision. These displays give the sensation of a screen that wraps around the field of vision, but among other problems they require dim lighting conditions for maximum effect. This requirement defeats the purpose of the display on, for example, outside job sites.

Storage

With limited memory and storage capacity, information access and display is very slow. This condition prevents the standard use of rich media such as video or learning objects available on CDs or DVDs, or media-rich Internet sites. Consequently, PDA's support mainly information management and only minimal information creation.

Access

Apart from issues related to user-centered design, m-Learning platforms are susceptible to disconnection and degradation of information. As with any network speed is an issue, but with wireless connections stability is *more* of an issue. The devices themselves are low power, and signals may degrade with increased mobility. As with cell phone service, as a user moves from one service area to another, communication may deteriorate and data may be of low quality or lost altogether. Mobility also implies higher security risks.

Content Creation

Text entry provides a serious challenge to m-Learning.

Manufacturers of handheld devices have not yet duplicated the functionality of a desktop keyboard. Miniature keyboards offer input speeds of only 10–15 wpm, where full-size keyboards support an average of 60 wpm. The fold-up keyboard is one possible solution to this problem,

keyboarding	However, a keyboard needs a flat, level, stable, raised surface - any reduction in this surface reduces productivity and comfort level. So, while the use of a portable keyboard makes sense for note-taking during an information session, for example, it is difficult to deploy on a bus or while standing at the bedside of a hospital patient.
handwriting	Handwriting, on average is three times slower than typing but allows the keyboard to be eliminated. Usually accomplished through the use of an input device like a stylus, recognition rates can be 96-98% accurate on high-end systems. Handwriting may be a barrier to some users, including those with motor impairments.
speech production	Speech production is in its infant stages and is a problem because of substantial storage and processing demands. Audio may also be inappropriate in certain situations, as witnessed by the increasing irritation and sanctioning of cell phone use in controlled spaces.

In addition, speech recognition may not be recognized clearly in noisy environments, reducing accuracy and compromising privacy. Similarly, content with an audio component should be used in very limited social circumstances.

A standard input interface, which could lead to device convergence and eliminate need to carry multiple devices with "redundant functionality" is desirable, but not yet available.

Sources of Content

Content for m-Learning is becoming more readily available. Many of the solutions to date are customized to the application and the client.

For example, Docent Mobile allows learners to download from a Docent Content Delivery Server to complete self-paced learning activities (e.g. assessments).

Sun Microsystems provides wireless access to a Web-based learning management software, *Isopia Learning Management System*, to check course information, some activities, and training status.

specialized content	Global Knowledge recognized that m-Learners needed modularized content that they could quickly download in small chunks and that could adapt to the particular handheld device. For example, in Global modules graphics can be rapidly redrawn for the delivery platform.
legal e-Texts	Westlaw, Inc. is a legal information supplier who has partnered with Palm™ to provide e-Book legal texts:

- The Federal Rules of Evidence
- The Federal Rules of Criminal Procedure
- The Federal Rules of Civil Procedure
- Federal Rules of Appellate Procedure
- The Federal Bankruptcy Rules
- The Federal Bankruptcy Code

West Group also provides the licensing for *AportisDoc* by Aportis, which is a standard for displaying and interchanging electronic text and books of any size.

In [Chapter 4](#), you read about the trend away from original content development towards the reuse of interoperable learning objects. The m-Learning field also follows this approach, which makes a great deal of sense in HE applications while the field develops and stabilizes.

The content equation for m-learning is the more difficult puzzle. It's how to chunk content in a granular way and develop it so it can be deployed in different forms. Doing this requires a whole new perspective. There has been no work done in this area.

Hodale, 2001

<http://www.learningcircuits.org/2001/jul2001/harris.html>

e-Books

e-Books have been available since 1998. Textbook companies have not moved quickly into this market but have watched the trend carefully, often working with libraries and educational institutions through small research projects.

Melick Library at Eureka College participated in such a field study in 2001 with two college classes of undergraduate English students. Students overall liked the pilot, especially the built-in dictionary function, ability to underline passages and take notes. Reading performance was improved for reluctant readers — participants used the dictionary to increase vocabulary and comprehension. Also, the novelty effect likely accounted for the increased motivation of these poor readers.

Bell, McCoy & Peters, 2002

The students recommended the inclusion of color and enhanced audio recording and playback features and more immersive interaction with content and with instructors and each other as key to continuing to support e-Books in their studies.

At the conclusion of the pilot, Melick Library decided to place primary emphasis on supplying e-books for course readings. Subject areas best suited appeared to be history and literature.

This study identified several practical and theoretical challenges for libraries, including:

- Requirement to purchase many different kinds of readers to support e-books
 - Teaching patrons to use readers
 - Loading texts onto devices was a tedious process and not very scalable
 - Providing ongoing technical and troubleshooting support
 - Loss, theft and damage
 - Replacement of batteries, downloading operating systems was expensive
-

Implications for Libraries:

1. Users want to download library content onto devices as varied as laptops and cell phones, and to have library services delivered over handhelds.
2. They want to integrate library content with other kinds of content.
3. They want to interact with information content in increasingly complex ways.

Bell and others, 2001

m-Learning in HE

Several completed and ongoing m-Learning projects are described in this section. As you read about these explorations, try to determine:

- Intended instructional outcomes

- Appropriateness of project design to outcomes
- The more effective or promising uses of m-Learning

University of South Dakota

In the 2000/01 academic year, the University of South Dakota provided incoming freshmen and first-year law and medicine students with a Palm Pilot™ for both organizational and e-learning uses. The devices support coursework in English, speech, biology, computer science, information technology, medicine and law. Used for communication purposes, the administration also sought to lighten the physical load of backpacks and make applications available.

Stanford University Law School

Palm and West Group have worked with Stanford University's Law School on a six-month pilot to provide access to e-Texts, communications software, coursework, and information services.

The participants each paid \$100 for a keyboard and received a Palm™VIIx wireless handheld, downloadable software, and six months' worth of wireless access. Following a three-month training program, law students used the devices both on-campus and during summer employment. In focus groups in the fall term, the participants described their experiences and made recommendations.

"The legal profession as a whole is embracing wireless technology because access to the latest legal information anytime is such an obvious advantage," said Davis. "This initiative is an excellent opportunity to help students become conversant with the technology, use it in school and carry it forward in their professional lives."

Associate Dean for Information Systems
<http://west.thomson.com/>

Wake Forest University's PocketClassroom

The Research and Development Team in Information Systems at Wake Forest University developed PocketClassroom, a proprietary software that turns a PocketPC with a wireless card into a "webserver," presentation controller, and feedback device for classroom instructors or lecturers.

For example, the feedback device can work as a polling system or as a way to assess learners' understandings of concepts during the presentation. The device also gives students private, synchronous access to the instructor during class time.

Professors can use the software to present PowerPoint slides or other Web sites during their lectures.

Harvard University Medical School

Harvard uses PDA's in medical school training. Over 300 students had access to class schedules, hospital case log notes, lecture notes with anatomy illustrations, course evaluations, exam calendars, and the ability to enter patient info while making rounds.

Recently, Harvard Medical School and the CareGroup Healthcare System, which employees over 12,000 medical personnel signed an agreement with Portable Emergency Physician Information Database (PEPID) LLC, that gives access to PEPID ED (Emergency Doctor), PEPID MD (Medical Doctor), PEPID RN (Registered Nurse), PEPID MSC (Medical Student Companion), and PEPID PDC (Portable Drug Companion) products for a period of one year.

Northern Alberta Institute of Technology (NAIT)

In Canada, NAIT's Compaq Centre for Information and Communications Technology has launched a pilot project to assess handheld wireless technology in a first-year postsecondary accounting course as a value-added tool that:

- Enhances student success

- Increases student access to the institutes' services
- Expands the body of teaching and learning strategies available to faculty

Approximately 120 first-year accounting students at NAIT and Seneca College in Toronto are involved in the mobile learning pilot program that is partially subsidized by a consortium that includes NAIT, Seneca College, McGraw-Hill Ryerson, Bell Mobility, Blackboard, Hewlett-Packard, Avaya and Cap Gemini Ernst & Young.

With new ways to share information, research assignments, study and practice new concepts, students are enjoying a variety of learning options. Through this technology students have been able to accomplish everything from journal entries to homework assignments to tests and quizzes.

Mobile Learning Project
<http://www.nait.ab.ca/MobileLearning/defaultST.asp>

University of North Carolina at Wilmington (UNCW)

Project Numina is a partnership between faculty at UNCW, Pearson Education (Prentice-Hall) and Hypercube™. The project is exploring the use of handhelds to facilitate learning of abstract scientific and mathematical concepts and integrates media, interactive exercises, and hypertext materials. Like Wake Forest University, Project Numina provides a Web-based interactive student response pad, called the Student Web Answer Technology Template, or SWATT™. The project claims to increase the 2–3% response rate typical in large classrooms and provide instructors with feedback that helps them make informed decisions based on student data that impact the pace of class, the curriculum, and classroom procedures.

UNCW is also evaluating an online chemistry text and *HyperChem*, a software application with standard functions for general and organic chemistry. The project has been extended to include classes in mathematics, educational psychology, computer science, instructional technology, and business management.

Tip Download this paper describing the results of Project Numina.

Encouraging Active Student Participation in Chemistry Classes with a Web-based, Instant Feedback, Student Response System

Ward, Reeves, & Heath http://aa.uncwil.edu/chemed/papers/srs/confchem/confchem_srs.htm

The m-Reader

Far from enjoying widespread adoption in the HE sector, m-Learning appears to be at the innovation stage and explored mostly through partnerships between universities, colleges, publishing companies, and vendors of mobile computing devices.

Many of the projects described above focus on presentation systems, feedback systems, and productivity applications. However, these projects are also exploring communications enhancements, access to coursework and access to specific information resources. In almost all cases, interaction is a significant factor.

e-Books have been with us for over five years, as have electronic journals and other online information sources. For example, the Web site *Planet eBook* supports an e-Book Community that includes a forum, updates on industry developments, and a growing list of e-Books available for download and for purchase.

Other online communities, for example the *Ebook Reviews.net*, invites e-Book authors to submit their book for review by an open list of reviewers. Review guidelines are published on their site.

The *Open eBook Forum (OeBF)* is an international trade and standards organization with membership from hardware and software companies, publishers, authors, users, and accessibility advocates. The OeBF is working to develop standards and specifications for the electronic book publishing industry,

much like IMS Global Learning Consortium who works in the same way for the e-Learning industry.

e-Books may pose accessibility problems for many, but they may also enhance access for groups that have reading disabilities and other challenges. Of course the accessibility issue will depend on quality e-Book design - as with all online resources, authors must be sensitive to the user-centered design principles discussed in Chapters 3-6.

Open an eBook suggests nine reasons to "open an e-Book".

Nine reasons to open an e-Book

1. Read now
2. Simple to use
3. Portable
4. Convenient
5. Intuitive
6. Quick navigation
7. Easy on your back
8. Interactive
9. Highly accessible

<http://www.openanebook.org/>

Throughout this book, you have considered whether e-Learning environments require a new approach to writing. I have suggested that e-Texts require a different kind of relationship between the writer and the reader and the reader and the text. In short, interacting with hypertexts that may be retrieved through reader-defined semantic nodes and through which the e-Reader connects to a community of peers to construct meaning, fundamentally changes the reading experience.

Miriam Schcolnik reflects this evolving learning context as she encourages us to look beyond technology and examine signs for possible changes in human reading behavior.

If the new medium of e-readers becomes commonplace, it will be necessary to understand what new reading possibilities it offers and how these can be best exploited.

A Study of Reading with Dedicated e-Readers

Geoffrey Ring, of the *eBusiness on the Move* course, concludes that m-Learning is most suited to specific content areas such as language skills and that WAP technology is best applied to discrete e-Learning elements such as tips, ready reference, feedback, reminders, browsing course material, links to WAP sites, and course registration (in Web Tools Newsletter).

Summary

At this time, m-Learning is best used as an enhancement to the blended learning models you have seen. Controlled experiments and projects in North America and around the globe reflect this approach.

Promising applications for m-Learning include medical training/bedside learning, just-in-time information retrieval and professional learning in the field and enhanced interaction in F2F situations.

m-Learning solutions are currently expensive and less stable than wired platforms. Learning institutions, in particular, will seek industry partnerships as they begin to define appropriate uses for m-Learning.

Content development for mobile computing devices and environments is currently in commercial hands, for example, educational publishers like Prentice-Hall. These companies have the resources needed for large scale and implementation of e-Books and texts. Writing for m-Learning environments should be based on user-centered guidelines that maintain access to learning experiences. Limitations of handhelds that reduce access include small screen size, poor resolution, and text entry difficulties.

Several technological problems must be solved before education is able to adopt m-Learning, including security, stability of data, sustained connectivity, and processing capacity.

Practice

Several publishers and hardware developers are making m-Learning applications available on the Web. For example, Palmä provides a template for student worksheets for multiple-choice and short answer assessments. Try creating one of these *HandySheets* at <http://www.handysheets.org/>.

Team LiB

◀ PREVIOUS ▶ NEXT ▶

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Success Stories from Palm™.RetrievedApril 27, 2003from the World Wide Web:
<http://www.palm.com/education/studies/index>

Resources

For more information on e-Books:

Ebook Reviews.net. Retrieved on August 18, 2003 from the World Wide Web: <http://www.ebook->

reviews.net/

Open eBook forum. Retrieved on August 18, 2003 from the World Wide Web:
<http://www.openebook.org/>

Planet eBook. Retrieved on August 18, 2003 from the World Wide Web:
<http://www.planetebook.com/>

Team LiB

 PREVIOUS  NEXT 

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◀ PREVIOUS ▶ NEXT ▶

Recommended Activities

1. Katie Dean tells the story of one autistic child's use of a Xybernaut wearable computer that enabled better communication with the world at <http://www.wired.com/news/school/0,1383,52148,00.html>. Read this story and look for other uses for special educational needs. Is this a promising direction for m-Learning?
2. Join the m-Learning Forum at <http://www.pjb.co.uk/m-learning/> to connect with colleagues who are experimenting with m-Learning.
3. Subscribe to *ELearn Magazine: Education and Technology in Perspective*. This magazine is a project of Association for Computing Machinery (ACM), the "not-for-profit educational association serving those who work, teach, and learn in the various computing-related fields." <http://www.elearnmag.org/index.cfm>

Team LiB

◀ PREVIOUS ▶ NEXT ▶

Glossary

A-E

Accessibility

Refers to problems encountered by Internet users with perceptual challenges, physical conditions or other factors such as language, which limits use of the Web.

Active learning

Refers to the process by which learners do something new with information, which can include making choices or interacting with others in an e-Learning environment.

Affective

Domain concerned with emotional learning.

Animation

A particular form of video, which is comprised of cartoons or moving diagrams, that helps learners form useful mental models.

Applets

According to the [TechEncyclopedia \(May, 2003\)](#), an applet is a "small application, such as a utility program or limited-function spreadsheet or word processor. Java programs that are run from the browser are always known as applets."

<http://www.techweb.com/encyclopedia/defineterm?term=applet>

Authentic assessment

Learning evaluations, which reflect a match between the learning activity and its demonstration in a real context.

Cognitive

Refers to the knowledge shared in memory. Its central principle is that most behaviour is controlled by internal memory processes rather than by external circumstances.

Cognitive Load

The quantity of information, which the reader is required to absorb.

Collaborative learning

Learners work together and cooperate to complete specific learning activities. For example learners may work collaboratively to solve problem or address a case study. Collaborative learning is based on a set of five assumptions:

1. Learning is an active, constructive process
2. Learning depends on rich contexts
3. Learners are diverse
4. Learning is inherently social
5. Learning has affective and subjective dimensions

Comparative tests

Comparative tests allow a developer to compare two versions of his/her own material or to compare his/her design to another, similar design.

Compliance

To adhere to standards of accessibility or benchmarks of good practice in the development and delivery of online learning.

Constructivism

Learning is an active process. Meaning is made through building and reshaping personal knowledge through interactions with the world. Effective learning environments support collaboration, autonomy, critical reflection, and authentic interaction with the **real** world.

Converging Technologies

Newly developed technologies, which are based upon or combine previous technological innovations.

Design Shell

The design shell refers to the course framework. The shell can be organized in many disciplines, and other factors. For example, the shell may reflect a topic organization.

Diagnostic tests

Diagnostic testing occurs during development and is meant to identify what is working well and what is not, so that you can fix problems before they become too big to handle easily. A diagnostic test is best done frequently.

Downloading

The process of receiving a file transmitted over a network.

e-Book

Literature which is available online and is produced in a Web format.

Electronic documents

Ready made resources available online.

Extrinsic motivation

When a person's impetus for learning comes from an outside source. For example, a person may learn a program because an employer requires it.

F-M

Formative evaluation

Term that describes an iterative evaluation that takes place during the design, development and implementation stages of a new content, curriculum, textbooks, programs, software, etc.

Free-standing

Learning objects, which are designed to be useful without the user having to update their hardware or software requirements substantially.

Genre

A literary form that is accompanied by expectations, limitations, and conventions, and is the categorization of information.

Goal-based

A design shell based on case-based learning.

Granularity

Granularity refers to the size of the learning object. Each learning object addresses one instructional objective. This level of "[granularity](#)," or size maximizes the usefulness of the resource for assembly and reassembly to diverse learning environments.

Hit and Run

The process by which someone visits a site, scans the first page quickly, clicks on a link, and then moves on.

Information architecture

The way in which an environment is organized to support learning and information retrieval.

Inquiry

Evaluators seek information about the users' needs and preferences, perceptions and attitudes as they use the system for real work.

Inspection

One of three types of usability evaluation methods. Inspection involves a team of usability professionals who examine usability-related aspects of the system. The other two methods are testing and inquiry.

Instructional wrap-around

Interactive online discussions centered on a specific topic or other activities designed to organize the learning.

Interface

On the Web, the site architecture is revealed in the visual design, elements with which users interact. Visual design and the interactions it reflects are called the interface. The interface is the bridge between the content and the learner.

Intrinsic motivation

When a person's impetus for learning stems from personal or professional goals, such as self-esteem, quality of life, or increased job satisfaction.

Just-in-time learner

Describes previously excluded readers and learners like real-estate agents, professional learners like dentists, and pre-professional learners like articling law students.

Keyhole problem

The keyhole problem occurs when users/learners become disorientated or confused as a result of scrolling through an extensive amount of on-line text since they are unaware of the depth of the information.

Knowledge construction

See [Constructivism](#).

Learning object

Refers to the process of modularizing the development process, which can be used as a single resource or combined to form a much larger unit of construction.

Learning outcome

The result of completing a unit of learning.

Learning style

The way in which a learner processes information.

Message design

Message design refers to how concepts and information are conveyed to the learners. Good message design is a case of designing for learning. And, designing the message in the optimal way for learners to be able to achieve defined learning outcomes.

Metadata

The description assigned to learning objects, which are being stored for distribution.

Metaphor

The development of an e-Learning environment is likened or modeled after a direct comparison to another concept or idea.

Mind tools

Cognitive tools or Jonassen's ***mind tools***, help learners develop a deeper understanding of key learning concepts by organizing and re-presenting information, annotating and elaborating, and building on learners' experience through scaffolding. Mind tools require that learners undergo self-assessment, reshape knowledge, and reflect critically.

m-Learning

The intersection of mobile computing and e-Learning which extends to an anytime, anywhere learning experience.

m-Learning Environments

The use of mobile computing in controlled situations, which is now being utilized by colleges, universities, training organizations, libraries and the private sector.

Mobile computing devices

Instruments that facilitate the use of e-Learning resources such as PDAs, cell phones or laptops.

Modular course design

Instructional planning in which smaller learning objects are combined together in order to create a larger whole.

Monolith

Until recently, traditionally taught campus-based courses have been thought of in terms of monoliths. In other words, the course is a single entity and its quality depends heavily on the time and ability of the instructor to incorporate new elements or ideas. Frequently, the materials and content of the course are tied to the instructor most heavily involved with the teaching of the course. When he/she leaves or works in other projects, much of the expertise involved in delivering the course is gone as well.

Team LiB

◀ PREVIOUS | NEXT ▶

N-T

Navigation

The way in which users will get around in the program.

Organizational scheme

The way in which information is sorted into standard frameworks meant to be understood internationally.

Peer review

A process by which peers or colleagues review e-Learning content, courses and learning objects to ensure quality.

Personal digital assistant

According to [TechEncyclopedia \(May, 2003\)](#), a PDA is "a handheld computer that serves as an organizer for personal information." www.techweb.com/encyclopedia/defineterm?term=PDA

Prototypes

A partial or full version of a program, course, website in the early phases of design and development. Prototypes can be tested for usability before going into full scale production.

Psycho-motor

Domain concerned with physical learning ("psycho" acknowledges the cognitive aspect to physical skill).

Qualitative data

Data, which can be attained through qualitative research methods such as observations, journaling, interviews and focus groups.

Quantitative data

Data, which can be attained through quantitative research methods such as scientific experiments and quantitative surveys.

Reflexive

Interactive environments can be responsive and reflexive. They can permit free exploration at a personal pace, with immediate feedback. They can also represent a real world context in which to obtain and use new information.

Repository

An online learning resource storage facility.

Re-purpose

To redesign course materials for suitability in a Web-based learning environment.

Search Engine

Online program which facilitates the location of information or resources on the Web, MERLOT for example.

Semantic Linking

Making sense of information through organization and categorization.

Social constructivism

See [Constructivism](#).

Spatial Map

Demonstrate relationships of information and concepts versus contents lists.

Standards

Guidelines and specifications that e-Developers must meet to ensure the accessibility and quality of e-Learning environments.

Streaming

According to [TechEncyclopedia \(May, 2003\)](#), streaming refers to "the continuous transmission of data, typically audio or video."

www.techweb.com/encyclopedia/defineterm?term=streaming

Transfer

According to TechEncyclopedia, transfer means to send data over a computer channel or bus.www.techweb.com/encyclopedia/defineterm?term=transfer, accessed on 01/05/03 at 10:30pm.

Triangulation

The use of three methods in a usability test in order to facilitate the comparison of data against two other tests in order to pinpoint gaps in the information or to ensure that you have the information you need and that the data is consistent.

U-W

Usability Testing

Usability testing comprises a large set of methods for identifying how your users *actually* interact with your content. The goal, quite simply, is to find out what is working well and what is not working well, or at all. Generally, usability testing is a systematic, iterative process that involves testing your content or site and then using the results to improve the design and content to meet the users' needs.

Virtual reality displays

Media, which involves a screen that wraps around the field of vision, creating the sensation of actually being inside or apart of a specific situation.

Ways of knowing

Patterns of reasoning which evolve as a result of experiences and cognitive development, resulting in a shift in values and other factors.

Webcast

According to [TechEncyclopedia \(May, 2003\)](#), there are two components to webcast:

- "(1) To send live audio or video programming over the Web. It is the Internet counterpart to traditional radio and TV broadcasting.
 - (2) To send selected Web-based information (text, graphics, video, audio, etc.) to Internet users based on individual requirements."
- [www.techweb.com/encyclopedia/defineterm ?term=webcast](http://www.techweb.com/encyclopedia/defineterm?term=webcast)

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E-ffective Writing for E-Learning Environments Handbook

Overview

This handbook is designed to support active learning -your active learning. Use the handbook alongside the text as a guide to reading or as an accompanying resource that extends the ideas in the text.

As you work your way through this guide you will encounter many practical suggestions for developing e-Learning environments. Completing a practice activity will help you adapt new concepts about instructional writing to your own work developing new resources.

The guide also includes cognitive tools - tables, outlines, checklists, etc. - that you can complete and then adapt and use as you re-purpose your content for online delivery.

Each chapter in the *Handbook* corresponds to a chapter in the text. As you read the text, you will notice that the icon that looks like this



appears frequently in the left margin. This icon signifies that a resource or an activity is included in the *Handbook*, as well as its location.

These activities and tools may also be used independently.

Hopefully, the *Handbook* will also give you some ideas for developing resources that will support users (or readers, or learners) of your materials. Please feel free to liberate some of these concepts!

Introduction: Trends and Challenges for Learning Organizations

Concept Guide

The social and political contexts for learning

- Do you agree with the four key planning issues?
- Do you face similar issues or different ones?
- What effects do these issues have on your work in the organization?
- Are you aware of a digital divide in your context?

A new learner profile

- How will you describe your learners or readers?
- How will each planning factor affect your relationship with your colleagues? Your administrators? Your learners?
- Why consider a blended learning approach?

Trends in the use of learning technologies

- How have the new trends begun to affect your institution or organization?
- Is there a legitimate business case to be made for e-Learning?
- Are there concerns arising from these trends that your institution should be aware of?

Questions and Goals

Use this form to record your questions about the trends and challenges in e-Learning facing you and your learning organization.

As you read, return to this form to record new ideas, resources, and additional questions.

Personal Goals

Questions	Related information	Resources

Key Terms

Use this list as a guide to the vocabulary common to the e-Learning field.

- q e-Learning
- q m-Learning
- q me-Learning
- q Web-based learning
- q Online learning
- q Distributed learning
- q Distance learning
- q Blended learning

Four Issues Related to e-Learning

What effect will each issue have on your institution? What are the implications for you as an online writer and teacher?

1. The changing learner
2. The rise of the information and global economy
3. The emergence of the consumer culture
4. The changing nature of work and implications for higher education
5. Others?

My Most Pressing Issue... Master Action Plan

Note two or three of the most pressing concerns or questions you have about creating online learning opportunities. What action could you take to explore the issue more thoroughly? What do you already know?

As you work through this book and encounter information that helps you answer your questions return to this page again and again to flesh out the "problem." This template may help you organize your thoughts.

At the end of the book, decide whether you are comfortable that you have adequately addressed your concern(s). You may also have *new* questions. Note them here as they arise.

Question or Concern: _____

Action Step Problem-solving step	New Information Notes, key ideas, plans, questions	Sources References, URL's, people
Why exploring this topic/issue will help me write e-Texts		
What I already know about writing for e-Learning environments		
What I need to find out more about The activities and resources		
Ideas to use for my redesign		
Most interesting new idea		

To Do List

What Who Date

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Team LiB

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1Five Factors for Planning

Concept Guide

Why e-Learning?

- At this moment, why are you interested in becoming an effective e-Writer?

Learning Outcomes

- Which of the three domains are most represented in your discipline?
- How do you assess outcomes now?
- Can you add to the seven advantages of e-Learning?

Learners

- When have you been most successful as a learner?
- When have you been most successful as a teacher?
- Do you teach to *your* learning style?

Learning Activities

- What is your role as a teacher or e-Writer?
- What activities have worked well for you? Can they be translated to e-Learning environments?

Learning Assessment

- How do you currently implement authentic assessment?
- Does your discipline require specific assessment methods?

Resource Factors

- What resources will you need to develop e-Learning environments?
- How will you acquire the resources you need?
- How will you present the cost-benefit argument to your administrator?

Should I choose the Web?

- Can you list your reasons for going online?

Questions and Goals

Use this form to record your questions about the factors affecting planning.

As you read, return to this form to record new ideas, resources, and additional questions.

Personal Goals

Questions	Related information	Resources

Key Terms

This chapter may contain words and phrases that are unfamiliar. Use this list as a guide to the vocabulary common to the e-Learning field.

- q Learning outcome
- q Knowledge construction
- q Cognitive
- q Affective
- q Psychomotor
- q Active learning
- q Authentic assessment
- q Collaborative learning
- q Learning style
- q Constructivism

5 Key Questions

As you develop your e-Texts, you should continually ask yourself these five key questions. If you cannot answer one or more, you might want to re-visit your decision to use an e-Learning strategy.

1. Who are the learners or readers?
2. What learning goals or information outcomes do I want to achieve?
3. How will I know when this happens?
4. Is the Web the best learning/information environment for this course?
5. Will it add value to the teaching or learning experience?

Return to your responses at the end of the chapter. Would you change anything?

Checklist of Active Learning Strategies

Promote Higher-Order Learning

- q Provide assignments that simulate in some way the real world application of the course content.
- q Engage learners in meaningful activities throughout the instruction not just at the end of a module or unit.
- q Require students to generate meaning for themselves by asking them to analyze, compare, evaluate, and synthesize the concepts, principles, and procedures.

Provide Opportunities for Interaction and Collaboration with Others

- q Use face-to-face discussion and online conferencing to:
 - Develop a learning community for your students
 - Access a rich array of resources including experts who may be thousands of miles away
 - Augment the development of critical thinking
 - Facilitate collaborative learning activities
 - Enhance creative thinking
 - Develop a sophisticated understanding of complex issues and situations

Provide Feedback

Feedback consolidates a learner's understanding, enables him or her to plan how to study, and allows the instructor to elaborate on the instruction.

- q Ensure that learners have ongoing information about their progress.
- q Link feedback to associated reference materials for enrichment or remedial support.

In sum, ensure that the learning environment you create is a dynamic and intellectually stimulating one for your students.

Advantages and Disadvantages of e-Learning Environments

Advantages	Notes	Disadvantages	Notes
Active learning		Time consuming to develop	
Real-world context			
Depth of coverage			
Developing information literacy skills			
Critical and creative thinking			
Collaborative learning			

Decision-making Checklist

Use the Web as a Learning Environment If....

- q Access to a wide range of perspectives, information, and current, authentic representations is desired.
- q The opportunity to make personal sense of information through organization and categorization (semantic linking) is key.
- q A wide range of learning style preferences, perceptual modalities and options should be supported.
- q Communication and reflection with others at a remove of time or place is necessary.
- q Global access to a learning environment is encouraged.

Five Learning Outcomes

Learning Style Theories

Compare and Contrast

Organizer	Model	Model
What learning process is described?		
Are learning styles described?		
Is the model developmental?		
Does the model respect diversity?		
How does the model define "intelligence"?		
Does the model reflect your own understanding of how people learn?		
Can this model be implemented easily as a planning tool?		

Strategies Related to Learning Domains

Domain	Strategies	Media	Assessment
Cognitive	Didactic	All	MC texts for lower-level skills
	Individual research	Print Internet	Think-aloud
	Manipulation of data		Writing, portfolio construction
	Problem-solving		Group projects and presentation
	Case study		Debate, discussion
	Simulation	Video	Observation
	Modeling	CBL	Self-assessment
Affective	Microworlds	IMI	Peer-assessment
	Role-play		Inventories
	Collaborative learning		
Psychomotor	Demonstration, modeling	Video	Observation, checklists
	Practice and coaching	Interactive media	Performance

Morten Flate Paulsen's Online Teaching Methods and Techniques

Methods	one-alone	one-to-one	one-to-many	many-to-many
Techniques	Online databases Online journals Online applications Software libraries Online interest groups Interviews	Learning contracts Apprenticeships Internships Correspondence studies	Lectures Symposiums Skits	Debates Simulations or games Role Plays Case studies Discussion groups Transcript based assignments Brainstorming Delphi Techniques Nominal group techniques Forums Project groups
Devices	Online resources	E-mail	Bulletin board	Computer conferencing

Online at <http://www.nettskolen.com/forskning/22/icdepenn.htm>

Evaluation Methods

Method	Description	Advantages	Limitations	Tips	Online evaluation
TF questions	A choice is made between two alternatives	Short items Fairly easy to score Use for polling	Items at low cognitive level Not very nuanced Little diagnostic information Emphasizes rote memorization	Items should be unequivocally true or false Avoid multiple negatives Approximately same number of true and false answers	Use as self-assessment Poll learners online after a structured debate
Matching	Associate one item with a number of alternatives	Measures understanding of association between pairs of items Rapid response time	Frequently used to associate trivial information Recognition over recall of information	Explain basis for matching, e.g. Can items be used more than once? Extra alternatives eliminate answering by process of elimination 6–8 associations for each question	

Completion	Finish a sentence or answer a question in a sentence	Good for recall Eliminates guessing Covers large amount of content	Difficult to develop items that measure higher-level cognitive skills Difficult to score	Write specifically (one right answer) Blanks go near end of sentence rather than beginning Require one-word response or short phrase only	
Multiple-choice	Stem + alternatives (one correct)	Used for simple memorization to complex cognitive manipulations Learning problems diagnosed if alternatives are designed to catch common errors Can be constructed so that there are no absolutes, requiring deeper thinking	Difficult and time-consuming to write Can be ambiguous to some learners Too often poorly written	Avoid opinion items Include media wherever possible Present only one problem or idea in a stem Use negatives sparingly Provide only one correct or clearly best answer Include common misconceptions in the distractors to help diagnose learning errors	
Essay	For higher-level cognitive skills, making arguments, etc.	Measures desired competencies at greater depth Freedom to respond within broad limits Encourages originality, creativity, divergent thinking	Disadvantages those with literacy challenges, non-native English speakers	Specific directions Prepare list of key points, (weights) Score papers anonymously	

Performance	Measures skills needed to accomplish real-life task	Demonstrates knowing and knowing how in real context Student demonstrates, rather than just describes, desired performance With checklist student can practice beforehand	Requires more than one judge Increased setup time Must develop good tools (e.g. checklists)	Specify exactly what learners are to do, equipment needed, assessment guidelines, time to complete, etc. Develop a checklist based on acceptable performance standards Give copy of checklist to learner to help them shape their learning	
Portfolios	Purposeful collection of work that tells the story of the learner's efforts, progress, and/or achievement	Provides broad picture of what student can do Portrays both process and product of work, growth Active self-assessment Actively promotes critical reflection	Work may not be totally representative of what learners know or can do Criteria should reflect most relevant or useful dimension of the task	Provide models of exemplary portfolios Negotiate what will be included and assessment criteria Should contain rationale, intents, contents, standards, and judgments Examples that illustrate growth Include self-reflection	
Interviews, oral evaluations	Design set of questions to be asked, covering specific objectives. Could be structured or unstructured	In-depth Allows more flexibility and is learning process itself Can be recorded and diagnosed	Time-consuming May be unreliable	Practice interviewing with peers	
Logs and journals	Students keep a written record as they move through a learning task	Promotes critical reflection Good for formative stages of learning Writing is a cognitive tool	Skill that needs to be developed and supported Evaluation is subjective	Try journal club	

Open-ended	Learners are placed in novel situation requiring a performance -e.g. mock trials, debates, role playing	Diverse results play on individual strengths Authentic			
Long-term projects	Require extended research work; often	High-level cognitive skills supported Interpersonal skills	Requires development of tools such as checklists for major attributes	Combine with other evaluation methods	

Adapted from [Newby, T. J., Stepich, D. A., Lehman, J. D., & Russell, J. D. \(2000\). Instructional technology for teaching and learning: Designing instruction, integrating computers, and using media \(2nd Ed.\). Upper Saddle River, NJ: Prentice-Hall.](#)

A Case Study: Introduction to Psychology

Background

Professor John Boeglin teaches a first-year undergraduate course. French is the language of instruction.

The course enjoys one of the larger enrollments in John's faculty because it is required for many of the degree paths. A similar, lecture-based course is offered on the English campus.

John consistently received high student evaluations for the face-to-face course, but he was unhappy with the lecture mode of the course because of the lack of interaction with his students. Nor did they have the time in class to interact with their peers.

John was concerned about other issues as well:

- Assessment of learning was done entirely with multiple-choice examinations
- He wanted students to do more in-depth research and research in non-traditional sources
- He felt that a more problem-based model was desirable
- He saw that while students were taking copious notes, they were not engaged with the material
- He wanted to increase active learning time
- He wanted to provide more flexibility

Course Redevelopment

The online content closely parallels the weekly lecture by topic. The online version extends the lecture material with:

- Additional content
- Embedded media (or e-Texts)
- Semantic links to related sites and reports of recent research in English and French
- Online forums

An asynchronous class discussion supports an issues-based discussion on a special topic four times during the semester. Students are placed in cooperative groups with which they stay for class assignments

and for the discussions, for which they are graded.

John uploads a class outline, adapted from a PowerPoint™ slide presentation, several days in advance of the class meeting. The outline serves as a notes outline (or *advance organizer*) to guide student note-taking during the lecture. The notes outline is based on reflective questions that are repeated again in the online discussion.

Costs

John estimated that the time devoted to the redevelopment of this course was about 480 hours. This estimate includes:

- John's learning curve
 - Pedagogy of teaching on the internet
 - Re-purposing of all course content
 - Effective videoconferencing techniques
 - Developing learner support materials
 - Piloting course segments at a distance
 - Course development and productivity tools:
 - WebCT
 - PowerPoint
 - PhotoShop
 - Developing a learner tutorial
 - Attending workshops
- Instructional design time
 - .2 FTE instructional designer
 - .2 FTE expert in synchronous delivery
- Production assistance
 - .1 FTE graphic artist
 - .1 FTE Web developer
- Evaluation assistance
 - .2 FTE evaluator
 - 2 focus group sessions in first term

Rates

Technical assistance may range from \$50–75/hour

Instructional design expertise may range from \$75–150/hour

Evaluation assistance is usually rated at 10% of the total cost of a faculty member's time

A Value-added Checklist: Key Features of Good e-Learning Environments

Check no fewer than 8.

- q Opportunities to interact
- q Multimedial
- q Open
- q Searchable
- q Asynchronous
- q Resource-based
- q Semantic links necessary
- q Visual
- q Distributed
- q Cross-cultural interaction
- q Cultural relevance
- q Learner-controlled
- q Multiple perspectives represented
- q Multiple expertise available
- q Discussion-based
- q Current
- q Accessible to learners with diverse needs
- q Accessible to learners who do not have fast access
- q Access to information not available in non-traditional formats
- q Opportunity to perform an activity not easily available off-line

To Do List

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2User-Centered Design (Part 1 - Cultural Diversity)

Concept Guide

What is user-centered design?

- Who are your users?
- Are they a homogeneous group?
- How will that affect your e-Writing?

Culture

- Does your discipline have cultural assumptions?

Minority cultures

- If you were asked to develop inclusive guidelines for your department, what would you emphasize?

Age

- What have you learned about learning styles, needs, and models at various stages in the lifespan?

Health and perceptual challenges

- After reading this chapter, do you have a new or different view of accessibility?

Access to technology

- If you widen access to your content through e-Texts, will you exclude any populations of users?

Gender

- Do you believe that there are gender differences in learning?
- Are your e-Texts gender or culturally neutral?

Questions and Goals

Use this form to record your questions about user-centered design.

As you read, return to this form to record new ideas, resources, and additional questions.

Personal Goals

Questions	Related information	Resources

Key Terms

This chapter may contain words and phrases that are unfamiliar. Use this list as a guide to the vocabulary common to user-centered design.

- q Target audience
- q Participatory design
- q Peer co-designer
- q Design co-owner
- q Expertise contributor
- q Self-advocate
- q Needs assessment
- q Genre
- q Usability
- q Human-computer interface (HCI)
- q Standards
- q Specifications
- q Compliance
- q Interoperability
- q ISD
- q Dominant culture
- q Globalization
- q Internationalization
- q Inhibition
- q Disinhibition
- q Iconography
- q Ways of knowing
- q Experiential learning

- q Lateral thinking
- q Cognitive flexibility theory
- q Andragogy
- q Keyhole problem
- q Multiple intelligences
- q Universal design
- q Digital divide

Design Features

Describe three design features that you really like or find powerful.

Needs Assessment: Sample Survey

These are excerpts from a needs assessment tool developed for a Continuing Pharmacy Education program. Several questions from each section have been included. This is a very extensive tool; you may not need to develop a survey that is so encompassing.

As you examine this document, try to draw some assumptions about a "typical" learner profile based on possible responses to these questions.

I. Program Format

For each of us, there is a program format that reflects our preference in learning style.

A. Live Programs

For the following options, please circle the format(s) that best correspond to your preference for live (face-to-face) educational programs.

1. Lecture
2. Lecture with audience participation
3. Interactive scenarios (e.g. role-playing)
4. Workshops
5. Case studies
6. Small group discussions
7. Other (please specify) _____

In addition to various formats, there are also tools or aids that can contribute to the effectiveness of live educational programs. Please circle the corresponding number that reflects how useful the following tools are.

	1 Not Useful	2 Some- what Not Useful	3 Neutral	4 Some- what Useful	5 Useful	9 Not Sure
a. Visual aids (e.g. slides or overheads)	1	2	3	4	5	9
b. Comprehensive handouts	1	2	3	4	5	9
c. Readings, articles, or monographs	1	2	3	4	5	9
d. Other (please specify)						

B. Distance Education Program Formats

It is important that educational programs are accessible to pharmacists. Today, there are various program delivery options that pharmacists can participate in without having to leave their homes or workplaces. As well, with increasing demands on the pharmacist's time, such options may be useful to pharmacists in any practice setting or geographical location.

Please circle the corresponding number that reflects how useful each format is in meeting your learning needs as a practicing pharmacist.

Overall, which program format would you say best represents how you currently obtain the **majority** of your continuing education units? Please circle only **one** answer below.

1. Live programs (e.g. conferences, seminars, presentations)
2. Videoconferencing
3. Online computer-assisted programs
4. Packaged computer-assisted programs
5. Home study correspondence courses
6. Home study audio tapes
7. Home study video tapes
8. Other (please specify) _____

	1	2	3	4	5	9
	Not Useful	Some- what Not Useful	Neutral	Some- what Useful	Useful	Not Sure
a. Lecture	1	2	3	4	5	9
b. Lecture with audience participation	1	2	3	4	5	9
c. Interactive scenarios (e.g. role-playing)	1	2	3	4	5	9
d. Workshops	1	2	3	4	5	9
e. Case studies	1	2	3	4	5	9
f. Small group discussions	1	2	3	4	5	9
g. Other (please specify)						

II. Scheduling

Due to busy work and personal schedules, pharmacists need conveniently scheduled learning opportunities.

Do you currently work shift work?

1. Yes
2. No

Do you currently work weekends?

1. Yes
2. No

In general, what month(s) of the year would you be *interested* in participating in continuing education programs? Please circle as many as applicable.

1. January
2. February
3. March
4. April
5. May
6. June
7. July
8. August
9. September
10. October
11. November

12. December

Which day(s) of the week are generally best for you to attend evening programs (e.g. 7–9:30pm)? Please circle as many as applicable.

1. Monday
2. Tuesday
3. Wednesday
4. Thursday
5. Friday
6. Saturday
7. Sunday

III. Time Commitment

Continuing education programs can vary in length from a single evening event to a two-year program. Since some options would require more time commitment than the more traditional evening or full-day CE programs, it is important to determine interest in various durations of programs.

Please indicate your level of interest for the following options:

	1 Un-interested	2 Some- what Un- Interested	3 Neutral	4 Some- what interested	5 Interested	9 Not Sure
a. Evening program (e.g. 2–3 hours on 1 evening)	1	2	3	4	5	9
b. Series of evening programs (e.g. once per week for 3 consecutive weeks)	1	2	3	4	5	8
c. Weekend program (e.g. 2 full days)	1	2	3	4	5	9
d. Series of weekend programs (e.g. 2 full days for 3 weekends)	1	2	3	4	5	9

e. Program delivered via computer (online) Short Course (e.g. 4 weeks)	1	2	3	4	5	9
f. Program delivered via computer (online) Long Course (e.g. 12 weeks)	1	2	3	4	5	9
g. Other (please specify)						

IV.The Use of Computers in Continuing Pharmacy Education Programming

The use of computers to facilitate the delivery of CE programs is becoming more and more popular. As well, more and more pharmacists are using computer technology as a tool for lifelong learning. This section will explore your access to and attitudes toward the use of computers in continuing pharmacy education programming.

A. Access

Do you have access to a computer? Please circle one response.

1. Yes, only at home
2. Yes, only at work
3. Yes, both at home and at work
4. Yes, other (please specify) _____
5. No

If you own/have access to a computer, was it purchased within the last two years?

1. Yes
2. No
3. Not sure

Do you plan to purchase a computer within the next two years?

1. Yes
2. No
3. Not sure

When specifically considering courses delivered online, it is important to know how much time pharmacists can spend at one time during the day to participate in such courses. Please circle the option that best represents the average amount of blocked time you would be able to devote to study

online:

1. Less than 30 minutes
2. 30–60 minutes
3. 1–2 hours
4. 2–3 hours
5. 3 or more hours

B. Views on the Use of Computers for Educational Programming

Since computers are being used more and more for the delivery of continuing education courses, we are interested in learning about how pharmacists feel about using computers in educational courses in general as well as specifically in continuing pharmacy education.

Please respond to the following statements by circling the applicable number:

	1 Dis-Agree	2 Some-what is agree	3 Neutral	4 Some-what Agree	5 Agree	9 Not Sure
a. I would feel more at ease learning on a computer than in a traditional, face-to-face format.	1	2	3	4	5	9
b. I would feel more independent learning on a computer than in a traditional, face-to-face format.	1	2	3	4	5	9
c. I would like learning on a computer because I could work at my own pace.	1	2	3	4	5	9
d. Learning on a computer would limit the communication I would have with other people.	1	2	3	4	5	9
e. A computer structures the learning activity too much.	1	2	3	4	5	9
f. Learning that is mediated by a computer would be a cold and impersonal experience.	1	2	3	4	5	9
g. Computers can be useful in continuing pharmacy education.	1	2	3	4	5	9
h. I would use the computer for assistance in learning pharmacy-related material.	1	2	3	4	5	9

i. Computers could increase the quality of pharmacy education.	1	2	3	4	5	9
j. Computers could increase the access to educational programs for pharmacists.	1	2	3	4	5	9
k. I would like an online mechanism to collaborate with other pharmacists.	1	2	3	4	5	9
l. I would like an online mechanism to collaborate with experts.	1	2	3	4	5	9
m. Other (specify)						

VI.Motivation

Pharmacists have various reasons for participating in educational programs. These reasons influence whether or not we enroll in a particular educational activity.

Please circle the number that corresponds to the extent of influence each statement had on your reasons for participating in continuing pharmacy education opportunities.

	1 No Influence	2 Little Influence	3 Neutral	4 Moderate Influence	5 Much Influence	9 Not Sure
a. To satisfy my intellectual curiosity	1	2	3	4	5	9
b. To comply with my employer's policy	1	2	3	4	5	9
c. To respond to the fact that I am surrounded by people who continue to learn.	1	2	3	4	5	9
d. To increase my competence in my job	1	2	3	4	5	9
e. To take part in an activity which is customary in the circle in which I move	1	2	3	4	5	9
f. To have a few hours away from responsibilities	1	2	3	4	5	9
g. To abide by the recommendations of someone else	1	2	3	4	5	9

h. To help me earn a degree, diploma, or certificate	1	2	3	4	5	9
i. To participate in group activities	1	2	3	4	5	9
j. To get a break from the routine of home or work	1	2	3	4	5	9
k. To secure professional advancement	1	2	3	4	5	9
l. To fulfill the requirements of a regulatory licensing body	1	2	3	4	5	9
m. Other (please specify)						

X. Personal Information

In order for us to link your responses to important factors in evaluating educational programming priorities, please volunteer this information.

1. Year of birth: _____
2. Gender: Male Female
3. Year first licensed as a pharmacist: _____
4. Primary employment description (please check one):

a) Community Practice:

Independent Pharmacy:	Owner	Staff
Corporate/Chain Pharmacy:	Manager	Staff
<i>b) Hospital Practice:</i>	Manager	Staff
<i>c) Long Term Care:</i>	Manager	Staff
<i>d) Other:</i>	Military	Academia
	Industry	Resident
		Graduate Student
		Other (specify)_____

5. Primary employment status (please check one):
 - Full-time
 - Part-time
 - Unemployed, actively seeking employment
 - Unemployed, not seeking employment
 - Retired
 - Other (specify)_____
6. Education in pharmacy (institution, degree, year of graduation)
7. Other formal education:
(specify degree, diploma, certificate or other and year(s))
8. Pharmacy Residency:

(specify location and year)

Survey Results

When this survey is returned:

- 70% of the respondents say that they have only 30–60 minutes at a time to work online.
- Over 50% do not own a personal computer, but have limited access at their workplace.
- "Learning on a computer would limit the communication I would have with other people" is the choice of over 35% of the respondents.

These results suggest that the target audience will have to work on their materials in short chunks of time, perhaps during their breaks or lunch hours. If their workplace supports professional development they might have access to a dedicated computer, but it is more likely that they will have to use business machines that are in use most of the day. In this kind of environment, they will have to be able to tolerate distractions and interruptions.

Implications for the eWriter include designing short chunks of eTexts that can be read and understood in one sitting (say, 30 minutes; it takes some time to get started and to clean up the workspace). Long segments will be interrupted and the user will find it hard to relate concepts and information from one session to the next. Also, if the workstation is in a public area, the use of audio can be a problem. Finally, how can you make a more friendly, connected eLearning environment?

Learner Profiles

This is a 'worked example' of a learner profile. The first part represents a completed survey of learner preferences. Part II is the resulting profile. This example is followed by another completed survey. Try your hand at developing a profile for Learner 2.

Part I: Learner 1

Your Name (optional):

Year in program: 3rd year

Age: 20



Sex: (please circle)

Female

1. Place a check mark by the work experiences you have had in this program.

- Lab assistant
- Peer coach
- Evening supervisor
- Summer internship
- Co-op placement (1 term)

a. In which of these activities did you feel most successful?

I preferred being a lab assistant

b. Why?

I enjoyed setting up and organizing the workspaces and experiments. I liked helping the prof record observations for his own research

3. What do you like to do in your spare time (hobbies, interests, etc.)?

I have a part-time job in the evenings -I work for a landscaping company.

4. List your favorite television shows: History Channel, Conan O'Brian, Crocodile Hunter
5. List your favorite books or magazines: Conde Nast Traveler, Lonely Planet guides
6. Describe your favorite course in your program. What learning activities did you enjoy the most? Botany 220. classifying plants, field trip to experimental farm
7. How would you rate your own computer abilities?

q No experience
 q Poor
 q Weak
 ý Fair
 q Good
 q Excellent

8. Which of the following Internet activities do you perform on a regular basis?

q None
 q Games
 ý Research
 q Purchasing something
 q Educational
 ý Communicating (e.g. e-mail)
 q Designing web pages
 q Other (please list):

-
9. Describe your favorite Web site. I really like the site for the American Botany Society. There's not too much text, lots of photographs of the plants and gardens. You can click on the images and get more information and links to other sites. There's also a list so you can ask questions or get involved in discussions.

10. Do you own a computer at home?

ý Yes
 q No

11. Do you use the computer labs on campus?

q Yes
 ý No Not too often

12. How would you describe your access to technology? I have my own laptop at home. We use dial-up. Sometimes it's hard to get into my e-mail account. Once I dialed in over 100 times.

13. On average, how many hours per week do you spend on a computer?

- q None
- q Less than 3
- q 3–5 hours
- ý 5–7 hours mostly checking e-mail
- q 7–15 hours
- q More than 15 hours

14. What do you like MOST about this class so far? It's small and we spend most of our time in the lab or outside
15. What do you like LEAST about this class? Nothing -too many notes
16. How important is it to attend all your scheduled classes? I don't mind if I miss a class or two, if I can get the notes from someone

Profile Summary

This is a 20-year old male in his third year in the degree program. Given his age, he entered the program directly on graduating from high school. He probably doesn't have much work experience, although he does work part-time as a landscaper in the evenings. He notes that he enjoyed the field trips in Botany 220 and that he liked the lab work he did for Jeff. Seems to do well in smaller groups or one-on-one, and actually working directly with tools and materials. Doesn't like sitting in lectures or taking extensive notes.

His tastes run to the scientific and documentary-type shows. He didn't check off computer games or talk about anything like that -action movies, large get-togethers, etc. Solitary?

Has a laptop and seems to use it every day but mostly to do research or check his e-mail. He likes a site that is professional, has lots of images, is fairly layered, and gives him a chance to connect with others interested in botany. He mentioned text again -appears to prefer hands-on activities, images; interaction. Steers away from the campus labs, but they're almost impossible to access during the day and he works in the evenings.

Design implications -blended learning design with some meetings and lectures, but lots of hands-on, real-world experiences, and opportunities to communicate with others in the field. Would prefer visuals to text. Doesn't need to go to class three hours every week, as long as notes, updates and activities, and opportunities to communicate are provided. Since he works in the evenings, he would not appreciate having to spend hours in front of the computer to get course information. He would prefer a site that is not heavily text-based, but that doesn't require a high-speed connection or long download times. He would participate in a class discussion list online. He might be interested in participating in an online project with others around the country.

Learner 2

Your Name (optional):

Year in program: 2

Age: 27

Sex: (please circle) Male

Female

1. Place a check mark by the work experiences you have had in this program.

- q Lab assistant
 - q Peer coach
 - q Evening supervisor
 - ý Summer internship
 - q Co-op placement (1 term)
- a. In which of these activities did you feel most successful? I did the internship because I like working outside during the summer. I was also pretty independent. Before I came back to school I was thinking about starting my own business.
3. What do you like to do in your spare time (hobbies, interests, etc.)? Roller blading, mountain biking, hiking, traveling
 4. List your favorite television shows: don't watch it much, except for movies.
 5. List your favorite books or magazines: personal or academic?
 6. Describe your favorite course in your program. What learning activities did you enjoy the most? The first time I was here I really enjoyed the courses I took in Psychology and Sociology. I liked reading about human behavior and doing research in the community. I like to talk to people. I like to write.
 7. How would you rate your own computer abilities?
 - q No experience
 - q Poor
 - q Weak
 - q Fair
 - ý Good I use lots of business tools and word-processing. I'm also on the Web a lot.
 - q Excellent
 8. Which of the following Internet activities do you perform on a regular basis?
 - q None
 - ý Games
 - ý Research
 - ý Purchasing something
 - q Educational
 - ý Communicating (e.g. e-mail)
 - q Designing web pages
 - q Other (please list):

 9. Do you own a computer at home?
 - ý Yes
 - q No
 10. Do you use the computer labs on campus?
 - q Yes
 - ý No

11. How would you describe your access to technology? My husband and I compete for time, but it's usually pretty even.
12. On average, how many hours per week do you spend on a computer?
 - None
 - Less than 3
 - 3–5 hours
 - 5–7 hours
 - 7–15 hours Couple of hours a day, usually when I get home.
 - More than 15 hours
13. What do you like MOST about this class? The prof knows her stuff and tells us about her research and what's going on in the field. She has a good sense of humor. We have good discussions.
14. What do you like LEAST about this class? The other students who don't carry their weight on group assignments.
15. How important is it to attend all your scheduled classes? I'm paying for them, but we could do a lot of the stuff on our own. I like it when we discuss a point that there is a lot of debate about.

Profile Summary

Try this one on your own.

Checklist: Evaluating Texts for Language

- Acknowledge your own culture
- Be polite
- Don't assume tacit knowledge
- Use explicit language
- Avoid local expressions
- Avoid idioms
- Use internationally known references
- Avoid relative expressions
- Spell out currency formats
- State dates clearly with words and numbers
- Make time zone known
- Include both international and American units of measure
- Use international telephone number formats
- Pick universal symbols
- Avoid political statements of any kind
- Write in international English
- Use simple (vs. complex) sentences and shorter words
- Be direct

- q Use active, not passive voice
- q Use words everyone can understand
 - q No slang
 - q No faddish or made up words
 - q Gender neutralize
 - q Fewer multi-word verbs (e.g. 'tolerate' instead of 'put up with")
- q Spell out abbreviations and acronyms
- q Use high-quality, proper spellings (e.g. 'through' vs. 'thru')
- q Use just one modifier before the word it modifies
- q Use fewer pronouns
- q Use 'alerting words' such as 'first, second, third'
- q Cut out words (try to cut back by 50%)
- q Give clear directions in short, active sentences
- q Use less formal language
- q Replace multi-syllabic words with shorter words
- q Guard against pop cultural references
- q Use literary references sparingly
- q Use humor carefully

Practice: Suggestions for Improving the e-Text

WebCT at the University of Alberta, <http://www.ualberta.ca/webct>

The screenshot shows the homepage of WebCT at the University of Alberta. At the top, there's a banner featuring the University of Alberta logo and a photo of two women. Below the banner, the title "WebCT at the University of Alberta" and the subtitle "Sun Microsystems Centre of Excellence for E-Learning" are displayed. The page is divided into several sections: "Logon to myWebCT" (with links to "Access your courses" and "Course Listing"), "Student Resources" (with links to "Guide, Tutorial, FAQs, Help" and "Related Links" like "Calendar, Registrar, Student Services, Bookstore, Libraries"), "Instructor Resources" (with links to "Workshops, Tutorial, FAQs, Help" and "Administrative Information" like "Policies, Statistics"), "News & Events" (listing "Upcoming workshops" such as "WebCT 3.8" and "WebCT Vista"), and "WebDAV file management". A search bar is located at the bottom left, and the WebCT Institute logo is at the bottom right.

A few improvements:

1. Top banner
 - a. Replace at least one image of the two Caucasian women with an ethically different individual. One could be replaced with a male.
 - b. Check for colorblindness concerns.

2. Language/Readability

- a. Replace "FAQs" (an acronym) with spelled-out version.
- b. "WebDAV" is not a widely-known term.
- c. Replace complex sentences with simple sentences.
- d. Replace serial lists with bulleted lists.

3. WebCT logo portrays a Caucasian, formal, male academic, carrying a red metal toolkit, which is exclusionary for gender and ethnicity.

Others?

Way of Knowing	e-Writing Suggestions	Gender pattern
Absolute knowing (Junior undergraduate)	<ul style="list-style-type: none">■ E-mail or online forums build in opportunities for teacher-student interaction■ Set behavioral expectations for how to disagree■ Use links and sidebars to give choices for different levels of difficulty■ Write less formally, use a more relaxed tone■ Use surveys and interviews that students initiate with each other■ Describe your assessment goals and methods clearly and provide examples	Males tend to be mastery-pattern knowers, who: <ul style="list-style-type: none">■ Enjoy a public learning role■ Show interest to instructor by participating■ Are more argumentative in class■ Appeal to authority to resolve differences Females are more likely to be receiving pattern knowers, who: <ul style="list-style-type: none">■ Are private learners■ Expect to listen and record rather than interact with instructor■ See peers as sources of support■ Value evaluation that lets them demonstrate mastery■ Try to work out discrepancies for self rather than consult experts

Transitional knowing	<ul style="list-style-type: none">■ Use private e-mail to show concern and interest■ Use public forums for interaction■ Set up a social chat■ Use a positive tone■ Maintain a FAQs section which is regularly updated■ Encourage peers to answer each others' questions■ Build in questions related to personal experiences■ Create practical exercises or point to other sites that will support applications of knowledge■ Build in high-level questions that require research■ Pair students for one task■ Activities should be open-ended and require evaluating evidence■ Provide sample assessment questions■ Provide opportunities to encounter contradictory views, for example through a debate or inviting 'virtual guest lecturers'	<p>Males tend towards impersonal knowing and:</p> <ul style="list-style-type: none">■ Prefer to exchange ideas through debate■ Expect to be challenged■ Value evaluation that is fair and practical■ Resolve uncertainty by logic and research <p>Females tend towards interpersonal knowing:</p> <ul style="list-style-type: none">■ Prefer to be involved by collecting others' ideas■ Expect to have their views heard by peers■ Desire exposure to new points of view through interaction with peers■ Seek rapport with instructor to enhance self-expression■ Value evaluation that considers individual differences■ Resolve uncertainty by their personal judgment
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Independent knowing	<ul style="list-style-type: none">■ Connect learning to real life by providing authentic contexts and examples■ Promote skills, which can be used in the workplace/profession■ Give independent assignments requiring creative thought■ Give lots of choice on activities and assignments■ Build in team assignments■ Don't use multiple choice tests■ Give choice of assessment forms	<p>As independent knowers, males' primary focus is on their own thinking, and they therefore:</p> <ul style="list-style-type: none">■ Expect peers to think for selves■ Stress thinking for themselves■ Prefer to be allowed to define own learning goals■ Enjoy being challenged <p>As inter-individual knowers, females believe that:</p> <ul style="list-style-type: none">■ They learn well by engaging views of others■ Evaluation is a joint process■ Instructors should engage all points of view■ Learning should involve interplay and exchange
Contextual knowing (Often not evident until senior year or in graduate school)	<ul style="list-style-type: none">■ Don't write as absolute authority; embed open-ended questions■ Build-in threaded discussions for meaningful dialogue■ Insist that online responses are evidence-based and demonstrate responsibility for own thoughts and work■ Examples and contexts reflect the BIG issues■ Activities based on teamwork and collaboration	Magolda didn't identify patterns but identified increasing compassion, degrees of humanity, and initiative

Figure 2.1: Ways of Knowing—Learner Profile and Implications for e-Writing

Guidelines for Designing e-Texts for Adults

Adult users may experience cognitive overload in hypermedia environments. If you are writing for older adults who are unfamiliar with the architecture of the Internet, evaluate your site for these concerns.

Concern	Guideline
Hypertext may be problematic for learners who...	Are from hierarchical cultures <ul style="list-style-type: none">■ Publish rules of engagement■ Require users to choose roles
	Are field-dependent <ul style="list-style-type: none">■ Include a site map■ Use an outline
	Are task-oriented <ul style="list-style-type: none">■ Define task clearly■ Suggest reasonable timeline for completion
	Are confused with too many choices <ul style="list-style-type: none">■ Advise users of implications of choices■ Annotate links so user can make decisions
	Are confused by structured tasks in unstructured environments <ul style="list-style-type: none">■ Use scaffolds■ Include tools to help collect, organize, synthesize and apply new knowledge (e.g. outline)
	May not have highly-developed reasoning skills <ul style="list-style-type: none">■ Cue users to organization■ Include meta-cognitive strategies
	Are novices in the discipline <ul style="list-style-type: none">■ Provide links to prerequisite knowledge■ Include evaluation tools
	Are not expert computer users <ul style="list-style-type: none">■ Design online tutorial or users' guide■ Simplify interface
Expect one right answer	■ Design open-ended task <ul style="list-style-type: none">■ Provide an example with more than one solution

Feelings of social isolation	Design collaborative tasks that require communicating with others	<ul style="list-style-type: none"> ■ Do not allow anonymity ■ Build in communication tasks ■ Assign response partners ■ Regularly provide critical feedback
Orientation	Keyhole problem	<ul style="list-style-type: none"> ■ Use a site map showing depth
	Complex navigation	<ul style="list-style-type: none"> ■ Include a site map

Designing and Evaluating Interactive Materials for Adult Learners

Theory Implication	Applications to Design
Provide adults with opportunities to set their own goals	<ul style="list-style-type: none"> ■ Clear menu structure ■ Search functions ■ Self-tests included ■ Practice with feedback provided ■ Record-keeping among sessions ■ Different representations of content ■ Varying difficulty levels
Establish a need to know and readiness to learn	<ul style="list-style-type: none"> ■ Problems established ■ Testimonials included
Provide opportunities to link new information with prior knowledge	<ul style="list-style-type: none"> ■ Relevant examples included ■ Frequent responses required ■ Invite learners to develop own catalogue of links ■ Encourage annotation
Provide adults with individual responsibility for their learning	<ul style="list-style-type: none"> ■ Frequent entry and exit points possible ■ Learner control of program options

Multiple Intelligences and e-Learning

Intelligence	Matching Strategies and e-Texts
---------------------	--

Linguistic	<ul style="list-style-type: none">■ Text-based learning■ Case studies, personal accounts■ Computer mediated conferencing■ Working w/electronic databases
Logical-mathematical	<ul style="list-style-type: none">■ Modeling problems■ Collaborative research such as <i>Earthquake</i>■ Puzzles and games■ Building systems
Spatial	<ul style="list-style-type: none">■ Microworlds■ Concept-mapping■ Flowcharting or modeling■ Image maps
Musical	<ul style="list-style-type: none">■ Recorded narratives■ Options for production of new learning■ Optional sound tracks, motion video■ Creating sound effects, sound tracks
Bodily-kinesthetic	<ul style="list-style-type: none">■ Manipulation of objects
Interpersonal	<ul style="list-style-type: none">■ Computer-mediated conferencing■ Collaborative workgroups■ Global research projects, keypals■ Forums and newsgroups■ Microworlds■ Simulations

Intrapersonal	<ul style="list-style-type: none">■ On-line surveys and questionnaires■ Reflective activities, journaling■ Role-playing, MOOs and MUDs■ Computer-mediated conferencing
Naturalistic	<ul style="list-style-type: none">■ Environmental simulations

To Do List

What Who Date

q

q

q

q

q

q

q

q

q

q

<?xml version="1.0"?>

Team LiB

◀ PREVIOUS **NEXT ▶**

3User-Centered Design (Part 2 - Age, Gender and Accessibility)

Concept Guide

Health and Perceptual Challenges

- After reading this chapter, do you have a new or different view of accessibility?

Access to Technology

- If you widen access to your content through e-Texts, will you exclude any populations of users?

Gender

- Do you believe that there are gender differences in learning?
- Are your e-Texts gender or culturally neutral?

Questions and Goals

Use this form to record your questions about user-centered design.

As you read, return to this form to record new ideas, resources, and additional questions.

Personal Goals

Questions	Related information	Resources

Key Terms

This chapter may contain words and phrases that are unfamiliar. Use this list as a guide to the vocabulary common to accessibility and user-centered design.

- q Universal design
- q Accessibility
- q Ways of knowing
- q Intrinsic motivation
- q Extrinsic motivation
- q Reflexive
- q Spatial map
- q Compliance

Nielsen's Accessibility Guidelines

Jakob Nielsen is world renowned for his research and writing about accessibility on the Web. These guidelines are adapted from his book *Designing Web Usability* (2000).

Perceptual and Motor Challenges (including those related to aging)

- q e-Texts other than plain text or HTML are problematic
- q The hearing impaired can be supported by use of captions and transcripts of audio
- q Visually-impaired users are harder to support - provide a completely textual alternative that integrates the video and audio information
- q Increase image size
- q Use a slide-show presentation with simplified still images
- q Design for your older self
- q Get feedback on all graphic elements from a red-green colorblind user
- q Use high contrast between foreground and background colors
- q Avoid busy backgrounds
- q Textual pages can be fed to a screen reader that will read the text out loud through a synthesizer
- q Use HTML heading tags (H1, etc.) to facilitate scanning
- q Use only relative font sizes so that users can enlarge the fonts
- q Test pages at 10, 12, and 14 size fonts, then again with 18 and 24, to make sure that design still works
- q Include transcripts for all spoken audio
- q All video should be subtitled
- q Do not design image maps that need extremely precise mouse positioning

Cognitive Challenges

- q For the general public, aim for readability levels at grades 5–8
- q Some users will not be able to visualize the structure of the site - a sitemap is useful.
- q Use words with high information content as hypertext anchors
- q Search engines should probably include a spell checker
- q Give a list of possible correct spellings to click on if no match is found

International Users

Nielsen notes that in 1997, 80% of total web users were in Canada and the US. By 1999, the proportion had dropped to 55%.

- q Don't use icons of body parts
- q Don't use visual puns
- q Don't use sports metaphors
- q For times, use 24 hour clock
- q Specify AM/PM
- q Specify time zone; add a geographical locations such as "that's 10 am in New York"
- q Spell out dates
- q Watch punctuation, currency symbols or abbreviations, and measurement

Teaching for Diversity Checklist

The University of Western Australia's student population is characterized by diversity with regard to, amongst other characteristics, gender, race, age, disability, sexual orientation, cultural background and socio-economic status.

Teaching which disregards diversity places students at a disadvantage by reducing their capacity to learn. An inclusive curriculum, which acknowledges, respects and responds appropriately to diversity can contribute to:

- Enhanced learning outcomes for a greater number of students
- Validation of student experiences and world views
- Development of international skills, cross-cultural perspectives, respect for different values and learning styles, and other skills useful in a diverse global environment
- Improvement of academic standards and the quality of university teaching
- Recruitment and retention of a greater number of students from diverse backgrounds

The following questions and suggestions aim to assist teaching staff to develop curricula appropriate to a diverse student population.

1.Curriculum Design

In designing the curriculum do you:

- Consider your students' gender, cultural backgrounds, learning styles, health and disability status, English language proficiency, numeracy, values and experiences?
- Take account of students' prior knowledge and learning?
- Seek participation in curriculum design from people with specialist expertise?

- Include opportunities for a positive engagement with other cultures, practices and life expectations?
- Include texts and readings, which reflect a diversity of perspectives?

2.Content

Does the course content:

- Acknowledge the diversity of knowledge and experience of your students?
- Use examples/case studies which are free of negative stereotypes or assumptions?
- Examine the implications of diversity as part of the theory or practice being studied?
- Encourage students to recognize and understand different ways of knowing?

3. Delivery

In your teaching do you:

- Provide students with a range of learning opportunities?
- Encourage students to know and listen to each other?
- Avoid using negative or potentially offensive stereotypes or assumptions?
- Actively encourage all students to take responsibility for learning?
- Encourage students to use their backgrounds as a learning tool?
- Make available teaching notes, overhead transparencies and recorded lectures?
- Speak in plain English, explain acronyms and avoid unnecessary colloquialisms?
- Actively discourage language or behaviour which is racist, sexist, and homophobic or which demeans people with disabilities?

4.Assessment

Is your student assessment:

- Transparent and able to provide students with timely and appropriate feedback?
- Supportive of students developing habits of routinely assessing their own work?
- Free of culturally or gender biased examples?
- Able to accurately assess intended learning outcomes?
- In plain English and free of unnecessary colloquialisms and acronyms?
- Flexible enough to assess the learning outcomes of students with disabilities?

Consideration of these questions will assist in the development of curricula that will improve learning outcomes for all students.

Practice: Make This Site More Accessible

Examine your organization or institution's official web site for cultural and technical accessibility. Suggest at least five ways that it can be made more accessible or inclusive.

Accessibility Issues	Solutions
1.	
2.	
3.	
4.	
5.	

Writing for Multiple Intelligences

The Philosophy 101 Homepage

(<http://www.arts.ualberta.ca/phil101/index.html>)

How many intelligences does this site support? Check them off.

Think of a way to support at least two more intelligences.

Intelligence	Evidence or suggestion
Linguistic	
Logical-mathematical	
Spatial	
Musical	
Bodily-kinesthetic	
Interpersonal	
Intrapersonal	
Naturalistic	

To Do List

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Team LiB

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4Selecting and Evaluating Learning Objects

Concept Guide

Finding the Right Resource

- How do you or your colleagues typically find suitable online learning resources?
- How do you track and store these resources for future reference?
- How do you share information about good online learning resources with others? How do you find out about good resources?

Use

- How can online learning resources be used to enhance your teaching?
- How do you use online learning resources to enhance student learning?
- How do you use online learning resources to enhance or fast track the course development process?

Evaluation

- What criteria do you use to determine the value of online learning resources?
- How do you communicate your ideas about online learning resources to others?

Questions and Goals

Use this form to record your questions about the trends and challenges in e-Learning facing you and your learning organization.

As you read, return to this form to record new ideas, resources, and additional questions.

Personal Goals

Questions	Related information	Resources

Key Terms

This chapter may contain words and phrases that are unfamiliar. Use this list as a guide to the vocabulary common to learning objects.

- q Learning object
- q Repository
- q Metadata
- q Usability
- q Re-purpose
- q Standards
- q Modular course design
- q Free-standing
- q Applets
- q Electronic documents
- q Peer review
- q Granularity
- q Search engine
- q Streaming
- q Monolith

Evaluating Learning Objects

Longmire (2000) stresses that learning objects should be *adaptable* to maximize their use and lists the following attributes:

- q Modular
- q Free-standing
- q Adjustable to fit a variety of learning situations
- q Non-sequential with no references to prior or future instruction
- q Confined to a single learning objective
- q Adaptable to a broad cross-section of users
- q Not tied to formatting so that it can be re-purposed to various learning situations

Reusability & Re-purposability

To what extent can the learning object be used in a variety of levels, disciplines or courses?

Granularity

Does the size of the learning object allow for use in a variety of learning contexts?

Instructional or Learning Value

To what extent does the learning object meet the needs and values of instructors or students?

Meta-data Value

Does the meta-data allow for easy retrieval from one or more repositories? Does the meta-data described allow for retrieval on the basis of a variety of content?

Flexibility

To what extent can the learning object be modified to accommodate different learning styles or prior learning levels?

Philosophy

To what extent does the learning object fit with the philosophical context of the learning environment, instructors and students?

General Agreement of Developers

To what extent is there agreement on the instructional soundness, sequencing and size of the learning object?

Merlot's Peer Review Guidelines

The following is based on Merlot's guidelines for peer review of learning objects and covers the areas identified by Merlot committees as crucial to learning object evaluation:

Content Quality

- How accurate is the content?
- How significant is the content to the discipline?
- How thorough is the treatment of the content?
- Is the content part of core curriculum in the discipline area?
- To what extent is the content difficult to teach or learn?
- Is the content a prerequisite for advanced material?

Instructional Potential

- How appropriate is the resource for my students given their age, background knowledge and other personal characteristics?
- Does the resource stimulate
 - Understanding of concepts, rules or principles
 - Skill development of procedures
 - Critical thinking
 - Attitudinal development
- Is the resource written clearly and logically for learners?
- Is the resource appealing to use?
- To what extent does the resource promote active learning and student engagement with the content?

Usability

(Ease of use for both instructor and student based on first-try access)

- Does the resource work on different platforms and browsers?
- Will students have to download necessary plug-ins? Is a link readily available to do this?
- Is the resource easy to navigate and easy to use for first-time users?

- Is the resource visually appealing and easy to read?
- Is the resource accessible to persons with disabilities?

Evaluation Rubric for Blue Web'n

Format

- User Friendly
 - Clear scope, easy to understand and use, includes appropriate, clearly labeled links
- Aesthetically Courteous
 - Graphics are quickly downloaded and relevant, text is easy to read. Background is subdued and coordinates with text colors and graphics. Someone using a 640 X 480 monitor doesn't have to scroll to the right.
- Aesthetically Appealing
 - Attractive and creative use of graphics and colors

Content

- Credible
 - Information is accurate, complete, and maintained
- Useful
 - Content is meaningful, difficult to convey, and/or quintessential
- Rich
 - Information is rich and likely to be revisited
- Interdisciplinary
 - Integrates several content areas or disciplines

Learning Process

- Higher-order Thinking
 - Challenges learners to think, reflect, discuss, hypothesize, compare, classify, etc.
- Engaging
 - Process engages the learner
- Multiple Intelligences or Talents
 - Effectively integrates at least three intelligences or talents (language, math, intrapersonal, interpersonal, spatial, musical, physical, natural)

Adapted from: <http://www.kn.pacbell.com/wired/bluewebn/rubric.html>

Standards Checklist

Technology

- q Can the learning object be used on both Macs and PCs?
- q Does the learning operate equally effectively in both Netscape and Internet Explorer?
- q Is the learning object easily accessible with standard computer software without the user having to spend time or money to upgrade?
- q Is the meta-data used to describe the object one that allows for retrieval based on a variety of criteria?
- q Is the object easily retrievable?
- q Does the object operate in a variety of tools such as course or learning management systems?

Instructional

- q Does the learning object function in a way that allows for use in different courses or as a freestanding unit?
- q Have terms been standardized and is language consistent to allow for modularization in different learning environments?
- q Have proper methods of Web design been used to ensure an accessible and comprehensive presentation?
- q Does the learning object avoid referring to previous content such as chapters, courses or objectives?
- q Have technical terms been presented in easily read formats through the use of tables or bullets or through supplied definitions or glossaries?

Social

- q Has the learning object been designed for a broad audience of users that would typically view this type of content?
- q Does the learning object avoid use of regional, cultural or organizational terms?
- q Has the learning object been designed to be inclusive for a variety of users?
- q Does the learning object avoid elements that contribute to gender, racial or other biases?
- q Has the resource been designed to ensure accessibility by people with disabilities?

To Do List

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Team LiB

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5From Text to e-Text - Message Design

Concept Guide

Developing Effective e-Texts

- What does the term "effective" mean in your context? Write a statement on which you could base an evaluation.

Thinking About the Reader

- Describe your own experience of reading on the Web. What problems do you encounter?
- What design techniques have made online reading easier for you?

Thinking About Roles

- What are the characteristics of the e-Reader?
- What are the obligations of the e-Writer?

Thinking About the Content

- Will adapting your content to a hypertext environment affect its meaning or impact?
- Which, of all the techniques for enhancing readability, interests you the most? Is most relevant for your content?

Thinking About the Environment

- How will you design your e-Learning environment to reflect and support your discipline?

Questions and Goals

Use this form to record your questions about message design.

As you read, return to this form to record new ideas, resources, and additional questions.

Personal Goals

Questions	Related information	Resources

Key Terms

This chapter may contain words and phrases that are unfamiliar. Use this list as a guide to the vocabulary used to describe message design guidelines for Web content.

- q Message design
- q Re-purposing
- q Hypertext
- q e-Text
- q Scannability
- q Readability
- q Hypertext
- q Animation

The Reading Experience

Some Functions	A Book	The Internet	Television
Selecting the contents	<ul style="list-style-type: none"> ■ Table of Contents ■ Index 	<ul style="list-style-type: none"> ■ Menu ■ Navigation bar 	<ul style="list-style-type: none"> ■ TV Guide ■ Special channel
Deciding on the reading sequence	<ul style="list-style-type: none"> ■ Pages are numbered sequentially ■ Page numbers relate to Table of Contents 	<ul style="list-style-type: none"> ■ Are there main topics in a hierarchy? ■ By linking to topics of interest, sometimes contained within the text 	<ul style="list-style-type: none"> ■ Controlled
Understanding concept relationships			
Using page layout conventions to guide reading	<ul style="list-style-type: none"> ■ Top to bottom 	<ul style="list-style-type: none"> ■ Navigation at top or bottom of page 	
Applying metacognitive skills	<ul style="list-style-type: none"> ■ Making notes in margins ■ Highlighting passages 		
Marking your place			<ul style="list-style-type: none"> ■ Controlled
Evaluating progress			<ul style="list-style-type: none"> ■ Use of commercials

Pacing the process	<ul style="list-style-type: none"> ■ Time to work ■ Reading speed known 		
Using tools		<ul style="list-style-type: none"> ■ Keyboard ■ Mouse pad 	
Extending information		<ul style="list-style-type: none"> ■ Drilling down ■ Pop-ups 	
<u>Semantic linking</u>		<ul style="list-style-type: none"> ■ Hyperlinks 	
Breaking at natural endpoints			<ul style="list-style-type: none"> ■ Commercials ■ Length of program
Using perceptual modalities and preferences			<ul style="list-style-type: none"> ■ Audio and video required
Portability	<ul style="list-style-type: none"> ■ Compact size 	<ul style="list-style-type: none"> ■ Internet connection ■ Laptop format 	
Other?			
Other?			

Rewrite for Interaction

Susan B. Anthony, a powerful speaker and writer, campaigned for temperance and abolition as well as women's rights. Like many suffragettes, she saw parallels between the lack of rights and opportunities for women and the bondage of slavery. When the Fourteenth Amendment to the Constitution granted the vote to black males, Anthony fought unsuccessfully to have women included. In this speech from 1859, Miss Anthony urged her audience to "make the slave's case our own." She further entreated, "Let us feel that it is ourselves and our kith and our kin who are despoiled of our inalienable right to life, liberty, and the pursuit of happiness, that it is our own backs that are bared to the slave-driver's lash... that it is our own children, that are ruthlessly torn from our yearning mother hearts."

Black History Treasure Hunt and Quiz http://www.kn.pacbell.com/wired/BHM/fr_hunt2.html

A Worked Example...

- What does the phrase "human rights" mean to you?
- Who should be included?
- Is there a relationship between human rights and civil liberties?

These questions are important ones for all Americans to consider now. In the third module of History 101, we will explore these issues in the context of the abolition of slavery. On March 23, we will view a short film on the great suffragette, Susan B. Anthony. Please be prepared to discuss the influence she had on three important concerns of her time, by reading and working with the following passage.

The guiding questions are provided to help you frame your contributions to the class discussion on March 23. Print this page out and note your thoughts and the results of your explorations in the space after each question.

Susan B. Anthony, a powerful speaker and writer, campaigned for temperance and abolition as well as women's rights. Like many suffragettes, she saw parallels between the lack of rights and opportunities for women and the bondage of slavery.

1. Think of one parallel now. Is there a similar parallel anywhere in the world, currently?

When the *Fourteenth Amendment* to the Constitution granted the vote to black males, Anthony fought unsuccessfully to have women included. In *this speech from 1859*, Miss Anthony urged her audience to "make the slave's case our own."

2. Read the Fourteenth Amendment. How might it have been amended to include women?
3. Why were women not included at this time?
4. In our time, what sociopolitical context influenced the Equal Rights Amendment?

She further entreated, "Let us feel that it is ourselves and our kith and our kin who are despoiled of our inalienable right to life, liberty, and the pursuit of happiness, that it is our own backs that are bared to the slave-driver's lash... that it is our own children, that are ruthlessly torn from our yearning mother hearts."

5. What did Anthony mean by these words?

Return to the three questions at the beginning of this module. Each question forms a topic on the class discussion board. You have one week to formulate and post an evidence-based comment to each question.

Checklist: Using Hypertexts

Use hypertexts to provide:

- q Documentation
 - q By general or specialized references by topic
- q Short, self-contained topics
- q Background information
- q Extended or supplementary information
- q Multimedia (e-Texts)
- q Three-dimensionality
- q Multimodality
- q Online communications
- q Multiple paths to a topic
- q Active links to alternative information sources

The Language of Interactivity

Element	Description	Use for...	Your Example
Hyperlink	Takes the reader to a different location in the site, or to another site. Can also take the reader to an image, a tool, a conference, etc.		

Hot Spot	A clickable spot in a picture or text. Indicated when the cursor changes shape when passed over an image. Images or text may have many hidden hot spots.		
Drill down	Clicking on a hot spot allows you to "peel back" a layer in an image that has many underlying layers. Online art galleries often use this feature.		
Pop-up	A small window of text, a menu, an image, etc., that is superimposed over top of a hot spot or link. The reader may have to manually close the window to return to the underlying text.		
Roll-over	When the mouse is moved over the screen, various hot spots are revealed, containing additional information. Clues are color changes, font changes, etc.		
Icon	A visual representation of an idea or an action; a metaphor. Icons are effective only when their meaning is recognized instantly by the reader.		
Drag and drop	An interactive function. Usually, an object must be physically moved to a "target" on the screen before an action takes place. For example, a puzzle might be constructed by dragging and dropping the pieces into the right locations.		
Point and click	Placing your cursor on a hot spot may reveal a roll-over. Sometimes you must point to a spot or link and then depress the mouse button. Taking this action often leads to more extended information or choices.		
Bullet	A symbol (like an arrow, a check mark, a star) used in a criteria list.		
Dialogue box	Can appear as a pop-up window: the reader selects an item. Contain fields, buttons, and often layers. Word-processing programs contain many dialogue boxes.		
Button	A visual object that indicates a choice or an action for the reader. There are many different kinds of buttons, Radio buttons, and check boxes are two examples. Buttons may contain descriptive text.		
Menu	Menus show a hierarchy of choices to make. Usually, selecting one item on the menu opens up new choices or new locations.		
Pull down	The menu will stay stable if the mouse button is depressed. In other words, the reader must hold the menu open.		
Drop down	Menus found at the top of the screen. Very common in productivity tools. Menus may also cascade from the right or the left of the screen.		
Scroll bar	Equivalent to page turning. A scroll bar is a column on one side of the screen in which a small button resides. Dragging the button up or down takes the reader to different parts of the page.		
Keying in	The reader uses the keyboard to provide information, often in a dialogue box.		
Metaphor	Often an icon, or visual representation, of an idea. Must intuitively carry the meaning for the text it has replaced.		

Image Map	A type of menu where hot spots are hidden under related images. The reader navigates by point-and-click or roll-over functions.		
Sidebar	Contains additional information or links that extend the text. Is usually placed to the right of the text.		
Plug-in	Usually an application that must be downloaded or added to the reader's machine to allow him/her to play video, read Javascript, etc.		

Adult Learners and Hypermedia Environments

Multimodal Learning

Over the past decade, learning technologies have evolved from environments in which highly structured information is presented electronically, to environments where the learner is supported in meaning-making or in *constructing* knowledge. This shift in control from the computer to learner is evident in multimedia and, in particular, hypermedia environments, where the onus is on the learner to make decisions about optimal learning paths and semantic linking.

David Jonassen (1990, [1994](#), 1996), [Roger Schank \(1993\)](#), and Brent Wilson (1999) are three of many learning theorists who believe that learners should be "doing something, not just watching something" and that if this occurs, "multimedia offers serious improvements to instruction through computers." (Yaverbaum, 1997, p. 141). Both multimedia and hypermedia environments have the ability to support and/or create active learning environments, affording the learner opportunities to engage with and think about the information (Hill, 1998). In the best of these contexts, learners must develop their own learning strategies, which is a cognitive process that encourages deep learning. If this process involves the social negotiation inherent in collaborative decision-making with others, knowledge construction is much enriched. Thus, the learning environment is much enhanced through the dynamic, interactive, and visual capabilities of multimedia learning. ([Crosby & Stelovsky, 1995](#)).

[Ewing, Dowling, and Coutts \(1998\)](#) have identified several features of the World Wide Web (Web) as an information source. In brief, information is semantically structured by creators of Web sites who embed links to other information according to their *own* individual or personal preferences and perceptions. These embedded links are dynamic, evolving almost daily, and are extended by the site users who follow the links through multiple stages and branches. In this process, the user is making his/her own semantic links or building a personal pathway structured by the way that the information is connected or the meaning that he/she brings to the relationships. The amount of information and the rate at which it is expanding is unknown and unknowable.

Although hypermedia environments have great potential to foster the critical thinking required to actively structure them for learning, they have to date resembled early CD-ROMs, that is, they are mostly linear text (Child, 1998). [Ewing, Dowling, and Coutts \(1998\)](#) speculate that the potential richness of hypermedia has not been realized because traditional perspectives on structuring learning tasks do not correspond easily to these environments. Planning for computer-based learning has been based on identifiable outcomes, with structured objectives on which activities are based and assessed. Teachers may have trouble re-conceptualizing their roles as instructional planners, just as learners may be confused about how to proceed with a structured task in the context of unstructured environments ([Ewing, Dowling, & Coutts, 1998](#)). Carver, Lehrer, Connell, and Erickson (1992, in Child, 1998) suggested that the lack of effective implementation of multimedial environments is rare because both teachers and students lack the skills necessary to function in environments where they are "collaborative designers rather than transmitters and recipients of knowledge" (p. 69).

In the following sections, the design challenges for these environments are explored and some guidelines are proposed for the successful implementation of hypermedia-based active learning strategies.

The Learning Benefits of Hypermedia Environments

The instructional paradigm is shifting from a teaching environment to a learning environment, with a

focus on "practice-centered learning." This orientation aligns with adult learning theory (andragogy), in which the notion of self-directed learning is fundamental to the design of learning contexts. Hypermedia environments support self-directed, life-long learning if structured to stimulate and motivate learners to be able to independently locate the resources necessary to continue learning (Diaz, 1998).

Technologies that facilitate self-directed, practice-centered learning and meet the andragogical challenge include hypermedia, real-time chats, threaded discussion, and tools such as VRML, Shockwave, and Java applets that make the Web interactive while delivering rich content. These technologies have been related to both learning and cost effectiveness, as they tend to influence the ways in which a learner represents and processes information ([Kozma, 1991](#)) as an active strategy in which he/she is required to structure the learning process as a co-designer of his/her own experience. Diverse learning and cognitive styles are supported through multiple presentations of information, improving retention and performance, and increasing motivation to learn ([Crosby & Stelovsky, 1995](#); Daugherty & Funke, 1998; Oz & White, 1993; [Yaverbaum et al., 1997](#)).

Criticizing conventional educational environments that help to shape 'compliant thinking.' Hill (1998) describes learners who lack the "orientation, mental models, and strategies (or capabilities for creating them) for open-ended learning environments, where divergent thinking, multiple perspectives, and independent learning are critical" (p. 79).

Learning is now deemed heavily influenced by social interactions and environmental factors such as culture, technology, and instructional practices. As educators and researchers increasingly accept the views of Vygotsky, (1978) and Bruner (1986) that interaction is the origin of all mental activity and growth, student learning is increasingly analyzed in a social context. From this perspective, meaning is seen as a negotiation and knowledge building process within a learning community (Bonk & Reynolds, 1998). These communities, characterized by their open-ended nature, are exemplified by the Web, which shows significant promise by its very structure, or lack of it, and in its support of communication tools that enable dialogue across and among diverse communities of knowers.

The social environment results in learning gains and increased creativity of outcomes that develops from collaborating and working in groups (Nelson & South, 1999). Internet-based communication tools such as e-mail, Internet-relay chat (IRC), threaded discussion forums, and synchronous conferencing enable dialogue that can help students think critically and make better decisions. Using computers as collaborative tools can be seen as a type of [social constructivism](#) whereby knowledge is generated and problem-solving skills are scaffolded through group activity (Clements & Natasia, 1992). In these groups, students frequently reach a state of conflict that must be reconciled in the form of a solution. The solution represents a "qualitatively different third perspective (combining) two opposing ideas into a coherent, higher-level idea" (p 243). Cooperative learning and cooperative problem-solving groups enhance opportunities for generative learning, generating a wider diversity of ideas, more reflective thinking, and increased creative responses (CTGV, 1990, 1992; Oliver, Omari, and Herrington, 1998, in Oliver, 1999, p 10).

Open-ended, hypermedia, collaborative environments are more engaging, can support diverse interests and cognitive styles, support independent and self-directed learning, increase retention and performance, and enhance critical-thinking and problem-solving skills by exposing learners to multiple perspectives. However, unless designed carefully these environments can be problematic and counter-productive for adult learners. Many of these problems stem from the very elements that make hypermedia environments so unique and effective: open-endedness, self-directed learning strategies; learner control.

Design Challenges for Adult Learners

An early supporter of hypermedia texts, Jonassen (1988, 1990) accentuated the structural differences of a hypertext-based organization of knowledge over the linear representation found in textbooks. According to him at that time, because hypertext is a node-link system based upon semantic structures, it should map fairly directly the structure of knowledge it is presenting (Tergan, 1997). However, Jonassen acknowledged that it is not merely the structure of the information that is important, it is the "active and constructive processing of the learner to meet the cognitive requirements of the anticipated task which are relevant for effective processing of hypertext" (Tergan, 1997, p. 260). He subsequently described the greatest problem related to hypertext-based learning as "how learners will integrate the information they acquire in the hypertext into their own knowledge

structures... Learners must synthesize new knowledge structures for all the information contained in the hypertext..." ([Jonassen, 1996, p. 190](#))

Similarly, Myers (1993, in Oliver, 1999) found that students needed a semester or even a school year to learn how to process hypermedia deeply. Simply embedding strategies in the system did not cue higher-order thinking unless the teacher similarly cued the students. Most learners cannot cope adequately with such complex systems and keep on studying texts in a fashion that is quite similar to linear text processing, following frames of information as presented in computer-based tutorials. A major result of this and related studies is that learning outcomes are ultimately determined by the quality of learners' goal-oriented activity, although learners who are more field-independent or who are domain experts, may perform better in unstructured environments (Tergan, 1997; Wenger & Payne, 1996).

Research shows that users are often unable to explore hypertext without experiencing navigational problems at some point. [McDonald and Stevenson \(1996\)](#), describe the [keyhole problem](#), in which learners don't understand the position of hypertext nodes in relation to the rest of the document, since it may be hidden. Detriments, other than the lack of adequate overview of the scope of resources, include cognitive overload, inefficiency because more time is spent learning how to navigate rather than processing information, and interference with the critical and creative comprehension necessary to solve open-ended problems (Oliver, 1999).

Interestingly, however, Mayes, Kibby, and Anderson (1990), in [McDonald and Stevenson \(1996\)](#), suggest that in certain circumstances, disorientation may be a necessary precondition for conceptual understanding. For example, in discovery learning the whole point is that learners should engage in a continual process of restructuring their knowledge by integrating the new information encountered into existing knowledge structures.

There is evidence that hypertext-based learning may be enhanced when it is integrated into a broader educational context. According to Cunningham, Duffy and Knuth (1993) the successful use of a hypertext system in university classes is mainly due to the instructional supports offered (i.e. explicit modeling and scaffolding and the system's embeddedness in a social context.)

Designs for Effective Hypermedia Environments

Is there an appropriate theory of learning for hypermedia environments? Many theorists believe that Piaget's theory of *accommodation* provides an epistemological basis for planning for experiences in which thinking and learning involves making links through new knowledge and past knowledge by organizing, ordering, classifying, identifying relations, transforming, and explaining.

Similarly, [Nunes and Fowell \(1996\)](#) and [Ryser, Beeler and McKenzie \(1995\)](#) suggest that hypermedia most effectively supports tasks requiring the acquisition of high-level skills of problem-solving and critical thinking. Learners actively increase their knowledge and understanding by working in collaborative learning environments that encourage them to adjust their views of the world. In this view, learning is likely to be the result of active involvement in internal mental processes (thinking) while *interacting* with others.

Interaction, especially in cooperation learning activities, appears to be a key factor for success in many hypertext-based learning tasks. Equally important, however, is the intellectual and technical support provided as adults learn to navigate these environments and structure their own learning in ways appropriate to the learning tasks and outcomes. The essential components of an effective hypermedia environment then, are: well-defined goals and explicit scaffolding support (Guzdial & Kehoe, 1998; Tergan, 1997); participation in determining learning goals and processes (Glaser, 1991); authentic learning environments in which knowledge is socially constructed (Denning & Smith, 1998; Rogoff, 1990); and navigational/cognitive devices such as spatial and conceptual maps.

Numerous models of learning have been examined for those best supported by hypertext frameworks. Learning is suggested to be most effective if it is embedded in social experience and if it is situated in authentic problem-solving contexts that entail cognitive demands relevant for coping with real life situations. In this notion, learning is characterized by the cognitive ability to effectively criss-cross landscapes of information (Spiro, Feltovich, Jacobson, & Coulson, 1988, 1991) represented by the semantic units in hyperdocuments and the development of cognitive flexibility. Opportunities to critically reflect on new learning are maximized by social activity and the expectation that new conceptions will

be shared and negotiated in dialogue with others (Fosnot, 1998; van Dusen & Worthen, 1993).

Embedding opportunities for reflection and summarization in social conversation helps solidify student learning and restructure student knowledge (Bonk & Reynolds, 1997). Naturally, how all participants share representations is a key issue in the design of these learning environments. Zhao (1998) suggests that the critical feedback of peers is required for learners to reshape their ideas and learn new information that they might not discover on their own. Another closely related factor is conceptual conflict resolution. According to Harasim (1990), group controversy may lead members to question their own concepts and seek new information and perspectives.

Apprenticeship learning and goal-based scenarios (GBS) are two learning designs that show promise for critically reflective, socially-based, authentic learning. Both are based on the idea that the learner acts as his/her own agent in determining learning progress and taking more executive control as he/she negotiates navigates a learning task.

Apprenticeship learning is when students learn through active participation in a task. At first it may be limited as students gain an understanding through observation and making small contributions, but the involvement develops into full participation and eventually task ownership (Guzzial & Kehoe, p 290, 1998).

Goal-based scenarios are where students are provided with an interesting situation in which they have goals to achieve. Students have the resources and tools with which to achieve goals. Progress is compared against a model of a successful process. When students fail they are provided with conceptual and process information in the form of a story of practice to allow them to understand and correct their faults. Often there is no single correct process and as learners articulate their learning in conversation with peers and coaches, they begin to move toward a personal conception of domain expertise. Browsing is not an effective instructional strategy in either of these environments, as it supports incidental rather than intentional learning (Tergan, 1997). Rather, cognitive strategies such as the creation of a conceptual map require the learner to trace and elaborate his/her learning progress.

How can we design a virtual community that supports learning? Schrage (1991) offers a model that highlights the importance of collaboration. According to Schrage, the goal is to create a *shared experience* rather than an *experience that is shared*. An experience that is shared is passive. A shared experience is one that is participatory and can be understood by comparing a conversation or a discussion (negotiated discourse) to a lecture or a television broadcast (didactic instruction).

McLellan (1997) outlines 13 design themes in Schrage's model of virtual community: competence, a shared, understood goal; mutual respect, tolerance, and trust; creation and manipulation of shared spaces; multiple forms of representation; playing with representations; continuous but not continual communication; formal and informal environments; clear lines of responsibility but no restrictive boundaries; decisions that do not have to be made by consensus; virtual presence; selective use of outsiders for complementary insights and information; and collaboration (p. 186). Hypermedia environments that support communications tools and that are structured by a problem-solving model are able to support the self-directed and collaborative learning in which adult learners are successful.

Checklist: Goal-driven Information Design

If you want e-Readers to:

Learn and Retain

- q Clarify
- q Simplify
- q Be direct
- q Provide repetition and reinforcement
- q Provide authentic examples and practice
- q Modularize
- q Include assessment and remediation
- q Present information in a variety of modalities

Have Fun, Include

- q Variety and surprises
- q Randomness and wit
- q Unpredictable events that change each time the 'product' is used
- q Ways to interact
- q Media

Understand, Use

- q Conceptual explanations
- q "How it works" illustrations and videos
- q Graphs and charts
- q Simulations
- q Practice with feedback

Experience, Design For

- q A high level of interactivity
- q Learner control
- q Realistic sights and sounds
- q Authentic experiences (e.g. role play)

Join, Include

- q Well-defined features
- q Clear explanations
- q Current events and archives
- q Toll-free numbers
- q Interactive order forms

Get Answers, Design A

- q Reference-style organization
- q Fast access
- q Searchable index of contents
- q Site map
- q FAQs
- q Live response to queries (e.g. Ask Jeeves)

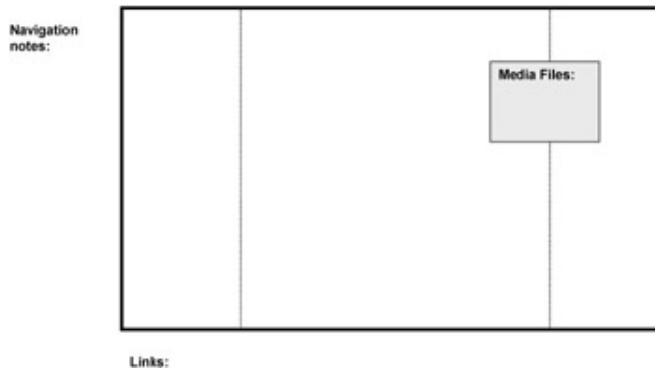
Guidelines for Enhancing Readability

Guideline Number	Guideline
1	Enhance scanning by providing clear links, headings, short phrases and sentences, and short paragraphs.
2	Use many carefully selected headings, with names that conceptually relate to the information or functions they describe.
3	Increase the number of headings.
4	Use a variety of forms and levels of headings (style, font size, etc.) to convey information hierarchies.
5	Write simple, straightforward headings that contain information about the content.
6	When appropriate, increase the font size.
7	Use familiar fonts, sans serif if possible.
8	Use fonts consistently.
9	Use style elements carefully and only to carry meaning (clues to the nature of the content). Don't ever use underlining for emphasis.
10	Use bright color to attract the eye.
11	Use vertical and horizontal whitespace to enhance readability.
12	Use about the half the screen width for the text area.
13	One chunk answers one question about one subject for one purpose.
14	Each topic contains only one-third to one-fifth of a paper page.
15	Separate chunks by a double-space.
16	Use sideheads, sidebars, and key words in the margin to enhance learner control and to provide additional context.
17	Reduce text to a maximum of 50% of the word count of the printed version.
18	To counter the loss of context, repeat contextual information each place it is needed and provide links to related information.
19	Aim for a readability level no higher than Grade 10 for post-secondary audiences; Grade 8 for general audiences.
20	Archive long, complex academic or technical papers.
21	Replace complex sentences with shorter, simple sentence structures.
22	Sentences should be no longer than 20 words; paragraphs no longer than five sentences.

23	Use the active voice wherever possible.
24	Change from the third person to the first person where appropriate.
25	Convert serialized lists to bulleted lists.
26	Place important information at the top of the page, or "above the fold" (in the first screenful of information), to ease scanning.
27	Most navigation pages should not scroll.
28	If reading speed is important and response time is reasonably fast, use links, or paging, rather than scrolling.
29	Provide balance for visual and verbal elements so that they are equally distributed vertically and horizontally.
30	Break complex visuals into smaller, simpler visuals (chunking).
31	Avoid excessive detail.
32	Present an image in close proximity to related text.
33	Redundancy is essential. The visual should not present a different concept from the text.
34	Audio should support other texts.
35	Always design animation for user control.
36	<p>The interface exists to enable user interaction.</p> <ul style="list-style-type: none"> ■ Identify users' goals and design interfaces to provide the means to achieve them ■ Images, audio, animation and video all come with significant overhead for the user e.g. downloading files, installing plug-ins, enduring delays, etc.
37	<p>Make sure the media on your web site is relevant.</p> <ul style="list-style-type: none"> ■ Moving images may detract attention from main content ■ Use e-texts only if they help communicate a message (or improve access)
38	<p>Send media to the user only in response to an explicit request.</p> <ul style="list-style-type: none"> ■ You don't always know 'what you're getting into' when you load a site ■ You have a bit more leeway if you are designing for students in a course because they must wait for media to excel in course (as long as it is relevant) ■ Include high-bandwidth pages on a secondary page that users can access when and if needed
39	<p>Provide information about your media so users can make informed decisions.</p> <ul style="list-style-type: none"> ■ Provide previews and descriptions, summaries, thumbnails
40	Provide different views for different types of users.

41	Leave control in the hands of the user. <ul style="list-style-type: none">■ Interaction with media should always be user-driven■ Don't include prescribed playback
42	Design the interface to be transparent.
43	Metaphors should make intuitive sense to the user.

Sample Storyboard



Tips for Chunking Text

- Split your online document into multiple, hyperlinked pages of topics.
- Break up your text into short, self-contained topics.
- Label chunks to clearly identify their content.
- Recognize that chunking requires compromise and judgment.
- For [William Horton \(1994\)](#), "Dividing a subject into discrete topics is as much art as science and requires compromise and judgment" (p. 109).
- Use a storyboard to represent a single screen.
- Write, edit, and review topics in random order.
- Use links to elaborate on topics, define key words, explain acronyms, etc.
- Use either a fixed or variable size strategy ([Horton, 1994](#))
 - With the fixed size strategy, all topics are the same length, usually the size of a paper page or a computer screen or window.
 - With the variable size strategy, the size of the topic varies to fit the content.

Chunk This Text

Making Sense of Learning Specifications & Standards: A Decision Maker's Guide to their Adoption (Original Version)

A simple working definition of the term e-Learning is "learning or training that is prepared, delivered, or managed using a variety of learning technologies and that can be deployed either locally or globally." The promise of e-Learning is that it provides leadership with powerful new tools for improving capability development, speed, and performance whether their organization operates in one geography or many.

Just as the rise of information technologies fundamentally changed the nature of how work gets done in organizations, the emergence of learning technologies is fundamentally changing the nature of how people learn to do that work.

The fundamental learning model hasn't changed: Learning professionals still help others learn how to do things they couldn't do before. In non-academic settings, this means they remain focused on providing leadership with the ability to build organizational capacity and improve performance. Learning technologies are simply a sophisticated new tool that enables each learning professional to be more productive at helping others learn.

Understanding the Standards Concept

As we have seen historically with battles over such things as railway track gauge, telephone dial tones, videotape formats, e-mail protocols, and the platform battles between Microsoft, Apple, Sun, HP, and others, companies often start out with proprietary technology that will not work well with others. However, these technologies often do not meet the needs of end-users, and thus, the market typically drives the various leaders from business, academia, and government to work together to develop common "[standards](#)." This allows a variety of products to co-exist. This convergence of technologies is very important for the consumers of these technologies because products that adhere to standards will provide consumers with wider product choices and a better chance that the products in which they invest will avoid quick obsolescence. Likewise, common standards for things such as content metadata, content packaging, content sequencing, question and test interoperability, learner profiles, run-time interaction, etc., are requisite for the success of the knowledge economy and for the future of learning. Fortunately, the first versions of these standards and specifications are now arriving. The question is this: How are we to integrate these standards into our plans for the future as well as into our current projects? Why should an organization care about the emergence and convergence of learning standards? The answer boils down to the organization protecting and increasing the return on its investment in the learning technologies it purchases and in the learning content and services it develops. Thousands, if not millions, of dollars will be spent on these technologies, content, and services to improve knowledge and skills. If the systems cannot grow, be sustained, maintained, and delivered to the learners, the investment will be wasted or seriously less effective in achieving results.

Chunked Version

Millions of dollars will be spent on learning technologies, content, and services to improve knowledge and skills. The investment will be wasted if the systems cannot grow, be sustained, maintained, and delivered to learners.

1. Why should an organization care about the emergence and convergence of learning standards?
2. How are we to integrate these standards into our plans for the future as well as into our current projects?

e-Learning is "learning or training that is prepared, delivered, or managed using a variety of learning technologies that can be deployed either locally or globally."

The Promise of e-Learning

Whether your organization operates in locally or internationally e-Learning, it:

- Provides leadership
- Uses new tools to improve:
 - Capability development
 - Speed
 - Performance
- Is fundamentally changing the nature of how people learn to do work

The fundamental learning model in organizations:

- Building organizational capacity
- Improving performance
- Professionals helping others learn

Understanding the Standards Concept

Companies often start with proprietary technologies that do not work well with others. End-users encourage the industry to develop common standards. Benefits include wider choice and improved lifespan of products.

In the e-Learning industry, standards are being developed for:

- Content meta-data
- Content packaging
- Content sequencing
- Question and test interoperability
- Learner profiles
- Run-time interaction
- And others

Writing for Clarity

Active Voice

1. The redesign of PSYCE 104 for Web-supported, distance delivery was intended by the instructor to provide a guided learning experience in which students were encouraged by their coaches to plan and evaluate their own learning.

The instructors redesigned PSYCE 104 for Web-supported, distance delivery that provided a guided learning experience. The coaches encouraged students to plan and evaluate their own learning.

2. Millions of dollars were lost after the decision made by the major shareholders.

The major shareholders made a decision that lost millions of dollars.

Bullets

The instructor for RELIG 101 in the Fall of 1997, Dr. Ehud Ben-Zvi, was unhappy with the typical course structure, which saw a change of instructors for the winter term. Among his concerns were the class size (74 students), difficulty in providing access to source materials, amount of content to cover by didactic means, lack of authentic context in which to learn, diminished classroom interaction, and lack of personal contact with students.

In fall 1997, Dr. Ehud Ben-Zvi re-designed RELIG 101 because he was concerned about:

- The change of instructors after the first term
- Class size (74 students)
- Providing access to source materials
- Amount of content to cover by didactic means
- Lack of authentic context in which to learn
- Diminished classroom interaction

- Lack of personal contact with students

The Inverted Pyramid

(Original Version)

It is a well-known proposition in public finance theory that an income tax system cannot meet all of the following three criteria: 1) equal treatment of all families with the same total household income (i.e. horizontal equity), 2) progressive taxation so that taxpayers with higher incomes pay a higher percent of income in taxes (i.e. vertical equity) and 3) the absence of an incentive or penalty for family formation (i.e. a subsidy or penalty for living as a couple). To see this, imagine that we have the following four groups of people: Case 1) two unrelated people living separately, each earning \$25,000; Case 2) Two people living together (i.e. a family), each earning \$25,000; Case 3) Two unrelated people living separately, one earning \$50,000, the other earning nothing and, finally, Case 4) Two people living together (i.e. a family), one earning \$50,000, the other earning nothing.

The total taxes paid by each group were considered. Equal treatment of families with the same household income implies that taxes should be the same for cases 2 and 4. That cases 1 and 2 should pay the same taxes, as should cases 3 and 4 were implied by the absence of a marriage or family formation penalty or subsidy. Together this would imply that all four groups should pay the same taxes. But if this is true, progressivity has been violated, because the same taxes are being paid in cases 1 and 3. Progressivity requires that the average tax rate be higher when income rises, so that a single individual earning \$50,000 must pay more total taxes than two individuals living separately who each earn \$25,000.

Adapted from the Canadian Policy Research Networks paper *Tax fairness for one-earner and two-earner families: An examination of the issues*. Online at <http://www.cprn.org>

(Adapted Version)

What is the issue?

A fair income tax system would meet three criteria:

1. Horizontal equity
2. Vertical equity
3. The absence of an incentive or penalty for family formation

We will illustrate these principles with four case studies.

Checklist for Using Links Effectively

- q Provide context for links whenever possible (for example, "To begin video clip, download = 50 seconds").
- q Always use underlines or some other visual indicator (e.g. a stacked list of items) to indicate that words are links.
- q Use blue underlined text for all unused links when possible.
- q Use text links. Do not use image links.
- q Do not require users to move the mouse to see when the pointer changes to a hand (mine sweeping).
- q For a graphic link, the term "click here" has been shown to increase recognition that the graphic is a link.

- q Clearly indicate when a link will move users to
 - a. The same page,
 - b. A different page in the same Web site
 - c. A page on a different Web site
- q Label links descriptively so that users can discriminate between similar links.
- q If clicked once, an internal link should change colour in each instance it occurs on the site.

Adapted from: Research Based Web Design and Usability Guidelines

<http://www.usability.gov/guidelines/index.html>

To Do List

What Who Date

q

q

q

q

q

q

q

q

q

q

<?xml version="1.0"?>

Team LiB

 PREVIOUS  NEXT 

6From Text to e-Text - Resisting Print

Concept Guide

Learning Modalities and Characteristics

- What is your preferred learning modality?
- Think about a group of learners with whom you work. What proportion of the group are verbal learners? What proportion prefer other modalities? Test your assumptions by discussing with the group.

Forms of e-Text

Visual

- What are the key characteristics of visual texts that support learning?
- When are visual texts most effective?

Audio

- When should you use audio?
- What should you be careful about using audio?

Video

- Why is video such a compelling e-Text?
- What accessibility issues are related to video?

Animation

- Would the use of animation be effective for *your* audience?

Slides

- How can electronic slide shows enhance cognitive outcomes?

Learning Outcomes

- What e-Text is best for:
 - Affective outcomes?
 - Cognitive outcomes?
 - Psychomotor outcomes?

Questions and Goals

Use this form to record your questions about the use of e-Texts.

As you read, return to this form to record new ideas, resources, and additional questions.

Personal Goals

Questions	Related information	Resources

Key Terms

This chapter may contain words and phrases that are unfamiliar. Use this list as a guide to the vocabulary used to describe message design guidelines for Web content.

- q Animation
- q Sensory Modality
- q Multi-channel
- q Mental Model
- q Others?

Incorporating Graphical Images

- q Draw attention to significant areas of a graphic using visual cues such as arrows or circled portions.
- q Use high quality images when the user has to learn to identify or recognize a feature, such as a tumor on the lung.
- q Position graphics near the related text.
- q Where appropriate the graphic should be captioned.
- q Have users create their own illustrations for key concepts. This could be accomplished with a drawing tool, by clicking on component parts, by dragging parts of a model together or offline.
- q Provide both realistic and abstracted detail by using a line drawing to draw the user's attention to the relevant features of the more detailed graphic.
- q When using an image, give users explicit instruction on how and when to use the graphical information in their learning.
- q Limit color use to four - space is a better organizer than color when separating information on a single screen.
- q Use color conventions but pay attention to cultural differences.
- q Remember that colors will be displayed differently on different systems. Err on the side of caution and try out on as many systems as possible.
- q Do not overuse animation for motivational purposes.
- q Do not use animation if material of significance is appearing elsewhere on screen.
- q When using animation, provide an option to repeat the sequence.

- q Make animation respond to the actions and decisions of the user, if possible.
- q Provide user control over dynamic displays.
- q While animation occurs, keep the rest of the screen static.
- q Use consistency - for example, always fly from the left for screen transitions.

Adapted from: [Schwier & Misanchuk \(1993\)](#)and Jonassen (1982)

Video in Domains of Learning

Experiential or cognitive objectives can be achieved by using video to show or document otherwise inaccessible:

- Places
- Viewpoints
- Complex or large-scale technical processes
- 3-dimensional objects
- Slow/fast motion
- People or animals, interacting
- Real-world events
- Dynamic change or movement
- Chronological sequence and duration

Video in the motivational and affective domains:

- Stimulates appetite to learn
- Provokes and mobilizes
- Encourages use of a particular strategy by demonstrating its success
- Personalizes
- Facilitates identification with a model
- Reassures, entertains, fascinates, delights
- Gives life, enhances relevance/authenticity
- Changes attitudes/appreciations

Adapted from: [Schwier & Misanchuk \(1993\)](#)

Applying Message Design Guidelines

The Very Real Dangers of Executive Coaching

Harvard Business Review (06/02) Vol. 80, No. 6, P. 86; Berglas, Steven

Over the past decade and a half, there has been a growing trend in the business world promoting the use of executive coaches for upper management individuals who need fine-tuning, but what worries Steven Berglas, the author of this article and researcher at UCLA's School of Management, is that most of these coaches are not trained in psychological issues, but are chosen instead because of their success as lawyers, business academics, consultants, and even athletes. Coaching by such individuals can lead to quick fixes for deep-rooted problems, given the business world's propensity for

effortless change. For faster results, coaches often employ methods that reject introspection, applying a band-aid where perhaps a deeper look was needed. Coaches not trained in psychological subtleties can often treat the symptom rather than the problem, such as assertiveness training, which may allow an executive to make himself heard more clearly, but will not address the fundamental issues that led to his lack of assertiveness in the first place. Also, coaches can wittingly or unwittingly exert an overbearing influence on their pupils, causing executives to overly rely on their advice. Before selecting a coach, companies should psychologically evaluate any employee slated for coaching to determine if it will really benefit the individual. They should also hire independent mental health experts to review coaching results. (www.hbsp.harvard.edu/hbr)

From: Daily News: ASTD

http://www.astd.org/virtual_community/daily_news/dailynews_fulltext.shtml#story19

Notes Outline

Keys to effective presentations	Suggestions:
z know your outcomes	Use an upcoming lecture as an example
z know your audience	Write down one outcome
z organize for the domain, outcome, and audience	Write a short sentence describing the characteristics of your audience
z get attention	Write one idea for getting attention and preparing participants for the lecture. What is this phase called?
z keep participants ACTIVELY engaged	Think of two ideas for encouraging active listening
z assess	

The Environment

Large Audience/Large Room (30 +)	Small Audience/Small Room (< 30)
Less interaction	More interaction
Less intimacy	More intimacy
Darker room required	Brighter room OK
Large screen size important	Smaller screen OK
Larger fonts	Medium-size fonts
Powerful audio speakers (on projector is best)	Audio OK from computer output
Audience noise a factor	Audience comments heard by all
Small distractions; attention diverted easily	Direct eye contact holds attention
Use more media elements	Fewer media elements necessary
Use broad gestures	Use facial expressions
More likelihood of diversity	More possibility of homogeneity
Take questions at end	Deal with arising questions

Adapted from: The Business Week Guide to Multimedia Presentations

Presentation Style

	Do	Don't
Gestures	<ul style="list-style-type: none"> ■ Use natural gestures ■ Orient yourself to mouse and keyboard ■ Use a wireless remote pointer/control 	<ul style="list-style-type: none"> ■ Rehearse gestures
Facial expression	<ul style="list-style-type: none"> ■ Smile 	<ul style="list-style-type: none"> ■ Show anxiety about the technology
Eye contact	<ul style="list-style-type: none"> ■ Look at the audience ■ Use pauses effectively - you are in control of pacing ■ Look at a visual, then at audience ■ Expand on points on screen or provide examples 	<ul style="list-style-type: none"> ■ Look at the technology or the screen ■ Pause consistently ■ Read text from the screen
Movement	<ul style="list-style-type: none"> ■ Move about the room ■ Use points to interact with audience 	<ul style="list-style-type: none"> ■ Stay anchored to the podium or computer
Language	<ul style="list-style-type: none"> ■ Leave a 2-second pause between points or visuals 	<ul style="list-style-type: none"> ■ Fill in pauses with "um.." ■ Immediately fill up silence ■ Plan humor
Voice	<ul style="list-style-type: none"> ■ Project your voice beyond the back row ■ Let sound clips finish before Speaking 	<ul style="list-style-type: none"> ■ Speak over video ■ Describe what the audience will see unless it needs explanation

Tips for Good Presentations

Know Yourself

- Preferred learning style = teaching style
- Comfort with environment
 - Room arrangement
 - Room size
 - Group size
 - Use of technology
 - Support available

- Comfort with pedagogical values
 - Expert or facilitator?
 - Teacher-centered or learner-centered?
 - Structured or open?

Know Your Audience

- Learning characteristics
- Experiences
- Expectations and needs
 - Content
 - Learning context

Identify Key Outcomes and Domains

- 1 key concept = 10–15 minutes
- Cognitive, affective, psychomotor
- Match assessment strategy to outcome

Match Approach/Strategy to Domain

- Low to high-level learning
- Behaviorist to constructivist approaches
- Autonomous to relational experiences
- Use of media
- Time to learn
- Structure: set/body/closure

When and How to Use Media

Media Type	Attribute
Text	<ul style="list-style-type: none">■ Authoritative■ Literal■ Main/key concepts■ Evocative words and phrases

Graphics	<ul style="list-style-type: none">■ Backgrounds, visual elements■ Use thematically, metaphorically■ Customize to audience■ Use to show detail (exploded)■ Use for conceptualization of abstract ideas■ Illustrate procedures
Photos	<ul style="list-style-type: none">■ Visually rich, detailed■ Evocative■ Show realism■ Use for dramatic impact
Charts, graphs	<ul style="list-style-type: none">■ Data visualization■ Comparative studies■ Literal■ Conceptualize data without much text
Video, animation	<ul style="list-style-type: none">■ Realistic, descriptive■ Entertaining■ Conveys temporal information■ For psychomotor demonstrations■ Dramatic impact■ Gains attention■ Use animation to clarify complex concepts■ Describes motion■ Conveys emotion■ Simulated situations

Sound	<ul style="list-style-type: none"> ■ Audible cues ■ Realistic effects ■ Emphasize points ■ Subliminal message ■ Narration
Music	<ul style="list-style-type: none"> ■ Mood and tone ■ Evocative ■ Cultural/emotional connotations

Orientation Elements in Various Media

	Content Architecture	Navigation/Orientation	Information Elements
Books	Main sections, chapters within (subsections), may include marginalia and other cues.	Immediately apparent - from front to back. Tables of contents, page numbers, index.	Text, possibly graphic images.
Newspapers & Magazines	Arranged by classification. Ads throughout. Main stories near beginning, continued at back.	Headlines, captions, index.	Text, graphic images.
Television	Introduction, each act climaxing before a commercial, resolution throughout and at end of episode.	Cued by music, pacing. Commercial breaks occur regularly. Timed episodes.	Text, motion video, audio.
Buildings	Rooms, lobby, stairwells, elevators.	Signs, directional arrows and floor index, doors, sometimes color.	Text, graphic images, may be audio.
Multimedia	Could be modularized, linear sequential, or random (hypertext). Always organized semantically.	Menus and sub-menus, screen numbers, progress chart or gauge (management), icons and image maps, headings and sub-headings.	Text, audio, motion video, graphic images.
The Web (fill this one in by yourself)	Hypermedia...		

Checklist for Message Design

Scannability

- q 2-3 levels of headings
- q Headings are meaningful
- q Use of emphasis
- q No blue or purple text for emphasis
- q Reduce italics
- q Upper and lower case
- q Sidebars
- q Marginalia
- q White space
- q Layering
- q 100–150 words per page

Clarity

- q Small chunks
- q Each chunk contains 1 main idea
- q Few paragraphs
- q Bulleted lists
- q Abstracts
- q Pullouts
- q Consistency
- q Reduce bolding in text
- q Move links out of paragraph
- q Directions provided

Orientation

- q Headings as anchors
- q Site map
- q Progress indicator
- q Metaphors
- q Important information in top third of page

Writing Style and Tone

- q Active voice
- q Short sentences
- q Focused chunks
- q Informal or conversational
- q Consistency

Accessibility

- q Learning style preferences
- q At least two representations of same content
- q Culturally meaningful
- q Fast downloads
- q Fewer plug-ins
- q Readability (5–8)

e-Texts

- q Appropriate use of:
 - q Graphical images
 - q Video
 - q Audio
 - q Animation
 - q Electronic slide shows
- q Accessibility for perceptual modalities

Quality

- q Edited
- q Spell-checked
- q Intact links

Re-purpose this Text

Improve the readability, scannability, and clarity of this text by:

- Chunking the text
- Reducing the text by 50%
- Using bulleted lists
- Rewriting as an inverted pyramid
- Using active, not passive voice
- Simplifying sentences
- Creating headings, sidebars, pull-quotes
- Linking text
- Developing a second way to present the content

We do love our families. A 1992 survey of Albertans revealed 92 percent of us thought a happy family life is essential to our lives. This came way ahead of other staples like a good income (34 percent thought this was essential) or a satisfying sex life (29 per cent of the vote). Family as their greatest joy was described by eighty-three percent. These numbers would seem to be bolstered by our marriage rate, which in 1994 was the highest in Canada. That leap is being given more serious thought than ever before. As recently as 1995, men on average tied the knot for the first time at a relatively

immature 22; their brides were only 20. By 1995, first-time grooms were waiting until they were past 28 before pledging their troth to 26.3-year-old brides. What's more, we're producing fewer kids and making more money. Alberta's female labour force participation rate, the highest in Canada, has helped to more than double average family income, after inflation, since 1971. In 1996, our average family earned \$55,269; among two-earner families with children, the figure topped \$65,000. Despite these rosy statistics, our family lives are being put under increased strain by the failure of government and the workplace to keep pace with the changes. Those income figures aren't so fat when you're an Alberta single mother, whose mean earnings are only \$23,650; more than a third of those receiving child support had to scrape together some semblance of a life on incomes of less than \$15,000 per year.

Adapted from: Chandler, G. (2000, Nov/Dec). *Father no longer knows best. Alberta views.*

To Do List

What Who Date

q

q

q

q

q

q

q

q

q

q

<?xml version="1.0"?>

Team LiB

 PREVIOUS  NEXT 

7 Structuring the e-Learning Environment

Concept Guide

Content

- How is the content in your discipline structured?
- Can you describe your discipline as a genre?

Organizational Schemes

- What are the appropriate ways to organize information for your content area?

The Design Shell

- What is the most effective way to sequence your content?

Content Management

- Do you have a plan that supports sustainability of your resources?

Questions and Goals

Use this form to record your questions about structuring the e-Learning environment.

As you read, return to this form to record new ideas, resources, and additional questions.

Personal Goals

Questions	Related information	Resources

Key Terms

This chapter may contain words and phrases that are unfamiliar. Use this list as a guide to the vocabulary common to information architecture.

- q Navigation
- q Interface
- q Information architecture
- q Metaphor
- q Genre
- q Design shell
- q Organizational scheme

Course Information Checklist

- q Introduction
 - Instructions
 - Technical and help information
 - Preamble
 - Rationale for learning design
 - Description of learning community
 - Instructor information - contacts, etc.
 - Tutor information
 - Security issues
 - Timetable
- q Course announcements
- q Objectives/goals
- q Resources (e.g. library)
- q Course description/syllabus
- q Prerequisite knowledge or completed courses
- q Style of instruction
- q Expectations for participation (e.g. participate in discussions once a week)
- q How to prepare for course
- q Study tips
- q Learning strategies needed
- q Course length
- q Grading policy, etc.
- q Copyright statements, disclaimers
- q Policies (e.g. cheating)
- q Ethical issues (e.g. acceptable language in e-mail communications)
- q Content

- q Assessments
- q Portfolio or presentation tools
- q Tools for checking progress (e.g. grade book)
- q Feedback forms

Checklist: Planning Steps for e-Learning Environments

- q Define the key messages
- q Define the information types and functionality
 - What is the purpose of the (site)?
 - Who are your readers?
- q Define logical relationships
- q Define links between information types
 - Define the tool/technology
 - Identify media elements
- q Brainstorm and conceptualize
- q Perform any required research and development related to advanced technologies
 - Will the reader require specialized hardware or software (e.g. plug-ins)?
 - Will the majority of your audience be able to access the material?
 - Should you design for the highest or the lowest common denominator?
 - What will be the media mix?
- q Test the functionality of the information architecture and navigation
 - Storyboard
 - Rapid prototyping
- q Identify specialized resources required to complete the projects
 - The nature of the team
 - Outsourcing

Based on [Mok \(1996\)](#)

Selected Domains and Organizing Frameworks

Domain	Skills/Knowledge	Framework	e-Texts & Strategies
Aviation	Training, procedures, decision-making, perception	Task analysis, objectives hierarchies, practice, criterion-referenced testing	Simulations

Computer programming	Problem-solving, procedural training	Whole-part and part-whole, problem-based, developing schemas, situated practice	Problems, active learning, link theory with practice
Concept learning	Forming hypotheses, classifying attributes	Connecting to memory, relating concepts, develop rules, discriminating, inductive and deductive	Examples and non-examples
Engineering	Problem-solving, decision-making, mathematical and spatial skills, management skills	Concept formation, scaffolding knowledge	Self-directed, experiential, simulated design activities
Second language learning	Understanding, communication, conscious monitoring, error correction	Association, reinforcement, imitation Schema, rule structures, meaning Interaction	Emphasis on communication, authentic environments in which to practice
Management	Skills, abilities, and personal development	Discriminate between perceptions and reality Concrete experience, reflective observation, abstract conceptualization, active experimentation (Kolb)	Interaction with others, modeling, role playing, coaching, cases
Mathematics	Resources, heuristics, control processes, and beliefs	Problem-solving, acquiring higher-order rules	Problem-solving, direct application
Medicine	Decision-making, reasoning, problem-solving, sensory-motor ability, attitudes	Memory and recall, problem-based	Case study, problem-solving, simulations
Military	Team skills, leadership, technical, decision-making, memory	Criterion-referenced, mastery learning	Experiential learning, social learning
Procedural learning		Declarative or knowledge, production rules, mental models	Demonstration, modeling, coaching, work towards automaticity
Reading	Attention, concept formation, imagery, language, memory, perception	Letter-sound correspondence, increasing importance of semantic-linguistic aspects	Cognitive and social tasks, comprehension
Sales	Gaining attention, understanding needs, presentation of products, handling objections, closing, follow-up		Role-playing, simulations, apprenticeship, coaching,

Troubleshooting	Diagnosis and repair	Hypothesis generation, testing, hypothesis evaluation Research skills	Extensive practice with feedback
-----------------	----------------------	---	----------------------------------

Adapted from the (Greg Kearsley) TIP database <http://home.sprynet.com/~kearsley/tip>

To Do List

What Who Date

q

q

q

q

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q

q

q

q

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Team LiB

◀ PREVIOUS NEXT ▶

8The Active e-Reader

Concept Guide

Content

Supporting cognitive processes

- Do the activities included in your content reflect several levels of cognitive processing?

Navigation

Think about an effective interface you have used. Why was it effective?

Schemes and metaphors

- Does your content reflect an organizing metaphor?

Visual design elements

- How do visual elements reflect orientation cues?

Questions and Goals

Use this form to record your questions about active learning.

As you read, return to this form to record new ideas, resources, and additional questions.

Personal Goals

Questions	Related information	Resources

Key Terms

This chapter may contain words and phrases that are unfamiliar. Use this list as a guide to the vocabulary architecture.

- q Semantic networks
- q Cognitive tool
- q Mind tools
- q Transfer
- q Goal-based
- q Webcast
- q Social constructivism

Goal-based Scenarios

Attributes of GBS

- Learn-by-doing simulation
 - Students pursue a goal by practicing target skills and by using relevant content knowledge
 - During simulation, students receive just-in-time coaching at the moment where they want to use it
- GBS can be software environments or live role-plays, but they all:
 - Contain a rich amount of content
 - Support interesting and complex activities
 - Are inherently motivating
 - Creates a model in which students learn 'how-to' rather than 'know-that'
 - Are contextualized

Constructing a GBS

According to Schank and his colleagues, a GBS comprises seven essential components:

1. Learning goals
 - 2 categories - process knowledge and content knowledge
 - GBS can include both
 - e.g. make a good argument by backing up claims with evidence obtained through research (process goal)
learn the factual, historical, etc. information relating to the content domain in order to make (content goal)

Design step:

- a. Focus on the skill set you want students to practice with related content knowledge
2. Mission
 - A mission is a *performance* goal
 - Should take the form of a significant plausible action goal to be achieved
 - The mission includes the skills and knowledge needed to achieve the learning goal
 - e.g. "develop a set of guidelines to present to your supervisor..."

Design step:

- a. Identify the outcome in the form of a product to be designed or completed

- b. Product should demonstrate the achievement of learning goal
3. Cover Story
 - The background story line that creates the need or context in which the mission is to be accomplished
 - Should contain enough opportunities for the student to practice learning goals etc., and be interesting
 - e.g. "The large multinational company you work for has been forced to downsize. Thirty thousand employees have been let go. Morale among the remaining employees worldwide is very low...."

Design Steps:

- a. Write the story
- b. The student takes on an important role in the story
- c. The role is pivotal and requires student to develop skills identified. The story is relevant, important, and appealing
4. Role
 - Who the student is in the simulation or cover story
 - What role is best in the cover story to help student achieve and practice skills
 - Role is:
 - Active
 - Interesting
 - Realistic
 - e.g. "you are the lead of the Professional Development Committee assigned by the head of the Human Resources Department to...."

Design Steps:

- a. Check the characters and roles in the story
- b. Is the student's role the right one, the one that actually has to do the work required to solve the problem?
5. Scenario Operations
 - Includes all the activities required in order to work toward the mission goal
 - e.g. scenario operations could include asking for expert opinions, compiling a reference list, asking for the evidence, presenting more than one strategy with pros and cons, interviewing experts about similar instances where this happened and a decision was made....
 - Decision-points arise during scenario operations
 - The effects of the decisions made signal progress toward mission or could signal expectations for improvement or "teachable moment"
 - Expectation failures can be anticipated and built in and should scaffold the learning
 - Failure only occurs if decision is made hastily without good research
 - Includes numerous scenario operations of varying complexity
 - Each operation should support achieving mission goal

Design steps:

- a. List all the learning goals required to achieve the mission
- b. List all the scenario operations needed to achieve the goal
- c. List all the decision points to be made for each scenario operation, along with expectation failures and how they will be addressed

6. Resources

- Must be plenty of well-organized and easy-to-access resources to use during scenario operation
- Students must be able to ask for information that helps in decision-making
- Information can be supplied in terms of stories
 - Stories can be a variety of forms
 - Stories are slightly different to make student adjust memory for new learning
 - Lessons are embedded in the stories
 - Resources are often experts telling their own stories of their own experiences

Design Steps:

- a. Collect resources in many different formats
- b. Each story should contain a lesson relevant to scenario operation
- c. One story could be just different enough from another that student must adjust understanding or change behavior to accommodate it (in other words, experience an expectation failure). Stories must be indexed so that they are retrievable when needed.

7. Feedback

- Expectation failure must be properly indexed so that it can be retrieved and used in the right context
- Feedback occurs through consequence of actions (natural), through coaches (mediated) who scaffold the process, through tasks or through domain experts who tell stories that pertain to the experience
- Feedback needs to be indexed and retrievable

Design Steps:

- a. Match appropriate kind of feedback to the resources and decisions. If online, identify coaches that are available and how to scaffold the process
- b. Collect expert stories from domain experts and index them
8. I've added the eighth step, reflection.
 - Students in same simulation should share stories and plans to
 - Enrich database of available resources
 - To identify their expectation failures
 - Correct or predict what they could have done
 - Working collaboratively to achieve mission goals will enhance communication, interpersonal reasoning skills, etc.
9. And the ninth step, retrieval (see [Chapter 4](#))
 - Stories are retrieved, coded, and stored
 - Learners add to story repository
 - Learners add to resource repository

Adapted from [Schank, R.C., Berman, T.R., & Macpherson, K.A. \(1999\)](#)

Goal-based Scenarios-Planning Template

Component	Key elements	Design ideas
-----------	--------------	--------------

Problem statement	<ul style="list-style-type: none"> ■ Well-structured ■ Ill-structured 	
Learning goals	<ul style="list-style-type: none"> ■ Process knowledge ■ Content knowledge 	
Mission	<ul style="list-style-type: none"> ■ Performance goal ■ Skills and knowledge needed ■ Stated in form of product that demonstrates achievement of learning goals 	
Cover story	<ul style="list-style-type: none"> ■ The story that creates the context ■ Interesting, motivating, authentic 	
Role(s)	<ul style="list-style-type: none"> ■ Who the learner is in the cover story ■ Role is as active participant ■ Role is realistic 	
Scenario Operations	<ul style="list-style-type: none"> ■ All the activities planned to achieve mission ■ Varied complexity ■ Decision-points which have consequences ■ Expectation failures ■ Scaffolding 	
Resources	<ul style="list-style-type: none"> ■ Expert stories ■ Easy-to-access ■ Other relevant information in various forms (links, print, each other) 	
Feedback	<ul style="list-style-type: none"> ■ Expectation failures indexed 	
Reflection	<ul style="list-style-type: none"> ■ Learners share stories and plans ■ Identify expectation failures and corrections/predictions 	
Retrieval	<ul style="list-style-type: none"> ■ Knowledge mining ■ Collection and indexing of stories ■ New resources added (learner-identified) 	

What Makes a Good Case Environment?

A cover story:

- q Presents one or more lessons relevant to the domain
- q Is descriptive, not prescriptive
- q Is authentic; realistic
- q Is written in a way that encourages learner to draw on personal experience (resonates)
- q Is complex
- q Contains a rich amount of content
- q Supports interesting and complex activities
- q Is inherently motivating, appealing
- q Are perturbing
- q Contains embedded lessons (or rules)
- q Creates a "need to know" in the learner
- q Requires the learner to take an authentic role
- q Is well-indexed by "rule" and retrievable when needed
- q Anticipates expectation failure
- q Requires learner to engage in the same kind of activities that present the same type of cognitive/affecti
those in the real world

Expert Stories:

- q Represent a variety of situations
- q Are models of expert thinking in the domain
- q Are not based on the correct or incorrect way to perform a task, but relate experiences of the expert in a
- q Do not present the expert standard (see above)
- q Create a model in which students learn "how-to" rather than "know-that"
- q Are incidents of just-in-time coaching
- q Are contextualized
- q Are the stories of events
- q Can be in a variety of forms
- q Ideally contain a variety of media elements
- q Scaffold student memory
- q Enhance cognitive flexibility by providing multiple representations of content

Indices:

- q Contain stories, told by experts, relating their own experiences with a similar situation
- q Contain stories that are slightly different, to make the learner adjust memory for new learning
- q Are structured to allow the addition of related stories
- q Are transparent to use
- q Are based on rules or reasons

Problem-based Planning Template

A PBL environment comprises six components. Jonassen has represented these as nested spaces.

Component	Attributes	Objects
Problem context physical, socio-cultural, and organizational climate revealed by authentic documents identify community of stakeholders and their values, beliefs, customs, skills and performance levels		Mission statements, balance sheets, annual reports personal stories video clips, interviews key people May be audio/video, visual or narrative/text
Problem representation	Must be perturbing and appealing Learners should engage in the same kind of activities that present the same type of cognitive and affective challenges as those in the real world (authenticity)	
Related cases	Scaffold student memory with case-based reasoning Human knowledge is encoded as stories about experiences and events Provide multiple interpretations, perspectives and viewpoints of content	Multiple, related cases of cases with lessons, context Case index
Information resources	Learner-selected, just-in-time information	Information banks and repositories Text documents, audio/video, graphics, animations, etc.
Cognitive tools	Tools that support thinking, performance, representation; information-gathering	Databases, spreadsheets mind maps CMC
Conversation/collaboration tools	Discourse communities Knowledge-building communities Communities of learners	Lists Threaded discussion forums Bulletin boards
Social/contextual support		Support groups, work coaching, etc.

Adapted from: [Jonassen, D. \(1999a\).](#)

<http://www.ed.psu.edu/~jonassen/CLE/CLE.html>

<http://curry.edschool.virginia.edu/go/ITCases>

Presentation and Communications Tools

Tool	Use	Pro	Con	Asynch	Synch	Presen
E-mail	For quick response For urgent announcements For impact To communicate same message to all at once For a discussion list or newsgroup	Quick One-to-many High impact Encourages immediate response Easily accessible	Lack of non-verbal cues Can seem abrupt Time management Too accessible?	v		
Chat	Brainstorming Social purposes Microworlds Role playing	Immediate Social	Keyboarding skills		v	
Threaded discussion	Collaborative work Extended discussion Social purposes	Encourages higher-order learning Community building Supports multiple perspectives Equity for time and space	Complex to facilitate Time management Security, privacy, ethical issues May not support learning culture Dominant participants	v		v
Screen-sharing e.g. white - board	Sharing work in progress Collaborative activities such as data analysis	Interactive Some can be recorded and archived	Technical issues Non-standard platforms		v	v
Audio conf	Two-way live interaction when only dialogue \ can be recorded and archived	Outline keeps on track Check on affective issues (voice) Active learning esp. if advance preparation required of participants	Withdrawal of participation, passive if one-way experience needed Time zone coordination Telecommunications expensive in some countries		v	v

Video conf	Presentation Expert lecture Group checks Involvement of distance learner Show movement Demonstration	Can be recorded and archived Community building Check on affective issues	More expensive than audio Technical issues Bandwidth & technical support concerns Can be one-way Time zone coordination		v	v
Webcast	Demonstrations Debate Interview Q&A Panel discussion Stump the experts Press conference Reference desk Imposter test Round-robin lecture Oral exam	Archived events Direct interaction	Technical issues Bandwidth May not proprietary software Expensive for some users	v	v	v
e-Texts	Content delivery		May be text heavy Inappropriate use Accessibility issues	v		v

Checklist: Visual Elements and Information Hierarchy

Interface

- q Where is the navigation bar?
- q Is the bar placed appropriately on the page?
- q Is this interface a metaphor?
- q Does the interface design support the structure of the information experience?

Size

- q Which element drew your attention first?
- q Does this element represent the most important information on this site?
- q Identify the headers on the page. How is size used to suggest how to best use the site?

Placement

- q Does the interface communicate how to sequence your experience?
- q An English-speaker reads from left to right and top to bottom. Does the placement of elements support this?
- q Look at the way the visual elements are grouped on the page. Does this tell you anything about their function?

Color and Contrast

- q Are color and contrast used as clues or cues to meaning or relationships?
- q Where was your eye drawn first? Is color/contrast used well to direct your attention to the most important information?
- q Whitespace is a design element that can be used to show relationships of information. Although not relevant to this site, is whitespace used well on this site?

Movement

- q Is movement used as an element in this interface? If so, does it help or hinder the user?

Rules of Navigation

Rule	Planning Notes
Interface should be easily learned.	
Avoid simple page-turners; offer alternatives.	
Keep the written text simple.	
Visual elements should represent the relationships of ideas.	
Communicate clearly and concisely.	
Use active, positive, polite language.	
Keep the process as visual as you can; use clear visual messages.	
Use consistent screen formats.	
The style throughout the environment should be coherent.	
Provide feedback. For example, the expected response to an action.	
Make sure users know what they have to do and the steps to get there.	
Provide help.	
Keep users engaged without frustration; be economical.	
Interface should support the users' goals and objectives.	
Don't make assumptions about understanding, e.g. color, icons.	

Design Matrix: Interface

Element	Color	Font	Size	Emphasis	Hot?	Media
Module Title						
Header						
Navigational Tools						
Lesson Title						
Lesson Subtitles						
Section Titles						
Background						
Cues						
Buttons or Icons						

Design Matrix: Language Specifications

Element	Decision Point	Project Standard
Writing	Readability	
	Tone	
	Voice	
	Spelling	
	Sentence structure	
Grammar Usage	Contractions	
	Colloquialisms	
	Abbreviations used	
	Acronyms used	
	Cues	
Language Usage	Specialized vocabulary	
	Indices, glossaries, etc.	
Reading	Level	
	Language of instruction	

Design Matrix: Visual Design

Element	Decision Point	Project Standard
Screen Elements	Number of concepts per screen	
	Number of lines per screen	
	Number of words per line	
	Spacing	
Numbering Conventions	Question Lists	
	Important points listed	
	Items listed	
	Page numbering	
	Section numbering	
	Menus	
	Links	
	Marginalia	
	Question frames	
Color: Background and Text	Instructional screens	
	Headers	
	Footers	
	Cues	
	Borders	
	Colors per screen	

To Do List

What	Who	Date
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Team LiB

[◀ PREVIOUS](#) [NEXT ▶](#)

9Usability Testing

Concept Guide

User-centered Design

- What UCD concepts from [Chapter 3](#) apply to your course materials?
- How will you know if you have met the needs of this group?

The Process of Usability

- How will you know if your e-Learning environment is effective?
- What methods can you use to meet your evaluation goals?
- What methods do you need to explore further?

Applying the Results

- Does your context support usability testing?
- Pragmatically, how can you use the results of an evaluation?

Groups that have benefited

- Identify the top 10 usability guidelines for your target audience.

Questions and Goals

Use this form to record your questions about usability testing.

As you read, return to this form to record new ideas, resources, and additional questions.

Personal Goals

Questions	Related information	Resources

Key Terms

This chapter may contain words and phrases that are unfamiliar. Use this list as a guide to the vocabulary common to the usability field.

- q Formative evaluation
- q User-centered design
- q Qualitative data
- q Quantitative data
- q Triangulation
- q Prototypes
- q Inquiry
- q Inspection
- q Diagnostic Tests
- q Comparative tests
- q Accessibility

Sample Usability Plan

A problem-based learning environment was developed for a third-year course in the Faculty of Law.

The Design

A wealthy client, age 62, is updating her will. Chief operating officer of a family company, she seeks legal advice related to succession planning, tax planning, and dispersal of a diverse portfolio of assets.

The design involves a problem statement, a set of resources that includes text documents of previous wills, current tax laws, business and personal correspondence with the legal firm, statutes and financial statements; profiles of the company's business officers and family members; audio interviews with the client, her colleagues, her family members, and her financial advisors; and so on.

The learner in this scenario takes the role of the head lawyer on a team that includes two legal assistants and a financial advisor. The team must produce a new will. The team "meets" by asynchronous threaded discussions and is supported by a web site that includes all the resources and links to related sites. An expert legal coach is available by e-mail.

The design interface is based on an office environment with visual representations of:

- A filing cabinet containing the documents
- A telephone for the expert coach
- A computer for the threaded discussion
- A tape recorder for the interviews
- A day planner for annotated note-taking

The Plan

A prototype site for the interface has been developed using PowerPoint. The documents and other artifacts are available in print form only.

For the first phase of the usability test only the interface will be evaluated. The effectiveness of the visual office metaphor is the focus of the first test.

The plan calls for six participants, all third-year law students. Each student will receive one free movie pass as a thank you for participating. Each participant will have completed the traditional version of this course, which has been delivered in a lecture format.

The participants will test the interface in three groups of two, while a graduate student in the Instructional Technology program in the Faculty of Education observes and takes notes on the slide version of a print-based PowerPoint document. Following the procedure, all participants will join a focus group led by an evaluator.

Application for Ethics Approval

Description of Project and Procedures for Observing Ethical Guidelines

Usability Test for Law 301

Name of Applicant: Dr. Katy Campbell

Section 1:

Please provide a general overview of your proposed research. Limit your response to one page.

Purpose of Study:

This is a test of the effectiveness of the interface design for Law 301.

Methodology:

Six third-year law students will work in three groups of two to evaluate the interface. Each pair will be observed by an Education student (Master's in Instructional Technology).

Following Stage 1, all participants will be invited to join a focus group led by an evaluator from the Population Lab. The focus group questions are attached. With consent, the discussion will be recorded and later transcribed. In addition to the evaluator, a second recorder will take notes by hand.

Nature of Involvement of Human Participants:

Participation will be solicited by direct invitation in all third-year law classes. Volunteer participants will have successfully completed Law 301 in the first term.

Each participant will be supplied with a description of the redesigned course and an outline of the test plan.

Participants will receive a movie pass on completion of the test. Names of participants will be kept confidential.

Are underage or "captive" participants involved? Yes_____ No_____

If "yes" provide details" (Please attach any consent forms to be used.)

Section 2:

Please describe clearly the specific procedures for observing the University's ethical guidelines for research involving human participants. Confine your response to two pages.

1. Explaining purpose and nature of research to participants:

Each participant will receive a written description of the usability test. Participants will have an opportunity to ask questions when solicited and during the test. A letter of consent must be obtained.

2. Obtaining informed consent of participants: (Consent forms must be attached.)

See attached

3. Providing for exercising right to opt out:

Participants will be advised that they have the right to withdraw consent at any time during the test. If withdrawing, they have the right to withdraw consent for using their comments.

4. Addressing anonymity and confidentiality issues:

Participants' names will be kept confidential; participants will not be identified by name on observation protocols or on focus group transcripts.

5. Avoiding threat or harm to participants or to others:

Participants may withdraw from the procedure at any time without penalty. Participants' identities will be kept confidential.

6. Other procedures relevant to observing ethical guidelines not described above (e.g. training assistants directly involved in data collection):

The test will involve three graduate students from the Instructional Technology program. These evaluators will have successfully completed IT 298 (Formative Evaluation). The students will sign a confidentiality agreement.

APPLICANT: Please submit the completed application form and all accompanying materials (consent forms, copies of instruments, sample interview questions) to the Research Ethics Board representative in your Department of the Faculty of Education, the School of Library Studies, or the Faculty of Extension.

When the application has been reviewed, a copy of the form will be returned to you.

Consent Form

I, hereby, consent to participate in the research study entitled *Usability Test for Law 301* conducted by Dr. Katy Campbell and/or an associated research assistant. This study is conducted under the auspices of the Academic Technologies for Learning unit in the Faculty of Extension, University of Alberta.

The purpose of the study is to investigate the issues related to usability of the interface for Law 301.

- I understand that my participation in this study is completely voluntary.
- The general approach to this study is clear to me.
- I understand that the results of this research may be published or reported, but that my name or identity will not be associated in any way with the published results, unless requested.
- I understand that my comments will be held in the strictest confidence.
- I understand that my comments may be recorded and transcribed.
- I understand that I will have the opportunity to approve the inclusion of my interview data in the study.
- I understand that I can withdraw from this study at any time and that if I do my data may also be withdrawn.
- I understand that my anonymity may be compromised if I choose to participate in a focus group. That is, other focus group participants will be able to identify me.

Date: _____

Signature: _____

Facility and Facilitator Checklist (2000)

The purpose of this form is to gather information about the server and lab environments where one of your faculty member's projects will be delivered. This data will also guide and facilitate hardware and software purchases, student and faculty training, and planning for project implementations and delivery.

Server Configurations

LAN Server

OS: (Circle One) Macintosh NT Unix - flavor?

Model: _____
CPU: _____
RAM: _____
Storage: _____
Backup system: _____

Web Server

OS: (Circle One) Macintosh NT Unix - flavor?

Model: _____

CPU: _____

RAM: _____

Storage available for each project: _____

Web server software product name: _____

Version: _____

MIME types configured?

Flash Y/N

Director Y/N

Authorware Y/N

JavaScript Y/N

RealMedia Y/N

Database Connectivity: No/Yes

If Yes: Cold Fusion No/Yes ASP No/Yes Other _____

FrontPage Extensions activated or willing to activate? Y/N

Remote Access (procedure for getting files to Web server) FTP No/Yes Other _____

Indexing support Excite No/Yes Microsoft Index Server

No/Yes Other _____

CGI support No/Yes If Yes, please describe the procedure: _____

Streaming media support: Real Networks Y/N NetShow Y/N

QuickTime Y/N

Does your institution/department support an Internet-based conferencing/web delivery software package such as: WebCT, Lotus Notes, Web Board? No/ Yes

If Yes (which one(s))

Lab and Desktop Computers

Student Lab Hardware

Type (Macintosh)

Model: _____

OS: _____

CPU: _____

RAM: _____

Storage: _____

CD-ROM: No/Yes If Yes - Speed 2X, 4X, 8X or faster?

Sound capable: No/Yes If Yes - Headsets or speakers ?

Microphone: No/Yes

Color capable: No/Yes If Yes - Color Depth = 256, 64 K or
Millions of colors?

Networked:No/Yes If Yes, what is Lab network speed? _____

Type (Windows95/98/NT)

Model: _____

CPU: _____

RAM: _____

Storage: _____

CD-ROM: No/Yes If Yes - Speed 2X, 4X, 8X or faster?

Sound capable: No/Yes If Yes - Headsets or speakers?

Microphone: No/Yes

Color capable: No/Yes If Yes - Color Depth = 256, 64 K or
Millions of colors?

Networked:No/Yes If Yes, what is Lab network speed? _____

Software Configuration of Lab and Desktop Computers

Student Lab Software

Type (Macintosh)

Browser type/version(s): _____

Plug-ins supported:

QuickTime: Y/N - If Yes what version? _____

Shockwave: Director/Flash; No

If Yes, what version? _____

Authorware; No If Yes what version? _____

Real Media: No/Yes - If Yes what version? _____

Adobe Acrobat: No/Yes - If Yes what version? _____

NetShow: No/Yes - If Yes what version? _____

Other: _____

Java enabled: No/Yes

JavaScript enabled: No/Yes

Cookies enabled: No/Yes

Additional comments:

Type (Windows95/98/NT)

Browser type/version(s): _____

Plug-ins supported: QuickTime: Y/N;

Shockwave: Director/Flash; Authorware

Real Media Y/N

Adobe Acrobat? No/Yes - If Yes, what version? _____

NetShow No/Yes - If Yes, what version? _____

Other: _____

Java enabled: No/Yes

JavaScript enabled: No/Yes

Cookies enabled: No/Yes

Additional comments:

Internet Access: Students

Do students have e-mail accounts? No Yes

Campus labs allow access to e-mail? No Yes

Campus labs access to Web browsing? No Yes

Remote access to e-mail? No Yes

Remote access to Web browsing? No Yes

Modem pool provided and supported by institution? No Yes

Is access free of charge No Yes (How much/hour/month? _____)

Please rate accessibility as: Poor Average Excellent

Is access limited to a certain amount of time? No Yes

What maximum connection speed is available? 56 kps Cable ASDL

Modem pool provided and supported by a corporation or state? No/ Yes

Is access free of charge No Yes

(How much/hour/month?) _____

Please rate accessibility as: Poor Average Excellent

Is access limited to a certain amount of time? No Yes

What maximum connection speed is available? 14.4 or 28.8 or faster?

What online resources (library databases, etc.) are available to on and off-campus students?

Internet Access: Faculty Members

Do faculty members all have e-mail accounts?	No	Yes
Do they have easy access to computers?	No	Yes
Access to Web browsing from same computer?	No	Yes
Remote access to e-mail?	No	Yes
Remote access to Web browsing?	No	Yes

If Faculty access is different than student, please complete the following:

Modem pool provided and supported by institution?	No	Yes	
Is it free of charge? Yes	No (How much/hour/month?) _____		
Rate accessibility as:	Poor	Average	Excellent
Is access limited to a certain amount of time?	No	Yes	
What maximum connection speed is available?	14.4 or 28.8 or faster?		

Modem pool provided and supported by a corporation or state?	No	Yes	
Is it free of charge? Yes	No (How much/hour/month?) _____		
Rate accessibility as:	Poor	Average	Excellent
Is access limited to a certain amount of time?	No	Yes	
What maximum connection speed is available?	_____		
What online resources (library databases, etc) are available to your faculty members on and off-campus?	_____		

Contact Information for LAN Administrator/Web Master

Name:
E-mail: Phone:

Quality Review Checklist

[Alessi and Trollip \(1991\)](#) advise evaluating each module or unit of instruction six times, once for each part of their *quality review checklist*. The checklist is comprised of the following seven categories:

Language and Grammar

- q Reading level
- q Bias, including race, religion, age, gender
- q Technical terms and jargon
- q Consistency
- q Spelling, grammar and punctuation
- q Visual display, such as spacing

Surface Features of the Display

- q Visual design of displays
- q Forms of representation
- q Quality and display of text
- q Input devices
- q Navigation

Questions and Menus

- q Menu interface
- q Quality of embedded questions
- q Feedback

Pedagogical Issues

- q Learner control
- q Design for diverse learners
- q Motivation
- q Active learning supports
- q Interactive tools

Invisible Functions of System

- q Student management
- q Security
- q Retrieval functions

Subject Matter

- q Goals, outcomes
- q Message design
- q Support for higher-order thinking
- q Architecture
- q Scope and sequence

Off-line Materials

- q Print-based resources
- q Student manual
- q Help sections
- q Directions
- q Instructor manual
- q Auxiliary materials
- q Other resources

The authors suggest numbering each screen display or page to provide a reference for the evaluators

and to help you locate the section needing revision.

Testing Methods

Method	Purpose	Description	People & Tools	Issues	Type of Data
Coaching	Provide better training, documentation Redesign interface to avoid need for questions	Participants ask questions of an (domain) expert coach Interaction between expert and user can be observed	Evaluator Domain expert 4+ users Recording devices Paper/pencil	Effectiveness Efficiency Satisfaction	Qualitative
Co-discovery	Helps users verbalize and problem-solve	Two users work together on a task or scenario and help each other verbalize observation	Evaluator 3+ groups of 2 Recording devices	Effectiveness Satisfaction	Qualitative
Performance Measurement	Obtain quantitative data about a participant's performance on a task, benchmarking	Goals are identified and rated for importance (e.g. # of tasks that can be completed in 30 minutes) Issues are quantified	Evaluator Technician to record test Recording devices 1-way observation System tools	Effectiveness Efficiency	Quantitative Qualitative
Question-asking Protocol	Understand participant's mental model of system and tasks	Testers ask users direct questions Questions are developed based on test goals, but can also be in response to a user's actions	Evaluator 4+ users Checklist Recording device	Effectiveness Satisfaction	Qualitative
Teaching	Tests a user's understanding of system and identifies design errors that confuse users	Experienced users work with novice users to explain learning task	Evaluator At least 2 groups of 2 Recording device Paper and pencil	Effectiveness Satisfaction	Qualitative

Thinking-aloud Protocol	Develop understanding of user's mental model of system Metacognitive strategy for user	Participants are asked to describe their thoughts, feelings, questions, etc as they work through a learning activity	Evaluator 4+ users Recording device is helpful	Effectiveness Satisfaction	Qualitative
Scenario Building	Understanding of user's requirements and expectations	Users design one or multiple real-life scenarios for accomplishing a task Features required to complete the task successfully are rank-ordered	Evaluator 4+ users	Effectiveness Satisfaction	Qualitative

Adapted from: Usability Evaluation at <http://cs.umd.edu/~zzi/UsabilityHome.html> and Usability.gov at <http://www.usability.gov/>

Inspection Methods

Method	Purpose	Description	People & Tools	Issues	Type of Data
Cognitive Walkthrough	Test the design of an interface by completing a series of tasks and evaluating their "understandability" and ease of learning	Testers determine interface components needs to complete the task Walk through task telling a "credible" story about why a user would choose that action. Success or failure stories	2–4 usability experts 0–2 developers	Effectiveness	Qualitative
Feature Inspection	Identify missing features and features to be eliminated or improved	Feature of the design is challenged against a "use case"	Evaluator	Effectiveness	Qualitative

Heuristic Evaluation	Discover usability problems, and provide strategy for addressing the issues	Based on general usability guidelines framework developed for design or system critique	4+ evaluators	Effectiveness Efficiency	Qualitative
Pluralistic Walkthrough	Increases probability of finding problems from a range of perspectives and needs Creates comprehensive documentation for the designer	Participants encouraged to individually describe experience or record observations, followed by group discussion	Evaluator Developer 2+ users	Effectiveness Satisfaction	Qualitative

Adapted from: Usability Evaluation at <http://cs.umd.edu/~zzi/UsabilityHome.html> and Usability.gov at <http://www.usability.gov/>

Inquiry Methods

Method	Purpose	Description	People & Tools	Issues	Type of Data
Field Observation	Observe use of system in authentic learning environment	Observation and interviews, and the collection of actual work "artifacts"	Evaluator 2+ users	Effectiveness Satisfaction	Qualitative
Focus Group	Achieve consensus about design issues	Participants who are brought together to have a moderated discussion about the environment or learning activity	Evaluator 6–9 users	Effectiveness Satisfaction	Qualitative
Interview	Probe or follow-up responses from other tests Acquire participant's story of use	Structured or unstructured	Evaluator 2+ users	Effectiveness Satisfaction	Qualitative

Questionnaire	Identify issues Analyze experience	A series of questions requiring either quantified or open-ended responses, or both	Evaluator 20+ users	Effectiveness Satisfaction	Quantitative Qualitative
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Adapted from: Usability Evaluation at <http://cs.umd.edu/~zzi/UsabilityHome.html> and Usability.gov at <http://www.usability.gov/>

Focus Group Protocol

You have all spent a few hours helping us evaluate the interface of a new course. We appreciate your commitment of time because it is very important to design an interface that helps students use the course materials in the most efficient and effective ways.

You provided very useful feedback to the evaluators while you were working in your pairs. We will summarize the information you gave us and make it available for you to look at. We will also summarize what you tell us today. All together, this information is going to help us make substantial changes to the Web site so that we end up with a good course.

Today, we want to get a sense of your experience of using the course Web site.

1. The interface design was based on a common metaphor. Can you describe the metaphor?
2. Is the metaphor appropriate for the task?
3. Did the metaphor help you find what you needed in the Web site?
4. How did you feel about the experience of using this interface? For example, did you feel that the interface supported your task? How did it support the task?
5. How can we improve the navigation experience for this Web site?

Sample Interview Protocol: Potential Faculty Interview/Focus Group Questions

Current Use of WebCT Tools

1. What WebCT tools are you using?
 - a. Content Delivery Tools
 - i. Course content path
 - ii. Presentation Tool
 - iii. Assignment Drop Box
 - iv. Glossary
 - v. References
 - b. Communication Tools
 - i. Bulletin Board
 - ii. Calendar
 - iii. Chat
 - iv. E-mail
 - c. Student Management and Tracking
 - i. Student Grades

- ii. My Grades
- iii. Student Tracking
- iv. Page Tracking
- d. Online Quizzes and Surveys
 - i. Quizzes for grades
 - ii. Quizzes for self-assessment
 - iii. Surveys

Reasons for Using WebCT

2. Why did you decide to use WebCT for this course?
3. Is size a factor in deciding to use WebCT? If yes, please explain.
4. Is the time of day in which the classroom component is scheduled a factor in deciding to use WebCT?
5. Is the course level a factor in deciding to use WebCT? If yes, please explain.

Use and Changes in the Use of Web-tools over Time and Reasons for Changes

6. Is this the first course you've taught using WebCT? If no, how has your WebCT use across courses changed over time? Please describe and explain reasons for the changes.
7. Can you talk about the instructional strategies and uses of WebCT that you felt worked and what didn't work and why.

Changes in Student Experience as Learners

8. Do you feel that there are any changes the students need to make to be successful learners in this mixed-mode learning environment?
9. Have you taught this course before without the use of technology? If so, do you feel there is a difference in student performance?
10. How do you feel your use of WebCT has made an impact on student's learning?

Integration of WebCT and Classroom Instruction/Move to Flexible Learning Environment

11. How has the availability of WebCT affected the way you use your in-class time?
12. Do you feel you have more contact time with students than before? Do you feel that you do most of your teaching in class? Has the role of lectures changed? Has in class attendance decreased due to your use of WebCT? If so, was that your intention? Do you see that as a benefit or a drawback to using WebCT?

Usability Checklist

Krug's #1 Rule of Usability, "don't make me think," elaborated in his book of the same name, cautions designers against making the learner think unnecessarily. Krug says, "...every time she has to ask herself, 'where is that?' or 'how do I get there?' or 'what is this supposed to be?' is adding to the (learner's) cognitive workload, distracting attention from the task at hand."

This checklist, a synthesis of the usability guidelines reported in this book, is designed to help you resist creating that extra cognitive load.

The Content

- q Content is up to 80% of page design

Make print option available for:

- q Documents longer than 2–3 screens
- q Academic or technical papers
- q Text-dense documents
- q A module with many smaller modules or chunks
- q On printable document, don't fix page width

Information Architecture

To make important concepts more prominent:

- q Use headings
- q Use color
- q Use emphasis
- q Use style
- q Use whitespace
- q Place near top of page
- q Use images more frequently on secondary pages than primary pages

Ways to organize information (Wurman):

- q Category
- q Spatial
- q Alphabetical
- q Time
- q Continuum

Other ways to organize information (Rosenfeld & Morville):

- q Topical
- q Task-oriented
- q Audience-specific
- q Metaphor-driven
- q Hybrid

Key headings are either:

- q Bolded
- q In a distinctive colour
- q Set off by more white space
- q Nearer the top of the page
- q Or a combination of all

Other headings:

- q Use 2–3 levels of nested headings
- q Meaningful, not cute
- q Make first word important

Related concepts

- q Related visually as well
- q Use similar visual style
- q Group under a menu or heading
- q Place in same screen area
- q Use outlines

e-Texts (Media)

Accessibility

- q Subtitle video
- q Mix media formats
- q Present same information in multiple formats
- q Provide optional transcripts for e-Texts
- q Accommodate different levels of technology
- q Use high production values for e-Texts

International users

- q Use generic objects that are not culture-specific (e.g. don't use American flag)
- q Include cross-cultural summary
- q Disguise or diminish national differences
- q Hide audience-specific details
- q Use an icon or simplified drawing instead of a photograph
- q Obscure or omit textual labels
- q Pick universal symbols, avoiding:
 - q Gestures
 - q Mythological beings
 - q Puns
 - q Religious symbols
 - q Totems

Music

- q Use universal forms such as instrumental versions of jazz
- q Be careful that melodies have same meanings in different cultures
- q Avoid music with strong regional or national associations (e.g. reggae)

Video

- q Use sparingly only where it is important to convey emotion, depict fact or history, and show natural movement.

Other recommendations:

- q Avoid using images or parts of peoples' bodies
- q Dress people modestly
- q Minimize indication of social or economic class
- q Keep relationships among people simple, polite, slightly formal
- q Keep hands as generic as possible
- q Use cartoon characters when possible and appropriate.

Links are:

- q Obvious
- q Contextualized (e.g. click here for....)
- q Consistent
- q Conventional
- q Not embedded in text

Readability

- q Grade 5–8 for general audience (or international)
- q Grade 8–10 for professional/post-secondary audience
- q Emphasis for important words
- q Bulleted lists

Fonts

- q Sans serif for online reading
- q Serif for printed documents
- q Don't mix font styles
- q No smaller than 12 point
- q Use title or sentence case, not all uppercase
- q Text stays still (e.g. doesn't flash)

Content Structure

- q Inverted pyramid
- q Use topic sentence (for scanners)
- q One idea per paragraph
- q Place detailed or elaborated information on secondary page
- q Chunk text
- q Link chunks
- q Use sidebars and pull-quotes
- q Reduce number of words (50%)

Language

Readability and International Issues

- q Concise, objective language
- q Simple sentence structure
- q Active voice
- q Limit use of metaphors
- q Limit pronouns
- q Eliminate jargon
- q Avoid local expressions and idioms (e.g. sportuguese)
- q Use internationally known references
- q Don't use relative expressions (e.g. domestic or international travel)

Make numbers easy:

- q Spell out currency formats
- q Decimal points differ
- q State dates clearly with words and numbers
- q Make time zone known
- q Include international units of measure
- q International telephone number formats

Other recommendations:

- q Spell out abbreviations and acronyms
- q Use high-quality, proper spellings
- q Avoid long, intensive modifier strings - use just one modifier before the word it modifies
- q Use 'alerting words' such as 'first, second third' or 'note, remember, caution'
- q Spell-check, then proofread

The Online Environment

Accessibility

- q Use HTML heading tags (H1, etc.) to facilitate scanning
- q Use meaningful page titles (for search engines)
- q Each page has its own title
- q Eliminate articles (e.g. 'the') in page titles
- q Avoid images, like site maps, that need precise mousing
- q List download times and file sizes beside e-Texts
- q Note length of play for audio and video

Color

- q High contrast between text and background to speed reading process
- q Remember some users are colorblind
- q Plain color backgrounds or subtle patterns

Navigation

- q Use navigational conventions
 - q Directional arrows
 - q Back button
 - q Home icon
 - q Site id
 - q Labels
 - q Search box
- q Hyperlinks are blue and underlined
- q Use standard icons
- q Provide a search tool in obvious location
- q Use "breadcrumbs"
- q Navigation pages don't scroll
- q Minimize instructions
- q Menus on left side or at top
- q Navigation bar: at top or bottom but not side of screen
- q Make hyperlinks obvious
- q Don't use links within the same page
- q Don't include every piece of content or link on site map, only general overview
- q User may not recognize graphical cues
- q Every page on the site should link to the front page or home page

Visual Design

- q Create a clear visual hierarchy
- q Break pages up into clearly defined areas
- q Left justify text
- q Headings should be just one double-space from the first line of regular text that follows

Information Retrieval

- q Use Table of Contents for sites with hierarchical organization and larger sites.
- q Important content goes above the fold
- q Depth of site is 3–5 mouse clicks

The Facility

- q Headphones available for audio texts
- q Stations are accessible
- q Full view of display screens from each station
- q Sufficient access hours
- q If authentication required, information provided
- q Technical support is available

This is a summary of the work of [Fleming \(1998\)](#), [Garcia \(1997\)](#), [Horton \(2000\)](#), [Krug \(2000\)](#), [Nielsen \(2000\)](#), [Rosenfeld and Morville \(1998\)](#), [Wurman \(1990\)](#)

The Case of Accounting Re-design

The Faculty of Management offers a senior-level undergraduate course in the Accounting and Finance major in the Bachelor of Management degree. The course has always been offered once a year in regular term, in a face-to-face setting. The primary mode of delivery is lecture, with one small-group project, a mid-term exam (multiple-choice and open-ended questions), and a final paper. Class size is 15–20.

The learner population is historically in the fourth year of the degree, with an average age of 21, over 75% white males from urban settings. By the third year of the program, the target audience has become more homogenous, high achieving, and highly competitive. They typically have excellent mathematical skills. End of course evaluations rate the lectures high but the group work fairly low on a scale of effectiveness and satisfaction.

A private firm, Financial Planning Educators, Inc. (FPE), has approached the program chair. The firm works closely with the public sector, providing paper-based courses to government employees and other personnel who wish to upgrade their credentials and progress through the ranks. The government has indicated an interest in providing upgrading opportunities for departmental bookkeepers, administrative assistants, and risk managers.

The Faculty and FPE agree to collaborate in re-designing the FP course to be offered in an e-Learning format. The new delivery format will be an option for full-time accounting students, but will be the only opportunity for government employees to participate, as they are scattered across the country. The client has agreed to establish small learning labs, one or two networked stations, in each department that has more than four employees enrolled in the course. The department has also promised to be the test site for the first version of the course, i.e. the pilot. However, the employees will not be allowed work time to participate; they will be required to study during regularly scheduled leisure and meal breaks. If they successfully complete the course, they may also apply to the institution to have the course credited towards a future or in-progress diploma from the Faculty's Continuing Professional Education division.

The professor who usually teaches the course and another more junior faculty member are given

release time to develop the course. The chair has also retained the services of a well-regarded instructor who runs his own accounting company during the day and teaches at night in the MBA program. The Deputy Minister has identified a departmental manager to work half-time with the course development team and the FPE agrees to provide, under a non-disclosure agreement, all of their current course materials and to review the design at various stages.

The team does a needs assessment and discovers that the majority (80%) of the new clients or learners are female, with an average age of 38. They report being comfortable with computer technology for work, but report only moderate experience and comfort with using the Internet. Most work full-time and have families. About 30% have taken a previous course in the diploma or have begun working on the FP certificate from FPE. Of 200 survey respondents, only ten have had an online learning experience.

The course team designs the course to be a blended delivery over six months. It will be case-based. There will be an intensive weekend seminar mid-way through the course that all participants will be expected to attend in person. During the seminar the small group project teams will be formed and the case presented. The team will have the opportunity to work together for one day to strategize their work plan. The seminar leader assigns roles.

The mid-term examination is eliminated. Instead, each learner will prepare an individual case assignment. The grading system changes to reflect the importance of the collaborative group project, i.e. the case is valued at 50% of the final grade.

The course materials remain heavily text-based. The team decides to make them all available as document sets within the Web course. The documents include the class notes, ten academic papers, and sample cases. No print versions are offered.

However, because the team agrees that interviewing skills are essential, two video clips showing two different interviews (one showing inappropriate interactions) are included on the site. A number of still images of charts, graphs, tables, etc. extend accounting concepts. A class discussion board is available and the groups are expected to communicate using this tool. Their group discussions are worth 15% of the total grade.

The team has eight months to develop the new course design. The pilot course will run over the winter session in the next academic year. Based on evaluation results, the faculty will decide whether to include this course format in the regular course calendar and whether to continue the relationship with FPE to develop other courses.

Sample Usability Plan

The usability testing strategy for this course is described by intended instructional outcomes, usability test goals, representative user profile, recommended methods and timelines, and proposed evaluation team descriptions.

Outcomes and Related Goals

The course is redesigned to:

- *Increase flexibility for full-time students in the program*
- *Provide access to other learning communities*
- *Address needs of older women learners who work full-time*
- *Use a problem-based strategy*

User Profile

There are two intended audiences:

1. Fourth-year students: majority male, high achieving, with logical-mathematical skills
2. Career female government employees: lower academic attainment levels, workplace environment, little study time, family and social responsibilities, low to moderate computer skills (related to learning online)

Participants should include 4+ target users from each group

Recommended Strategy

There are a number of key goals to evaluate:

1. Can users transform learning expectations from a didactic, lecture-based approach (and related assessment strategies) to a collaborative, problem-based approach (and related assessment strategies)
2. The learning needs of group #2 - for example, will content need to be structured differently?
3. How to accommodate both learners in the workplace and learners in a traditional academic setting. For example:
 - a. Short work sessions (15-30 minutes)
 - b. Security issues (e.g. firewalls)
 - c. Computer literacy
 - d. Readability levels
 - e. Access issues (e.g. bandwidth for video)
 - f. Accreditation issues
 - g. Individual vs. collaborative learning environment
 - h. Blended delivery approach - proportions, pacing
 - i. Gender, age issues
 - j. Culture of workplace vs. culture of institutional setting
 - k. Learner support

The usability strategy will need to proceed in several stages and will involve at least three user groups: government employees, management students, and a combination of both.

There are five key areas to evaluate:

1. Pedagogical approach
2. Delivery format
3. Learner support
4. Assessment strategy
5. Design of online environment

Timelines

Explorative Phases

Phase I: inquiry-based (6 weeks):

- Needs assessment of target users
- Baseline for group 1 (management students) - course evaluations, etc.
- Learning environment assessment (on campus, at work, at home)
- Field observations, user survey and facilities questionnaire

Phase II: testing (4-6 weeks)

- Prototype of interface

- Prototype of short case (paper and slides)
- Sample assessment strategy
- Co-coaching and think-aloud protocols
- Focus group
- If time permits, pluralistic walkthrough
- Location: in campus lab, at government department and in the homes of three employees (minimal access to moderate)
- Sample different times of day

Evaluation Phase III: (4 months)

- Pilot of first term of redesigned course
- One-to-one interviewing, cognitive walkthroughs, questionnaires, focus groups

Evaluation Team Roles and Responsibilities

- Manager, participant observer from each target user group, three evaluators, graduate student in accounting area

Data Elements: Some Guiding Questions...

- q Is text the best information element?
- q What is the purpose of the video?
- q What must the reader have in order to use this site (plug-ins)?
- q If you choose to use video, what must you consider?
- q What information elements are used to carry the main message?
- q If the user can't see the video, is the meaning of the content affected?
- q How are graphical images used?
- q When graphics are used, how do they relate to the text?
- q Could the writer have conveyed the message as effectively using other data elements?
- q Why did the writer choose the visual design?
- q What purpose does it serve?
- q Why is audio included?
- q Would audio alone have been effective?
- q Can you think of any cautions/challenges when using audio?
- q Is animation used well?
- q Does animation enhance interactivity?
- q Is animation necessary for learning?
- q What is your reaction when animation is over-used?

To Do List

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Team LiB

◀ PREVIOUS **NEXT ▶**

10e-Learning Trends - The Mobile Environment

Concept Guide

The Mobile Computing Scene

- Has your institution explored m-Learning?
- Does your organization have a technology plan that includes emerging technologies?

m-Learning Environments

- Think of an effective way to incorporate m- Learning in your context.

Advantages of m-Learning

- Describe two advantages of m-Learning for your discipline.

Challenges of m-Learning

- How does the screen size of a handheld device affect readability?
- Text entry is a challenge for mobile learners. Name another challenge in developing m-Content.
- Commercial m-Content is available through publishers and other developers. Are you aware of any providers for your discipline?
- Libraries are exploring policy and implementation issues related to e- Books. What is the biggest challenge for library specialists and how can it be resolved?

M-Learning in HE

- Several pilot projects are described. Many of these projects involve professional faculties and/or training organizations. What outcomes have been achieved?

The m-Reader

- Do m-Readers have different or unique accessibility needs or support needs from e-Learners?

Questions and Goals

Use this form to record your questions about m-Learning.

As you read, return to this form to record new ideas, resources, and additional questions.

Personal Goals

Questions	Related information	Resources

Key Terms

- q m-Learning
- q m-Learning environments
- q Mobile computing devices
- q Personal Digital Assistant
- q Just-in-time learner
- q E-book
- q Virtual reality displays

To Do List

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Team LiB

◀ PREVIOUS NEXT ▶

A Story of Practice John Boeglin and Psyce 104 - Procédés Psychologiques De Base

This is the account of one instructor's journey from teaching in a face-to-face lecture mode to a distributed, Web-based, blended model. This story is told through excerpts from:

- An original project proposal for the *Partnership*
- A recent conversation with John
- Published papers
- The course Web site
- Charts and graphs from the evaluation of the pilot
- Development tools (e.g. the critical path)...

...and is interspersed with my analysis.

John Boeglin, Associate Professor in Faculté Saint-Jean (FSJ), teaches undergraduate and graduate Psychology courses and graduate level research courses. FSJ is a faculty in which French is the language of instruction. As the only French-speaking institution in Western Canada, FSJ serves native French speakers and those who wish to learn in a bilingual environment. Many of these learners live in rural and remote areas and/or hundreds of miles from the campus. Concern for increasing learning opportunities for these communities was at the core of John's intention to re-purpose his large enrollment introductory Psychology course for both an on-campus and a distance population.

The story "plot" unfolds in the same sequence as the chapters in the text. Over a year he:

- Considered the challenges of re-purposing a face-to-face course, for which he has carefully accumulated mostly print resources.
- Analyzed environmental, social, and instructional contexts in which the new course will be taught.
- Explored the planning process and identified the resources he will need to be successful.
- Re-examined his course and his intended outcomes.
- Learned about the Web as a delivery platform, integrating synchronous technologies, and learning content management systems and related tools.
- Designed an environment that aligned his outcomes with the needs of his learners.
- Adapted his existing content, creates new content, and found additional online resources, or objects.
- Learned about strategies for effective online interactions.
- Evaluated the pilot course and revised it for the second term.

As you read this chapter, think about your own progress. Does John's approach seem logical? Can you relate to his experiences? Can you take away a new idea or avoid a problem?

Challenges and Trends at the University of Alberta

The Institutional Context

The University of Alberta is a large, urban, research-intensive, publicly funded institution. The university has 16 faculties, including a Law school, a Medical school and teaching hospital, a Business school, and very large Science, Arts, and Education Faculties.

Established in 1908, the university has always been primarily residential. The approximately 30,000 full-time students have come onto campus for classes that are scheduled Monday through Friday, from 8 a.m. to 5 p.m. Classes scheduled after those times are considered evening classes. During intercession (May through August) courses from every Faculty are available, including intensive summer institutes and academic travel experiences, for example, a mortuary archeology dig at Lake Baikal in Siberia (Department of Archeology).

The University of Athabasca (AU), in the province of Alberta, is a virtual university whose entire curriculum is delivered at a distance through a blend of print packages, the Web, media that are mailed out or educational programs carried on a learning channel on local television, and audio and videoconferencing. Accordingly, the University of Alberta is distinguished by senior administration as "primarily a face-to-face institution." Very few undergraduate programs are offered entirely online or in alternative or flexible formats. Students registered full-time at the University of Alberta who need or prefer a more flexible approach to their programs may complete courses at Athabasca University for transfer credit at the University of Alberta. In recent years, AU's student population has included increasing numbers of University of Alberta students who are seeking more options in the way they learn.

With no intention of competing with AU, the university has adopted WebCT™, a learning content management system, and has funded several academic and technical service support units to encourage its approximately 2000 faculty/instructors to develop Web-enhancements for their face-to-face undergraduate courses. Interest and activity vary among Faculties, with most Faculties adopting blended learning models to support their full-time, on-campus undergraduates. Several Faculties have developed entirely online environments for graduate or continuing professional programs.

The Faculty Context

Faculté Saint-Jean is the university's only Faculty in which French is the language of instruction. Courses range from undergraduate first-year Chemistry or History courses through Masters level courses in Education and French Literature. Although FSJ teaches largely in a face-to-face mode, it is one of the Faculties who has made a commitment to the distance delivery of selected courses into other western provinces and the Territories in Canada.

Since many of its learners are off-campus, FSJ has delivered many of its courses in alternative formats since 1984. For the most part, course content was contained in print packages mailed to the learner's home and learning was supported through regular audio teleconferences. In the late 1980's FSJ began exploring videoconferencing solutions. In 1997, they obtained funding for an in-house (PictureTelä) videoconferencing facility and, subsequently, an additional Smart Classroom. At that time, several faculty members became interested in exploring the Internet as an instructional platform. Between 1984 and 1993, the Faculté offered over 40 courses in an alternative format to learners in Western Canada.

John remembers the rationale for re-purposing Psyce 104 for an e-Learning delivery.

In the fall of 1998, PSYCE 104 was scheduled for simultaneous delivery to on- and off-campus students by way of interactive videoconferencing. This particular initiative arose out of Faculté Saint-Jean's commitment to develop and implement alternative delivery technologies for its regular and distance education programs. Since this delivery format represented a significant departure from the face-to-face format of previous years, particularly in terms of physical, social, and technical constraints, the entire course content had to be redeveloped. This development process involved, among things, repackaging the lecture content into smaller segments, incorporating more opportunities for interactivity into the lectures, and paying more attention to the preparation of visual materials to be used during the lectures. It was during the early stages of this redevelopment process that we decided to further enhance the course by way of online teaching and learning support.

[Boeglin & Campbell, 2002](#)

The Learning Context

access to technology and opportunities to learn	Alberta North is a coalition of small rural colleges and other training agencies. In the early 1990s, the coalition established a provincial network of community learning centers - in high schools, libraries, and town halls - that could support online learning through access to the Internet and in some cases through a videoconferencing classroom. Rural, northern, and out-of-province communities with a French-speaking population, some without Internet Service Providers, were able to participate in virtual classrooms that were supported technically at a low level.
changing learner	In 1997, the Dean asked John to teach a mixed mode course for the fall of 1998. The model would combine a face-to-face class with several learners in different distance communities joining at the class time. By combining the classes only one faculty member was needed to teach. The distance students were junior undergraduates, although several were employed older adults, who had families. Several of the students on campus were also older adults with jobs and families. The remainder were "typical" undergraduates. One on-campus student did not have French as his first language; the rest were native French speakers or completely bilingual.
digital divide	Since the distance learners were employed during the day, the class was scheduled for one evening a week. In this sense, the on-campus learners were expected to conform to the needs of the distance students, rather than vice versa. The on-campus students had extensive technical and learning support, through staffed networked computer labs in the Faculty and on the rest of the campus, and high-speed access to the Internet either through the University or personal ISPs. The distance students had to depend on the Alberta North community sites, which were not always staffed and did not have the same kind of access.
students as consumers	The distance students paid a premium on the regular tuition fees for a three-credit course and expected a comparable level of quality and support. The Faculté, through John, was expected to ensure a trouble-free delivery, technical support from a distance, and the same learning resources and activities, at the same time, as for the on-campus students. In reality, John assumed more roles or more complexity in his traditional role than before. He was the curriculum planner, content
the role of the professor	developer, teacher, videoconferencing expert, technical troubleshooter, and facilitator, as well as the tutor and the evaluator, both of student learning and of the course design and delivery. At the same time, he would have to become comfortable with a new delivery platform through WebCT, learning the LCMS, related productivity tools, and new approaches to teaching.

The Business Case

In the Introduction, you saw that key stakeholders within the business and education communities have made recommendations for the design of e-Learning environments that include:

- Expert-rich content and curriculum
- Ease of use
- Flexibility and convenience
- Continuous assessment
- Real-time feedback, tracking and metrics
- Multimedia simulations
- Rich case studies
- Threaded discussions

- A dynamic, engaging environment for learning
- Quality assurance

In the [next section](#), John addresses *Five Key Questions* about his Psychology course and the expectations of the administration for a combined distance/F2F delivery. As you follow his process of decision-making, keep the elements of the *Business Case* in your mind. *For example, how does he address the issue of quality assurance?*

Making a Decision for e-Learning

a personal challenge By 1998, John had taught university-level psychology for two decades. He had had early experience with videoconferencing and audioconferencing at another university. He had developed a set of resources (or objects) that included course notes, overhead transparencies, copies of articles and other information, pictures and slides, video, textbooks, and a databank of multiple choice questions. He worked hard every year to refine his teaching approaches and was known by students to be a knowledgeable, interesting, and effective lecturer. His course evaluations bore this out.

But John was at a point in his career where he was seeking new challenges and opportunities to stretch himself as a teacher.

At the time we were looking at reaching out to our Francophone and Francophile students who for geographical and other reasons were unable to come to Faculté to take courses and so were looking at alternative teaching and learning technologies.

Our first videoconferencing course was delivered in January of 1998. So all the prep work that was going on for this course kind of piqued my interest, I volunteered myself... I was interested in exploring this technology for my introductory psychology courses...

Given that we had no expertise at the Faculté, I had heard very good comments about ATL from (a colleague)... and that's how I ended up with ATL for the next 30 years! Everything came together at the right time....and also I was coming to the end of my first term as Associate Dean so it was an excellent opportunity to move off and do something totally different for awhile.

At the same time, he was responding to changes in student expectations and behaviors that were influencing his own planning.

The lectures are well organized and informative (according to student evaluations) but lack pizzazz (my auto-evaluation). Lectures include lots of overheads, videos, and classroom demonstrations to which the students are generally very receptive. Unfortunately, there is a significant amount of factual information that must be presented during class time, which leaves very little, if any time for theoretical reviews, research reviews, group discussions or guest speakers. Although students are encouraged to ask questions or share relevant experiences, there is little active participation during class time. There is a textbook for the course that is not particularly interesting (outdated French adaptation of a widely used American textbook) nor is it visually appealing (Quebec-based editors have very limited production budgets). According to the University Bookstore, fewer than half the students actually buy the textbook.

Partnership proposal, 1997

collegial support	In 1996, one of his colleagues worked with Academic Technologies for Learning (ATL) to develop an Internet-based French grammar course. He had been satisfied with the support he had received. As Associate Dean Academic, John had dealt first-hand with implementation issues for this course. He wondered whether he could apply those lessons, his desire for a new instructional project and potential research study, and the need of FSJ to support learners at a distance.
the Partnership	ATL had a program in 1997 that would support the redevelopment of John's course. The <i>Partnership</i> was designed to provide course release, for one term, to faculty members who were committed to developing a resource, course, or program with a significant technology component. With the help of an instructional designer in ATL, interested faculty members developed a proposal that described their course, identified goals for redevelopment and specified deliverables, and anticipated an appropriate timeline. ATL evaluated the project, and assigned a course development team for the length of the project. Each partner was expected to identify personal professional development goals and to collaborate in designing an evaluation model. The partner was designated a personal work area in ATL's Studio, where he/she was to work intensively with their team over the life of the project (usually about one year). John's partnership contract is included at the end of the story.

In this excerpt from John's Partnership proposal (1997), he talks about his personal and professional goals.

Over the past several months, Faculté Saint-Jean has organized several discussions, demonstrations as well as a workshop to promote the use of its videoconferencing facility. While academic staff members have shown a significant amount of interest, there is very limited professional support for initiatives of this nature. In the present case, I am turning to ATL for conceptualization and production support for the videoconferencing portions of these courses as well as for the creation of a course Web site. If this proposal is approved, the knowledge and expertise that I will have acquired during my partnership with ATL will allow me to undertake similar initiatives for the other psychology courses that I teach. It will also enable me to serve as a role model and resource person for other colleagues at Faculté Saint-Jean wishing to undertake smaller projects.

Partnership proposal, 1997

John's partnership proposal was accepted in the fall of 1997 and he was assigned a core course development team consisting of an instructional designer, videoconferencing expert, graphic artist, and Web designer.

Five Key Questions

John had personal professional goals for immersing himself in this intensive experience. Both he and his team recognized that the process would require re-evaluating his instructional methods and course planning approach, as well as his carefully accumulated set of learning resources. The resources would need to be re-purposed into learning objects and new objects might have to be developed or located. He would have to learn new technical and design skills.

Who are the Learners or Readers?

- diverse needs** The answer to this key question should suggest a rationale for a technology-mediated approach
- Do the learners in this course, for some reason, need or require a different or alternative approach to my "regular" course model? If the answer is yes, consider an alternative design or delivery.
 - Would an alternative approach be best supported by technology use? If the answer is yes, explore the characteristics of the learning technologies available.

We began this project by discussing the nature of the typical undergraduate in FSJ, compared to the new community of learners at a distance.

There has been some interest expressed for access to introductory, university-level courses from individuals in nonurban centers who are unable to come on campus on a regular basis...by offering one or two different courses each semester, over a period of two to five years, interested individuals will be given the opportunity of completing the first year of our BA program by way of innovative synchronous and asynchronous teaching and learning methodologies.

Partnership proposal, 1997

Many faculty assume that a class of undergraduate students in a first-year introductory course is homogeneous. For example, students are described as:

- Young, under or close to 20 years of age
- Full-time, on campus during the day
- Having part-time jobs, if they work at all
- Single
- Fluent in the language of instruction (in this case, French)
- Computer literate
- Open to innovation
- Probably local

However, as we saw in Chapters 1–3, the demographics on our campuses are changing. John's F2F class actually did contain students with this profile, but it also contained:

- A single mother
- A student not fully bilingual
- A student who worked full-time

- access issues** And, although there were degrees of computer literacy, in 1998 few students had access to an Internet connection or computer at home and were initially resistant to the Web component of the course, especially the online discussions.

The distance students were more of a mystery. The communities from which FSJ learners had come in the past and that had an Alberta North center were previously surveyed for their interest in the course. However, they were not asked for their age, access situation, or family situation.

Because we didn't know who the students were in advance, we decided to design the course to meet the needs of the "minimally connected" learners, with:

- Limited access to a computer

- A low-speed modem
- No color

In other words, we designed for the distance learners rather than the on-campus learners.

We also suspected that the distance learners might be older and work during the day. In that case, those learners might also be nervous about the technology - the actual computer use as well as the learning approach.

Did the characteristics of the identified learners suggest a technology-mediated design?

John talks about aligning his instructional goals with course design.

Providing pre-session access to lecture outlines highlighting the key concepts to be covered helped students organize the material for learning. The outlines also supported a guided, note-taking strategy during the face-to-face lectures.

The videoconferencing was limited to a single three-hour session each week, so we wanted to provide students with unlimited access to all course materials, plus have ample opportunities to interact with me and the other students in the course. Hyperlinks were there to actively pursue knowledge construction outside of the regularly scheduled weekly meetings. For example, we hoped that participation in an online threaded discussion would require students to prepare evidence and personal narratives related to the discussion topic.

Boeglin & Campbell, 2002

What Learning Goals or Information Outcomes do you want to achieve?

design rationale The answer to this key question should suggest a rationale for a technology-mediated approach:

- Are the learning outcomes primarily cognitive and/or affective? Psychomotor outcomes are more difficult to achieve on the Web.
- Are the learning outcomes best supported by or are enhanced by using e-Learning strategies? For example, if flexible access is a desired outcome, an e-Learning environment might be appropriate.

Psyce 104 is an introductory psychology undergraduate course. Psyce 104 and 105 (Term II) are required for the Bachelor of Arts. The learning outcomes for the existing Psyce 104 were primarily cognitive in nature.

resource inventory The original course design involved cognitive activities, including reading and discussion in class, that ranged from knowledge and comprehension through higher-order skills. Research and academic writing skills were introduced. Student learning was assessed through a mid-term and final multiple-choice exam and a mid-term academic paper on a relevant issue in Psychology. Through these activities individuals for whom French was a second language were also supported in improving their fluency.

John's inventory of teaching resources, while extensive, was difficult to keep current. Appropriate resources in French were not easily available in Canada and were expensive to import from Europe. He wanted to add resources, some from alternative sources that could be manipulated directly by students.

However, John was frustrated that his classroom interactions were dominated by the presentation of information. He was looking for ways to increase both the frequency and cognitive level of discussion in the class. He was interested in ways to encourage learners to prepare in advance for the lecture themes and to participate actively, rather than furiously taking copious notes.

affective outcomes John also wanted to encourage peer-to-peer interaction in this course. Since the class was often large (up to 120 students) and students came expecting a lecture there was little opportunity for discussion. The structure of the class and the amount of material to be covered did not encourage collaborative, project-based activities. John wanted to increase social interaction, increase learner expertise, and develop a community of learners.

Up until that time, PSYCE 104 had been delivered using a lecture-based teaching strategy. According to student evaluations extending over a period of several years, the lectures were usually well-organized and informative, though not particularly exciting. The lectures were enhanced with overheads, videos, and in-class demonstrations to which the students were generally receptive. Unfortunately, given the significant amount of content to be covered during class time, there was very little time left for group discussions or other forms of social interaction that could have created a more active, or participatory, learning environment. Moreover, students were reluctant to ask questions or to share their relevant experiences during class time, even when encouraged to.

[Boeglin & Campbell, 2002](#)

Aspects of e-Learning environments that aligned with John's instructional goals included:

- Alternative content presentation
- Increased interaction through discussion forums
- Access to new and alternative resources
- Ability to design cognitive tools
- Media
- Active learning activities such as group projects

Could an e-Learning Environment Support Intended Learning Outcomes?

How will you know when this happens?

The answer to this key question should suggest approaches to learning assessment that are authentic and that are appropriately or *better* accomplished using features of an e-Learning environment. For example, the cognitive level of discussion can be assessed because the online discussion results in transcripts of the interactions.

alternative assessment tactics Learner assessment had been accomplished mainly through timed multiple-choice examinations and a mid-term academic paper. John felt he could enhance the learning that occurs through self-assessment by providing online quizzes that contained meaningful feedback, a component of the learning management system in WebCT™. He could evaluate online discussions by applying a critical thinking rubric and setting academic criteria for responses that aligned with the goals of academic research and writing (e.g. providing evidence for responses). As a result, he was able to replace the mid-term paper with extended online discussions to meet similar learning outcomes.

What other components of an e-Learning environment provide alternative and improved assessment capabilities? John saw the online quizzes as an effective cognitive learning tool.

Self-assessment can take the form of online quizzes and things like that. Seems to me that that provides opportunity for them....in much the same way that you can learn from reading you can learn from online practice quizzes with feedback...

Is the Web the Best Learning/Information Environment for this Course?

This key question should be asked last, rather than first. Identifying a delivery environment in advance of developing an understanding of your learners, evaluation of your learning outcomes and resources and activities to meet these goals, and the nature of learning assessment tends to constrain your planning process and your instructional creativity. Our best advice is to seek the delivery technology to support your instructional goals.

John's instructional context, need to support diverse learner needs, and professional goals related to personal growth in methods of effective teaching, indicated a partial e-Learning solution. At this point it was possible to explore the delivery technologies that were available and appropriate and to develop a design blueprint for the learning environment.

John remembers asking himself why he wanted to develop a Web-based environment.

Is it because you want to cater to hundreds...of students at the same time? Is it because of off-campus as opposed to face to face? Is it because you have a special interest in technology? Is it because you are deeply convicted that this technology is deeply motivating and engaging for your students?

Another reason for having introduced the Web-based component of this course, which was initially supposed to be a strict videoconferencing course. I wanted the Web-based component to enhance interaction outside of the normally scheduled classes once a week.

Finally, will e-Learning add Value to the Teaching or Learning Experience?

This key question really has three parts.

1. Will a cost-benefit analysis evaluating the value to the institution of developing an e-Learning environment reveal that the investment of the extensive personal and institutional resources required - including time, personnel, and delivery support- are justifiable? *For example, will new communities of learners, that were previously excluded, be supported?*
2. Considering your academic career, personal teaching style and strengths, willingness to take risks and possibly make personal and professional sacrifices and time available for a steep learning curve, will designing an e-Learning environment be a good personal investment? *For example, will you learn valuable new instructional skills that translate to your F2F teaching?*
3. Will your learners have learning opportunities that were not previously available or will they learn more efficiently or effectively? *For example, will they be involved with new peers with new perspectives to share?*

John made a decision to proceed with a course redesign, given all the implications described above. What have you decided?

The Planning Process

In this section, John's design decisions are discussed in the context of five decision points in the planning process:

1. Outcomes
2. Audience
3. Activities
4. Assessment
5. Resources

Earlier you saw a checklist of seven advantages of Web-based learning. As you follow John's planning process, compare his decisions with this list. Is this checklist helpful in guiding your design decisions?

Seven Advantages

- q Active learning
- q Real-world context
- q Depth of coverage
- q Critical and creative thinking
- q Time for reflections
- q Collaborative learning
- q Developing information literacy skills

John's course architecture reflected several of these elements:

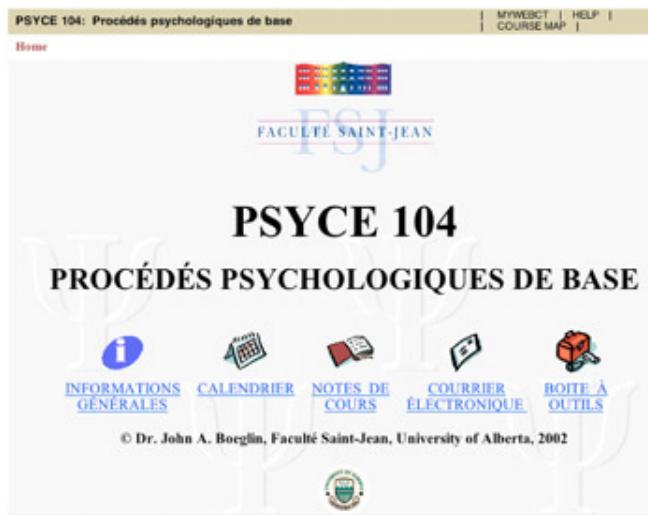


Figure S.1: Course Architecture

Outcomes

John's goals included:

- Increasing classroom participation
- Encouraging students to prepare the basic content so that he could elaborate on core topics in class
- Improving cognitive results
- Increasing and improving student/instructor interaction outside of the class
- Supporting peer discussions
- Developing effective research skills
- Improving academic writing
- Including more recent and interactive learning materials
- Distributing resources quickly
- Supporting learners who had been excluded

He explored Web-based environments with these goals in mind. *Would just one or even two of these*

goals have rationalized his decision to develop an e-Learning environment?

John recalls his primary goal or motivation as improving accessibility.

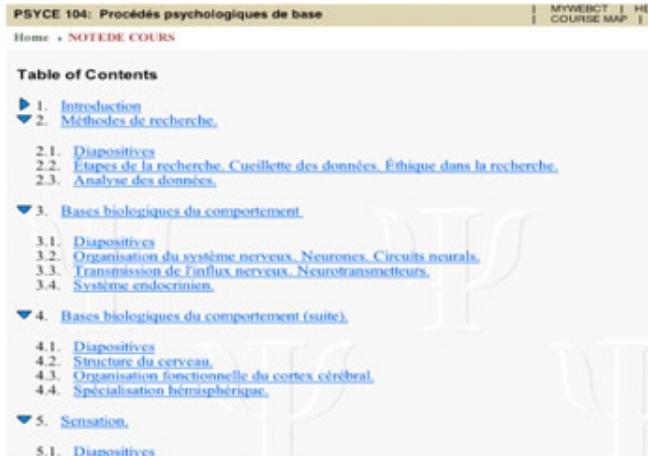
Within my context, it (the project) was to enable Francophone/Francophile students to take University undergraduate courses for credit that they wouldn't ordinarily have access to. So that would be the primary reason...

It's an accessibility issue. I was responding to accessibility for my students.

John felt that he could enhance his course significantly by supporting meetings with a course Web site. For example, he made his course syllabus available from the homepage of the course. Although he prepared a print copy of the syllabus, the online version could be updated quickly and be immediately accessible. The university's policies on plagiarism and behavioral guidelines were also available from the homepage so were expected to be followed without exception.

Static resources that would otherwise be mailed out to distance students were kept current and there was no delay in receiving updates.

cognitive outcomes	Cognitive outcomes were supported by embedded questions, cognitive tools such as notes outlines, course notes that highlighted key points, and quizzes for self-assessment. Figure S.2 shows the structure of each topic, which corresponded to a synchronous lecture.
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The screenshot shows the course website for PSYCE 104: Procédés psychologiques de base. The top navigation bar includes links for MYWEBCT, HE COURSE MAP, Home, and NOTEDE COURS. The main content area is titled "Table of Contents". The structure is as follows:

- 1. Introduction
- 2. Méthodes de recherche
 - 2.1. Diapositives
 - 2.2. Étapes de la recherche, Cueillette des données, Éthique dans la recherche,
 - 2.3. Analyse des données,
- 3. Bases biologiques du comportement
 - 3.1. Diapositives
 - 3.2. Organisation du système nerveux, Neurones, Circuits neurals,
 - 3.3. Transmission de l'flux nerveux, Neurotransmetteurs,
 - 3.4. Système endocrinien,
- 4. Bases biologiques du comportement (suite).
 - 4.1. Diapositives
 - 4.2. Structure du cerveau,
 - 4.3. Organisation fonctionnelle du cortex cérébral,
 - 4.4. Spécialisation hémisphérique,
- 5. Sensation,
 - 5.1. Diapositives

Figure S.2: Topic Structure

Each topic begins with the slides from a PowerPoint presentation that John will use in the face-to-face lecture (e.g. 2.1, 3.1, and 4.1). The students print and bring to class:

- The slides
- A page of key terms and objectives (notes outline)
- Several text screens of notes that highlight the key points of the content for that topic (e.g. 3.2–3.4).

These materials "free" them to participate actively during the F2F sessions. This content was updated and opened directly after the previous lecture so that learners had a week to prepare for the lecture. In the F2F class, John accessed the course Web site to show the learners where to find the content and highlighted the key questions that would be the themes for the next week's lecture. [Figure S.3](#) is an example of a course page in which key words are highlighted as organizers and the main points are provided in outline format with space for note-taking.

Home > NOTEDE COURS > Bases biologiques du comportement
 ACTION MENU: Previous | Next | Contents | Retrace | Refresh | Quiz | Glossary | Take Notes | Search | Chat
 Discussions | Mail

Objectifs

- Examiner l'organisation du système nerveux
- Examiner la structure et le rôle fonctionnel des neurones
- Comprendre les grands principes des processus impliqués lors de l'initiation, la propagation et la transmission d'un influx nerveux
- Identifier et comprendre le rôle de certains neurotransmetteurs
- Examiner l'organisation et le rôle fonctionnel du système endocrinien

L'organisation du système nerveux

Les neurones

Le rôle fonctionnel des neurones

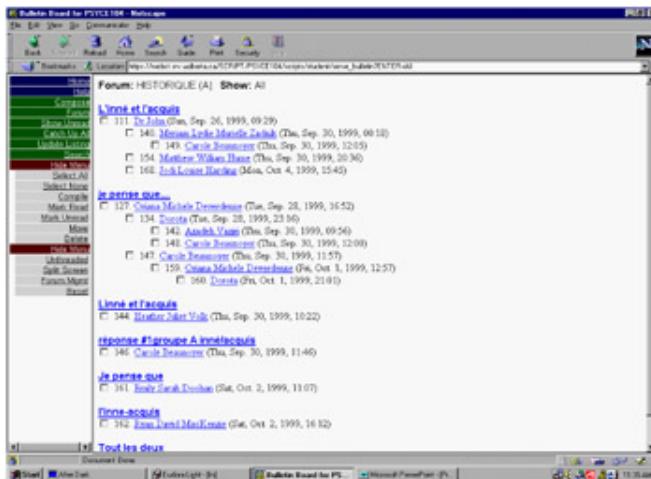
La structure des neurones

Les circuits neurals

Lectures: ATKINSON (pp 40-41, 33-34)

Figure S.3: Notes Outline

Social and peer interactions were encouraged through the weekly online discussions. These were launched with a provocative question. Discussion groups were formed and, while participating, learners had improved access to John and their group members. John noted that students who would not have known their classmates until well into the course, if then, were interested in quickly identifying their online partners. [Figure S.4](#) shows the format and developing threads of the class discussion area.

**Figure S.4:** Threaded Discussions

John was concerned that during the F2F meeting, when the distance learners participated through videoconferencing, that they had opportunities to interact with their on-campus peers. He inserted cues in his lecture outlines to remind himself to include them.

Audience

The class in the fall of 1998 consisted of six students on-campus and three students at a distance, two of which later withdrew. To accommodate the distance learners, the class met for three hours once a week in the evening. FSJ students had the option of taking an alternative section of the course that was scheduled during regular meeting times and that did not involve videoconferencing.

assessing delivery facilities	Once the distance students were registered, we contacted them in their communities to survey their technological needs. Not surprisingly, computer access was problematic and limited to the hours that the Alberta North centers were available.
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Videoconferencing was a new experience for everyone. Several practice sessions, from the near to the far site were indicated, and scheduled for the month before the course started.

John knew that if he were new to e-Learning, his students would be as well. This assumption held, even if they were familiar with the Internet. We developed a learning handbook that guided them through the course Web site and included examples and strategies for active participation.

The guide did not include a section on videoconferencing, because John would control those interactions on the near site from his instructor station. We assumed that the far sites would have technical support through a scheduled conference. As it turned out, the distance learners were not well supported and often had difficulty interacting during the class sessions, especially during the first class.

Given his FSJ goals, John did not have much leeway in deciding to use videoconferencing technology. At the time, the Faculty and John felt that a synchronous meeting had both cognitive and affective advantages.

John responds to the question...

What value would an online component have for this combined class?

...by highlighting the importance for him of affective cues to student understanding, even though he had to balance that with his concern for flexibility and accessibility.

Why synchronous?

(Online chats) were to reinforce communication outside of regularly scheduled class time (there were online synchronous chats)... but that didn't work out because it was a bit difficult...

...To recreate a classroom environment outside of the physical constraints of the on-campus classroom, which to my mind is another step to further enrich the learning experience for students...is a community-building thing, providing students who are off-campus with a learning environment in which they can learn not only from the instructor but from the other participants, immediately.

...The ability to be able to present and assess content, to provide an opportunity for students to ask questions, or to prevent irrelevant materials... to present information that might facilitate their understanding of the material but also to provide examples for other students who weren't participating in the discussions. Physical presence was important, and because you have the image, the affective presence...you can kind of clue in on facial expressions, cues, the same way that you would in a lecture. You can get a sense through facial expression about how students are interacting with the course content... adjusting... so when they have that question mark look on their faces you know to step and back up a bit.

...So, immediate interactivity and feedback...today's students want feedback and they don't want it in a week's time...

Of course, that's almost putting us in a position of almost having to deal with our courses 24/7, but I think it's interesting when you look at the logs...when do the students come into the course and when do they participate in the discussions...? Most of the time, prime time for them begins after 9 p.m.

A synchronous delivery, while inviting immediate interaction, is less flexible than an asynchronous model. On the other hand, an asynchronous format requires extensive advance development. John chose a blended model for the reasons he describes above, but he had to plan his face-to-face lectures carefully in order to maximize his expensive "on-air time." He had to rehearse every week to effectively use other synchronous and asynchronous tools. [Figure S.5](#) shows the planning chart for one classroom session.

Session 06 Planning - PSYCHE 104

Session date: October 14

Last revised: September 28, 1998 Page 1 of 2

PERCEPTION

Topic	Time	Content	Activities	Media/Outcomes
Roll call	05		Greetings & equipment check	Humanizing, familiarizes participants with equipment
Summary	05		Previous session	Recall
Overview	05	Current session	Lecture	Organizing
Perception	05	Overview	Lecture	
Perception vs. sensation	05	Definition	Each site provides a definition for either term. Written summary from each site.	Far end: OH, flipchart, board
	10		Demonstration	
Perceptual organization	05	Overview	Lecture	
Figure-ground	05	Demo/Discussion	All	OH, SP (drawings)
Laws of grouping	05	Demo/Discussion	All	OH, SP (drawings)
	10	Identify grouping principles Q & A	Group or individual	SP (5-10 drawings)
BREAK	10			
Depth perception	05	Overview		
Binocular cues	15	Demo/Discussion	All	WEB Stethoscope viewmaster, OH, SP
Monocular cues	15	Demo/Discussion	All	WEB
	05	Identifying pictorial cues	Group or individual	OH (VERY rich in cues)
Constancy	10	Demo/Discussion	All	WEB Notes OH, SP (line drawings)
BREAK	10			
Illusions	10	Demo/Discussion		OH, SP (line drawings)
Motion: Real vs. illusory	15	Definition Demo/Discussion	All	WEB OH
	05		Find examples from everyday experience	

Recognition & Identification	05	Overview	Lecture	
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Figure S.5: Session Planning

Activities

John's goals included improving cognitive and affective outcomes. He was also interested in supporting interdependence among peers, while increasing academic independence for all of the learners. Many first year undergraduates, especially those who are younger, must learn to be self-directed and independent.

The curriculum of Psyce 104, like most junior survey courses, covers a wide range of topics in a relatively short time, usually in 13 weeks. Students are introduced to basic concepts in the discipline and begin to think and act like psychologists - the instructor models the cognitive processes inherent in the field. Learning activities, for example, discussion and debate occur within a framework, which provides evidence for one's statements. Independent research reflects the actions and products of expert psychologists.

- Academic papers are structured in a particular way
- The American Psychological Association (APA) format is adhered to
- The paper length and form approximate research papers submitted for peer-review
- Language and syntax are appropriate for the field

Active learning is supported through frequent and sustained interaction, realistic practice that occurs in an authentic context, collaborative activities that are based in a community of practice, and meaningful feedback. John wanted to design active learning opportunities that connected learners with each other, wherever they were located, in discussion of relevant topics to the field and resolution of typical psychological problems. Further, in contrast to being the one expert source or the being expected to "supply the right answer," he wanted the learners to assume leadership and responsibility for academic rigor.

The format of this course reflected most typical first-year large-enrollment designs:

- Regularly scheduled large-group didactic lectures
- Assigned readings from textbooks and other academic sources
- A large amount of content covered quickly
- The presentation of visual models and exemplars through media
- Library research leading to a term paper
- Question and answer sessions
- Assessment through multiple-choice examinations and/or evaluation of an academic paper

Note Returning to Horton's comparison of learning activities in different modes, did Psyce 104 lend itself well to re-purposing into a blended e-Learning environment? (**go to [Table 1.1. Learning Activities and Formats in Chapter 1](#) in the Handbook**).

Table 1.1: Learning Activities and Formats Adapted from [Horton, W. \(2000\). Web-based training](#). New York, NY: John Wiley and Sons, Inc., p. 15–16.

We learn by...	
Face-to Face Activities	Online Activities

<p>Listening to:</p> <ul style="list-style-type: none">■ Lectures■ Interviews■ Debates■ Sermons■ Speeches■ Stories■ Testimonials■ Discussion among experts■ Critiques	<ul style="list-style-type: none">■ Webcasts■ Case-study activities■ Online conferences■ Audio and video conferencing■ Presentation sequences■ Reading online■ Discussion groups■ Mentoring■ Peer-review
<p>Seeking advice from:</p> <ul style="list-style-type: none">■ Parents■ Mentors■ Co-workers■ Consultants■ Experts	<ul style="list-style-type: none">■ Mentoring and coaching, apprenticing■ E-mail■ CMC among class members■ Bringing in online experts, guest speakers■ Collaborative problem-solving
<p>Reading:</p> <ul style="list-style-type: none">■ Books■ Manuals■ Papers■ Articles■ Reports■ Case studies	<ul style="list-style-type: none">■ Presentation sequences■ Resource pages■ Course notes■ Virtual libraries■ Transcripts■ Narratives■ Case studies
<p>Watching and hearing:</p> <ul style="list-style-type: none">■ Presentations■ Plays■ Media■ Demonstrations■ Debates	<ul style="list-style-type: none">■ Webcasts■ Presentations■ Whiteboards■ Screen-sharing■ Movies animations

<p>Organizing:</p> <ul style="list-style-type: none">■ With lists■ With outlines■ With tables and tools■ By classifying or grouping■ Annotating	<ul style="list-style-type: none">■ Using file folders■ Creating annotations■ Cut and copy (or paste)■ Downloading online documents■ With online tools such as File Maker Pro™
<p>Examining exemplars or models by/of:</p> <ul style="list-style-type: none">■ Visiting and touring museums■ Seeing a demonstration■ Work experiences■ Traveling■ Critiquing work of others■ Modeling the behavior of others■ Memorizing	<ul style="list-style-type: none">■ Virtual museums, etc.■ Online conferences■ Virtual field trips■ Case studies■ Online lab experiments■ Virtual reality■ Mentoring■ Webcasts■ Guest experts■ Case studies■ Simulations■ Application sharing■ Reading and repeating■ On-line MC
<p>Exploring and manipulating:</p> <ul style="list-style-type: none">■ Environments■ Objects and tools■ Working models■ Language■ Building something■ Documents	<ul style="list-style-type: none">■ Guided tours■ Simulations■ Case studies■ Role plays■ Virtual labs■ Brainstorming■ Shared online documents

Practicing with:	<ul style="list-style-type: none">■ Tasks■ New knowledge■ Others■ New abilities and skills	<ul style="list-style-type: none">■ Games■ Experiments, simulations■ Role-playing■ Manipulable objects
Contributing to:	<ul style="list-style-type: none">■ Discussions■ Debates■ Group problem-solving■ Writing	<ul style="list-style-type: none">■ Threaded discussion groups■ Chat sessions■ Role-playing■ Virtual labs■ Visiting experts
Conducting research:	<ul style="list-style-type: none">■ In libraries■ With interviews■ In the field■ In focus groups	<ul style="list-style-type: none">■ Guided research activities■ Group projects■ Case studies■ Online databases■ Simulations■ Online chats and threaded discussions

Assessment

Authentic assessment of learning outcomes in a large-enrollment course can be problematic. Very often, multiple-choice examinations are used as the only form of assessment because:

- They are efficient to administer and grade
- Many students prefer them to other, more time-consuming activities such as writing a term paper
- Instructors have developed a large databank of test items over many years and iterations of the course
- They are less subjective
- They can be randomized
- They can be used as self-assessment
- Grading can be automated
- And other reasons

However, developing multiple-choice test items that assess higher-order thinking skills, affective development, and authentic practice of new learning in the discipline are difficult to accomplish.

John had accumulated a databank of validated test items that allowed him flexibility in constructing mid-term and final examinations, but he was somewhat frustrated that students expected him to teach to the exam and then were *annoyed* when items on the exam were not covered directly during class discussion. John wanted to increase the amount of time for authentic, deep discussion during class

time, provide ways for learners to continually self-assess, and increase interaction that supported higher order affective and cognitive skills. He also wanted to teach for mastery, decrease the time between assessment and student access to grades, and provide more immediate feedback to student responses.

There was a two-fold purpose for using a multiple-choice item. One is the WebCT tool itself, the quiz, was much easier to use with a multiple-choice format than an open-ended format... The other thing was that the exams in these two courses were multiple-choice, anyway, so the format provided students the opportunity to get a feel for the type of questions they would be asked. Sort of a cognitive rehearsal...

John used the online assessment tool in the LMS to manage his test item databank, randomly create timed quizzes, permit multiple tries, manage grades, and develop meaningful feedback for each distractor on a test item. He designed the online asynchronous discussions to be more problem-based, encourage all learners to participate, sustain discussion, and provide a better assessment of higher order cognitive and affective skills ([go to Evaluation Methods in Chapter 1](#) in the Handbook).

During the course introduction, he discussed how contributions would be evaluated, for:

- Relevance
- Alignment with previous threads; building upon emerging threads
- Originality of thought and ideas, and examples
- Evidence for ideas
- Level of critical thinking

John developed an assessment rubric that was included on the course site.

Quite early in the design process he dropped the term paper as it was:

more than compensated for by the participation in the online discussions, which were asynchronous and students were coming in, not once, but several times and I thought that that was more than enough.

How did John use a blended model that included synchronous activities to enhance assessment of student learning?

Resources

Through 1999, ATL offered the Partnership, which provided teaching release and academic support for faculty interested in redeveloping their courses for alternative delivery. John became a Partner in 1997 and is now considered a leader in e-Learning both in his Faculty and in the institution. For example, John has published extensively on his experiences, is leading his colleagues at FSJ in the development of an online Masters program, and works nationally with colleagues to develop and evaluate learning objects and tools for French learners in Canada.

cost-benefit analysis There are many ways to evaluate the "worthiness" of course redevelopment based on a number of factors, including

- Number of times a course will be taught
- Number of students involved
- New learning communities served
- Amount of institutional resources required for development, implementation and sustainability
- Scalability
- Flexibility
- Learning effectiveness

and other factors. A commitment to faculty development and support is also a significant element in the decision-making process.

In this section, John analyzes the redevelopment of Psyce 104 from three angles:

1. People
 2. Hard costs
 3. Timelines
-

Now one of the first things I found very helpful...was to do this very nice blueprint (a critical path in MSProject) because the project involved a lot of people (about six team members).... I got a good understanding of the kinds of timelines involved and the different tasks that needed to be accomplished.

This timeline has been recreated in [Figure S.5](#).

There are different models for calculating the "real cost" of an e-Learning environment. John tracked the costs for the personnel resources required, through number of development hours, including his time to learn new processes, models, systems, and tools. He also tracked time for rehearsal, troubleshooting, and pilot testing, as well as time required to perform site maintenance. [Figure S.6](#) shows a gross breakdown of the time and nature of development tasks.

Course development time sheet PSYCE 104

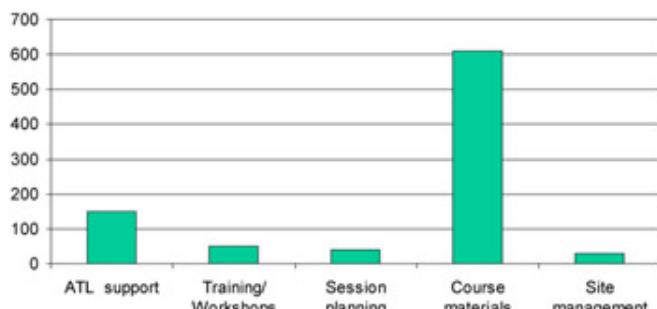


Figure S.6: Time to Develop a 3-Credit Course

In evaluating the Partnership Program, ATL has estimated one course team hour of support, including overhead:

Course team

Instructional designer	\$150
Project manager	\$100
Media developer	\$75
Web developer	\$75
Evaluator	\$150
<i>Total</i>	\$550

Overhead

Infrastructure (* 20%)	\$165
<i>Total</i>	\$715

Other costs related directly to course development support include:

Media

Video (1 hour of finished video)	\$1,500
Graphics (2 original graphics)	\$75
Text (2 pages of design and mark-up)	\$75

Technical support for pilot

Network administrator	\$75
Synchronous conferencing	\$125

Since the University of Alberta is publicly funded, these figures reflect subsidized (2002) rates in effect for internal clients.

direct and indirect costs When John estimated the university's investment in the course redevelopment, he included his time. Post-secondary institutions struggle with these figures as they consider the value of teaching, research, and service, and the increasing expectations for academic productivity in these areas. Estimates rarely consider the amount of curriculum redevelopment required in addition to the adaptation of existing content to an new delivery platform. For example, John re-examined his resources in the context of both a new platform and a new instructional approach.

Part of the decision-making process for institutions involves the potential recovery of direct costs, the requirement for ongoing support, the value to them of providing flexible learning environments, and the commitment to faculty development, support, and reward for this kind of activity.

The timelines required to develop an e-Learning environment range as widely as estimated costs, but in our experience faculty rarely begin redevelopment with appropriate and achievable deadlines. Our guideline has been a development time of 12 months for a 3-credit course (39 hours of F2F delivery time). *Are you realistically able to commit to this amount of time?*

Even though many LMS advertise an adaptation time of several hours and more recent versions of these systems have improved the instructor interface and development tools substantially, many experts will advise a minimum commitment of 4:1. In other words, a 39-hour course will require 156 hours of development.

sustainable approach Ultimately, ATL's Partnership Program was not sustainable. Large-scale redevelopment of undergraduate curriculum for e-Learning, in an institution with over 2,000 faculty, cannot be supported through an intensive process that involves a dedicated course team. However, most redevelopment involves a blended learning approach in which only portions of a course are technology-enhanced. In general, blended approaches include the addition of a threaded discussion, and/or adaptation of limited content to the Web. In some disciplines, practice and self-assessment activities are included in the course Web site. Most often, we see a phased approach in which a course may be redesigned over several years.

What is your reaction to John's analysis of resources required to redevelop his course?

Summary

You have considered diverse models that critically examine the value-add of an e-Learning environment. All models are multi-faceted; none have a simple formula leading to an objective decision-making process.

However, reasons to redevelop your course are not always appropriately reflected in business-oriented cost-benefit analyses. For example, look at the following checklist. *In your opinion, was John able to check off enough of these reasons to justify the resources he committed to Psyce 104?*

Five reasons to go online:

- q Including multiple perspectives
- q Encouraging semantic linking
- q Meeting diverse learning needs
- q Increasing and enhancing communication
- q Providing global access

Content and Psyce 104

In the first rendition of the course, John concentrated in developing screens where the content was linked directly to the class discussions, but the LMS required a JavaScript to do this. In the end, the direct link was dropped as it became apparent that students wanted to talk about different or extended topics that weren't reflected in the content pages. Using another tool supported a more current and, for the students, relevant topic.

For critical thinking skills...we embedded questions in course content...and these were set off in the original version... When we designed it originally the questions sent them off to a thread in the discussion forum but the topics changed from the second to the third renditions of the course so the boxes were linked to the discussion forums needed to be changed.

It was just easier to read the calendar and link to the forum from there, the discussion that was launched as of today.

John was looking for ways to chunk the content and minimize the screens of scrolling text.

One of the things I remember is the issue of scrolling, so the student was in front of the monitor and there's a lot of content, so you're looking for ways to break it up...you have these little boxes where there are questions... so by clicking on the question the student was directed into the discussion

He developed two versions of a PowerPoint presentation: an elaborated version was used in class and a simplified version was posted ahead of the class to be printed and used as a note-taking guide by the students.

Finally, in each version of the course, John re-evaluated links to external sites, deleting some and adding others. As the redevelopment time began to decrease, he began to annotate the links, expand the glossary, and expand the feedback section on the test items. [Figure S.7](#) is a content page showing some of these elements.

The screenshot shows a course content page with the following structure:

- Navigation Bar:** Home, NOTEDE COURS, Structure du cerveau, ACTION MENU, Previous, Next, Contents, Refresh, Quiz, Glossary, Take Notes, Search, Chat, Discussions, Mail.
- Section Title:** BASES BIOLOGIQUES DU COMPORTEMENT (suite)
- Mots-clés:** Apprentissage, Cortex cérébral, Motivation
- Text:** La structure du cerveau. Le cerveau humain est composé de trois couches concentriques: la partie centrale, le système limbique, et les hémisphères cérébraux.
- Text:** La partie centrale comprend les structures suivantes:

 - le bulbe rachidien qui contrôle des fonctions vitales du système nerveux autonome tels que le rythme cardiaque, la respiration et la digestion
 - la protubérance qui sert de centre de relai pour le système moteur permettant ainsi la coordination musculaire
 - la formation réticulée qui n'est pas vraiment une structure mais plutôt un réseau très dense de neurones qui s'étend du tronc cérébral jusqu'au thalamus et qui joue un rôle d'activation pour le système nerveux
 - le cervelet qui est impliqué entre autres dans le maintien de l'équilibre corporel et la coordination des mouvements volontaires
 - l'hypothalamus qui agit sur le système nerveux autonome ainsi que le système endocrinien et joue un rôle dans la motivation et les émotions
 - l'hypophyse qui est la glande maîtresse du corps
 - le thalamus qui est un centre de relai pour toutes les informations sensorielles à l'exception des informations olfactives

Figure S.7: Course Content

Evaluating Psyce 104

We evaluated the second delivery of Psyce 104 in the fall of 1999 through a multi-dimensional, quantitative and qualitative approach resulting in four data sets:

Set 1

Pencil and paper surveys were administered shortly after the beginning of the term (Week 3) and shortly before the end of the term (Week 12). These surveys consisted of multiple-choice and short answer, open-ended questions dealing with, among other things, students' impressions of various aspects of the course Web site, any problems or concerns they had, and suggestions for improving the course delivery. In addition, we asked the students to provide a self-evaluation of their computer literacy as well as their attitudes with respect to the use of learning technologies. Open-ended questions included:

- What is your overall impression of videoconferencing in this course?
- What did you like best in this course?
- What are the areas of improvement in this course?
- Have the teaching technologies used in this course changed in any way your own learning strategies?
- Would you recommend taking a course like this to other students?
- Why do you think the instructor chose to use the Internet in this course?

The quantitative items (5-point scale) for the mid-term survey included:

- What is your overall impression of the WebCT site to date?
- Have you had any problems understanding how to use WebCT?
- How comfortable do you currently feel working on computers?

- Have you ever previously used a computer as part of instruction (excluding word processing)?

Set 2

Quantitative and qualitative information concerning the course in general was obtained from the standard, University-wide course evaluation survey conducted at the end of the term.

e.g. *The instructor felt comfortable with the technology*

Set 3

The WebCT™ tracking tool was used to monitor, among other things, the number of times that the students logged on to the course Web site as well as the frequency with which they used some of the WebCT features and tools (e.g. level of participation in the online discussions). [Figure S.8](#) shows John's usage profile.

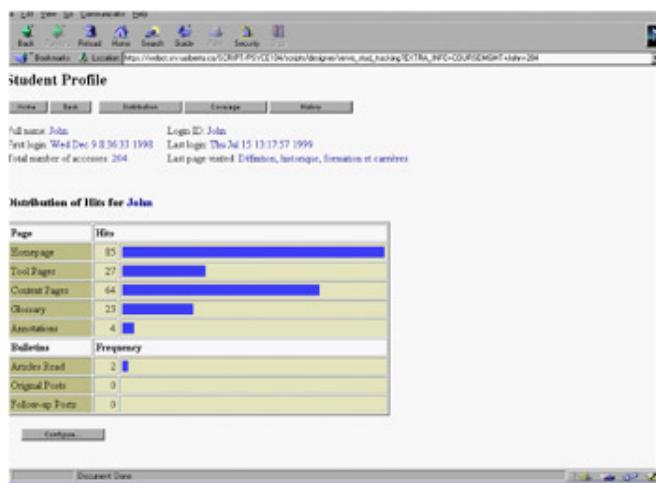


Figure S.8: John's Usage Profile

Set 4

A focus group discussion was scheduled during class time toward the end of the term. Two experienced course evaluators led this activity. The instructor was not in attendance. The students were encouraged but not obligated to participate in the focus group. Almost half of the class did take part in this activity, at which juice and doughnuts were served.

Learner profile

The profile revealed by the survey indicated that:

- About 2/3 were female
- Most were from 17–20 years of age, although 1/3 were from 21–29 years of age
- 1/4 had an Internet connection at home
- Only 13% had ever taken a technology-enhanced course

Results

One goal of formative evaluation is the application of useful information to course redesign. For example, we found that 1/4 of students tend to log on to the course site in the first week, with the majority visiting the site for the first time two or three weeks into the course. The average number of page "hits" was 224 per student. This means that the course site was visited an average of 2.5 times each day. One implication for course redesign: the majority of students will not visit the course site before each class meeting. With that information, the instructor might need to rethink the reasons for providing an online advance organizer, for example a notes outline for each topic.

A complete reference list at the end of this chapter provides a more substantive appraisal of evaluation results. However, in general the students:

- Felt comfortable with the course design, even suggesting that we add more activities besides the class lecture and discussions
- Wanted more links and other resources
- Found the conferencing activity difficult and time-consuming, but agreed that asynchronous conferencing helped them learn more about the topics and their peer's understanding
- Appreciated the practice quizzes and the course notes

In this brief overview, did John make progress towards his goals?

Summary

John Boeglin decided to redesign his junior undergraduate, large-enrollment introductory psychology course for a number of inter-related reasons:

- He wanted a new challenge
- He was interested in the pedagogical and delivery potential of the Web
- He needed to support a new learning community
- His faculty had made a commitment to deliver learning opportunities in rural and northern western Canada (distance)
- e-Learning infrastructure was in place at external sites
- The institution encouraged e-Learning development
- He had pedagogical and technical support from ATL
- Through the partnership release time was available
- The Web made more resources in French accessible
- An LMS was supported and training was available
- The LMS improved course management
- He wanted to increase classroom interaction
- He wanted to improve the quality of interaction among peers
- He wanted to encourage both interdependence and self-directed learning
- He wanted to meet affective outcomes
- He wanted to enhance critical-thinking skills
- The curriculum needed redevelopment
- His existing resources had to be evaluated and extended

John committed substantial personal and professional effort to this project. *After reading his account, do you feel that he achieved his goals? Would you have made a different decision?*

We are at the end of the book, but hopefully far from the end of your own learning process. The decision to develop an e-Learning environment depends on your professional context, institutional support, and disciplinary requirements.

However, ultimately, your decision must be personal and related to your core values and beliefs about learning environments, an understanding of your own teaching style, your risk tolerance level, and an interest in the potential of learning technology to make a difference for learners anywhere in the world.

Original Partnership Agreement

Partnership Agreement

This contract will provide the basis of an agreement between the Faculté Saint-Jean, John Boeglin and Academic Technologies for Learning.

Project Title: Development and implementation of alternative teaching and learning strategies for PSYCHE 104/105

Project Description (Summary Only):

Faculté Saint-Jean has undertaken a number of initiatives in order to reach out to Francophone and Francophile students, throughout Western Canada and beyond, and is currently positioning itself to become a role model in the use of alternative teaching and learning strategies.

This project involves two courses, PSYCH 104 and 105, which are to be delivered using interactive videoconferencing technology supplemented by computer-based teaching and learning technology. Support for the design, production, implementation, and evaluation of this project is to be provided through the ATL Partnership program.

Students stand to benefit from this initiative in several ways. First, they will gain access to a wealth of course-related information not readily accessible given the current format of delivery. Second, it will create a window of opportunity for the instructor to change current teaching and learning practices. Third, Francophone and Francophile students will be provided with an opportunity to learn and to communicate in French. For some, this will result in the creation of a community of learners with similar aspirations. For others, in particular those who are more geographically isolated, this initiative may offer a unique opportunity as well as offer a broader sense of community.

Project Start Date: January/98 **Project End Date:** May/99

Approximate Mid-date: (Prototype presentation) August 07th, 1998

Implementation Date: September/98 (PSYCHE 104); January/99 (PSYCHE 105)

Terms of Instructor Release. Please include dates and times of course release:

Releasing John Boeglin from three courses from September-April in the 1998/99 school year. His two-course release will occur in the fall term of 1998 and his single course release in the 1999 winter term.

A.Intent of this Agreement

It is intended that this agreement reflect a spirit of cooperation, collaboration and negotiation and not to be taken by its specific terms of the "letter of the law." The terms of this contract are intended to be flexible and negotiable in nature. Its function is to state the expectations, responsibilities and accountability of each party and seek agreement as to the general processes, deliverables, and timelines for the project.

B.Expectations of ATL

1. Payment Schedule

- a. ATL is agreeing to support this project up to the amount of **\$9,900**. This amount is based on a three course release of John Boeglin, Ph.D. being paid \$3,300/course. Disbursement of these funds will be in the form of three payments or as negotiated.
- b. The Initial payment of \$3,300 and two additional payments of \$3,300 and \$3,300. The initial payment is to be paid directly to the department within a reasonable time period of the signing of this contract or on a mutually agreed upon date.
- c. The second payment is to be paid within a reasonable period following the first deliverable which consists of a presentation of the project prototype, a design report, or a completed storyboard.

- d. The third payment is to be made within a reasonable time upon the determination and agreement that reasonable progress on the project has been made by December 1998.
- e. These presentations will be made to some or all of the ATL team by the project developer(s) and feedback from the team will be constructive and developmental in nature. Developers will be assisted in bringing the project up to the quality standards and attributes as agreed upon during the sessions.

2. Responsibilities of the ATL

- a. The ATL team and the developers will keep accurate logs of *all* time spent on the project including but not exclusive to time in the studio. This log shall include time spent on organizational, design and development, formal and informal meetings with ATL staff, content creation, and actual programming of the materials. These logs will be submitted or made available to the Manager of the Production Studio and to the developer(s) on a regular basis or upon request. The purpose of this record keeping is to provide more accurate information on the resources, money, and time needed to do courseware development.
- b. Access to the ATL Production Studio (2-111 Education N), a workstation, hardware and *supported* software and its library resources. Additional software and hardware needs may be negotiated with the Manager of the Production Studio. Keys to the studio and a workstation can be arranged with a \$20 refundable deposit.
- c. Access to the ATL team on a formal and informal basis to assist in the ongoing development of the project. Upon the developer's request this support may include:
 - q Formal and informal consultation with the ATL evaluation researcher to determine a formative and/or summative evaluation strategy.
 - q Up to 10 hours of formal and informal consultation meetings with an instructional designer to discuss such issues as a needs analysis, course content, andragogy, target audience, methodologies, user interface, etc.
 - q A series of formal meetings with the ATL team:

Meeting #1. This initial meeting will introduce the project and partner(s) to the Instructional Designer, Distance Education Coordinator, the Production Studio manager, and the Evaluation Researcher. The project will be presented and discussed in general terms, a preliminary attempt will be made at drawing up an agreement, and a date will be set for presentation of the modified agreement.

Meeting #2. The partner(s) will meet with the ATL development team and present the project. Meeting objectives are to introduce people to each other, familiarize the team with the project, begin a determination of the project's technology requirements and approximate the type and amount of support required. There may be a need to research appropriate technologies if the project developers request it and time permits. Follow-up meetings may be set up to discuss the project requirements or the results of this research.

Meeting #3. A demonstration of the prototype around the midpoint of its development cycle. The prototype should include a fully functioning interface complete with navigation, icons, presenting some content and key activities accessed through a complete and functional menu system. The prototype should accurately reflect the overall look and feel of the project, but may need additional content and activities to fill in the "structure." The ATL development team may offer feedback on additional development needs and will gladly assist with the agreed upon revisions or additions.

Meeting #4. A formal event held near the end of the project development cycle involving some of the ATL team and the partner(s). The project will be demonstrated to the ATL team and evaluated to determine whether the project meets the following conditions. All navigational tools, menus, graphics, icons, content and activities should be in place or easily completed. This meeting may also determine if follow-up support for the project is needed and what the nature of that support will be.

- q Informal meetings (drop-in or scheduled) upon request of client.
- q Programming support including consultation on software use, program authoring (to be negotiated), implementation issues, and troubleshooting of studio hardware and software.
- q Priority access to ATL training initiatives and an opportunity to be involved in a personalized professional development experience.

C.Responsibilities of the ATL Partner

- a. The ATL partner is expected to perform or arrange for the majority of any computer programming or HTML coding required for the project; manage the project itself including copyright and special licensing issues; design decisions; content delivery; facilitation of formal and informal meetings with the ATL team and actively take part in the development cycle of the project.
- b. Ensure the return of all ATL resources in good condition, including library resources, hardware, software, and keys as per ATL policy.
- c. Participation in a minimum of one Show Time. This activity will be scheduled in advance and involve discussing and/or demonstrating your project and its development to the university community.

D.Project Time Line

Project Start Date: January/98

Project End Date: May/99

<?xml version="1.0"?>

Team LiB

◀ PREVIOUS ▶ NEXT ▶

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<?xml version="1.0"?>

Team LiB

◀ PREVIOUS ▶ NEXT ▶

Index

A

Abernathy, Donna [287](#)
aborting a function [89](#)
absolute knowing [65](#)
abstract [182](#)
access [85](#)
access login [96](#)
access to technology [ix](#)
accessibility [ix](#)
accessibility guidelines [ix,47](#)
action model [xxiii](#)
action plan [xi](#)
active learning [ix](#)
active links [136](#)
adaptive technology [xxvi](#)
adult learners [64](#)
advanced organizer [xii,224](#)
advanced search techniques [96](#)
affective taxonomy [7](#)
age [ix](#)
aggregate [263](#)
Aguilera [125](#)
Alberta Freedom of Information and Protection of Privacy [xxviii](#)
alertbox [141](#)
alphabet [203](#)
alternative delivery [xix](#)
ambiguous schemes [206](#)
American Cancer Society [208](#)
amortize [30](#)
analogy [226](#)
anchored setting [124](#)
andragogy [70](#)
animations [83](#)
annotate [77](#)
applets [95](#)
architecture [46](#)
archive [151](#)
archived discussions [99](#)
argumentation [210](#)
assessment testing [253](#)
associative learning [206](#)
asynchronous [xxii](#)

Atlas Ti [276](#)
audience profile [70](#),[178](#)
audience-specific organization [208](#)
audio[xxv](#)
aural[178](#)
authentic assessment [17](#)
authentic learning [2](#)
authenticating[124](#)
Avaya and Cap Gemini Ernst & Young [297](#)
<?xml version="1.0"?>

Team LiB

[◀ PREVIOUS](#) [NEXT ▶](#)

Index

B

bandwidth [xxiii](#)
barriers to access [89](#)
Bates, Tony [xxiii](#)
Bell Mobility [297](#)
benchmarks [xxvii](#)
Blackboard [xxi, 297](#)
blended approach [33](#)
blended learning [xiv, xxii](#)
Bloom, Benjamin [5](#)
Blue Web'n [109](#)
Bobby [48](#)
bodily-kinesthetic intelligence [79](#)
bolded text [145](#)
Boolean operators [96](#)
booting up [89](#)
breadth [163](#)
building queries [96](#)
Bull, Emma [136](#)
bulleted lists [160](#)
Burgstahler, Sheryl [82](#)
<?xml version="1.0"?>

Index

C

campus portals [xiii](#)
captions [143](#)
case-based learning [227](#)
category [203](#)
category scheme [203](#)
Center for Universal Design [84](#)
Centra [29](#)
Characteristics of Adults as Learners (CAL) [70](#)
Choo, Chun Wei [125](#)
chunking techniques [ix,76](#)
Cisco [110](#)
clarity [119](#)
closed captioning [179](#)
co-designer [42](#)
co-discovery [269](#)
co-discovery learning [260](#)
coaching [260,269](#)
cognitive challenges [ix](#)
cognitive development [39](#)
cognitive flexibility theory [70](#)
cognitive load [119](#)
cognitive strategy [ix](#)
cognitive taxonomy [6](#)
cognitive tool [187](#)
cognitive walkthrough [262,269](#)
coherence [119](#)
ColdFusion [276](#)
collaboration tools [229](#)
collaborative learning [xxvi](#)
collaborative social learning [228](#)
collaborative software [290](#)
collaborative work [xiv](#)
collect [77](#)
color [52](#)
color symbolism [52](#)
colorblind [82](#)
communication services [xiii](#)
communication tools [xxii](#)
communities of practice [xiii,116](#)
comparative data [268](#)
comparative tests [245](#)

compliance⁴⁸
composite-picture techniques ¹⁸⁴
computer conferencing ^{xxii}
computer-assisted instruction ²¹¹
computer-based training ²¹¹
concept attainment ²²⁷
concept guide ^{xii}
concrete concepts ¹⁸²
connectivity⁸⁸
constructivist approach ⁴
constructivist learning ²³⁰
consumer culture ^{xiv}
content accuracy ¹⁰⁵
content arrangement ⁸⁹
content delivery ^{xxv}
content management ²¹⁷
content representation ²⁰⁰
content-rich site ²¹⁷
contextual cues ¹⁶⁸
contextual knowing ⁶⁵
continuous assessment ⁸⁸
continuum²⁰³
converged technologies ^{xxiii}
cost-benefit analysis ³⁰
course delivery ³⁴
courseware development ⁹⁷
crashing⁸⁹
credentials^{xvii}
critical attributes ²²⁷
critical information literacy ⁹
critical thinking ⁹
cultural artifacts ⁵⁷
cultural assumptions ⁵⁴
cultural barriers ⁵⁷
cultural community ⁵⁰
culturally inclusive e-Writing ⁵⁸
culture^{ix,49}
curriculum conversion ¹⁹⁵
customizability^{112,138}
cycles of design ²⁴⁴
<?xml version="1.0"?>

Index

D

data set [258](#)
database [96](#)
DeBry [53](#)
decode [180](#)
deductive process [227](#)
degradation of information [292](#)
delivery models [33](#)
demographics [xi](#)
depth [163](#)
design co-owner [42](#)
design shell [196](#)
designer bias [256](#)
designing Web usability [242](#)
Detlor, Brian [125](#)
development time [28](#)
developmental stages [78](#)
Dewey, John [78](#)
diagnostic tests [245](#)
didactic presentation [65](#)
digital convergence [xxvi](#)
digital divide [xvi](#)
digital media [96](#)
digital texts [xiii](#)
digitize [29](#)
discussion board [99](#)
disease of familiarity [246](#)
disinhibition [49](#)
Distance Education: Guidelines for Good Practice [xxvii](#)
distance learning [xiv](#)
distributed content management [218](#)
distributed learning [xiv](#)
distributed learning environments [xxvi](#)
distribution printing [168](#)
diversity checklist [64](#)
docent content delivery server [293](#)
documentation [136,263](#)
Dodge, Bernie [212](#)
domain [5,96](#)
dominant culture [49](#)
downloading [119](#)
DreamWeaver [28](#)

drilling136
<?xml version="1.0"?>
Team LiB

[◀ PREVIOUS](#) [NEXT ▶](#)

Index

E

e-Book[288](#)
e-commerce[xii](#)
e-Learning[78](#)
e-Readers[126](#)
e-Support[xiii](#)
e-Texts[49](#)
e-Writing[xi](#)
ease of use [101](#)
educational objects [viii, xxi](#)
educational technology [48](#)
effectiveness[271](#)
efficiency[271](#)
elaboration[166](#)
electronic bulletin boards [290](#)
electronic slide show [187](#)
Ellis[125](#)
embedded questions [ix](#)
emphasis[142](#)
encoding[224](#)
equal access [81](#)
ethics[81](#)
ethnicity[39](#)
evaluate[77](#)
evaluation methods [19](#)
evaluation rubric [109](#)
evaluation testing [253](#)
evidence-based decisions [178](#)
expert thinking [216](#)
expertise contributor [42](#)
explorative testing [253](#)
extend[182](#)
eyestrain[126](#)
<?xml version="1.0"?>

Index

F

face-to-face delivery (F2F) [viii](#)
facilitator [xxvi](#)
failure story [262](#)
fatal errors [89](#)
feature inspection [262](#)
feedback device [296](#)
field observation [263](#)
Filemaker Pro [276](#)
Flash [27,28](#)
Fleming, Jennifer [250](#)
flexibility [116](#)
floating teachers [290](#)
focal point [183](#)
focus groups [263](#)
fold-up keyboard [292](#)
formal usability testing [259](#)
formative evaluation [ix,243](#)
free exploration [275](#)
free-standing [95](#)
functional design [200](#)
functional impairment [278](#)
<?xml version="1.0"?>

Index

G

Gardner, Howard [78](#)
Gardner's Multiple Intelligences framework [78](#)
gender [62](#)
genre [44](#)
geography [ix](#)
gesture recognition [88](#)
global economy [xiv, xix](#)
global knowledge [293](#)
global navigation system [234](#)
global repositories [ix](#)
global search and replace [218](#)
globalization [xi](#)
goal-based scenarios [222](#)
Graham, Jeffery [253](#)
granularity [95](#)
graphics [xxv](#)
<?xml version="1.0"?>

Index

H

handheld devices [287](#)
Harris, Paul [286](#)
Harvard University Medical School [296](#)
headings [ix](#)
hearing impairments [82](#)
heuristic evaluation [262](#)
Hewlett-Packard [297](#)
hierarchical classification scheme [206](#)
hierarchical navigation scheme [233](#)
high-speed Internet access [86](#)
higher order thinking [5](#)
highlighting function [76,225](#)
hit and run [119](#)
home schooling [280](#)
Horton, William [56](#)
HTML [29](#)
human-computer interaction (HCI) [46,243](#)
human-computer interface [46](#)
hybrid format [viii](#)
hybrid scheme [209](#)
HyperChem [297](#)
Hypercube [297](#)
hyperlinked environment [51](#)
hypermap [149](#)
hypermedia environments [9](#)
hyperspace [124](#)
hypertext [76](#)
hypertext poem [201](#)
hypertextual environment [131](#)

<?xml version="1.0"?>

Index

I

- ICTxviii
- IMS Global Learning Consortium [48](#)
- incentive[xxviii](#)
- independent knowing [65](#)
- inductively[138](#)
- informal usability testing [259](#)
- information[xix](#)
- information architects [217](#)
- information architecture [141,196](#)
- information hierarchies [140](#)
- information management [291](#)
- information outcomes [4](#)
- information processing [4](#)
- information retrieval [17](#)
- informed consent [256](#)
- infrastructure[20](#)
- inhibition[49](#)
- input speeds [292](#)
- inquiry[245](#)
- inquiry-oriented activity [212](#)
- inspection[245](#)
- Inspiration[133](#)
- Institute for Higher Education Policy [xxvii](#)
- instructional blueprints [48](#)
- instructional designer [ix](#)
- instructional systems design (ISD) [48](#)
- instructional technology [ix](#)
- instructional wrap-around [119](#)
- intellectual authority [120](#)
- intellectual property rights [112](#)
- intelligences[11](#)
- interactive environments [71](#)
- interactive mystery [200](#)
- interconnectivity[290](#)
- intercultural dynamics [50](#)
- interface[46,196](#)
- interlace[127](#)
- interlinked[132](#)
- internationalization[50,278](#)
- interpersonal intelligence [79](#)
- interviews[263,270](#)

intrapersonal intelligence [79](#)

Isopia Learning Management System [293](#)

italics[145](#)

iterative evaluation process [243](#)

<?xml version="1.0"?>

Team LiB

 PREVIOUS  NEXT 

Team LiB

◀ PREVIOUS ▶ NEXT ▶

Index

J

job aids [287](#)

journaling [254](#)

just-in-time training [xviii](#)

Jutta Degenera [167](#)

<?xml version="1.0"?>

Team LiB

◀ PREVIOUS ▶ NEXT ▶

Index

K

keyboard [124](#)
keyboarding [292](#)
keyhole problem [76](#)
keyword descriptors [101](#)
keywords [96](#)
killing a file [89](#)
knowledge claims [66](#)
Knowledge management [xxi](#)
Knowles, Malcolm [70](#)
<?xml version="1.0"?>

Index

L

language [ix](#)
language of interactivity [136](#)
language translation [88](#)
lateral thinking [70](#)
layer [151](#)
layering tools [165](#)
layout cues [156](#)
learnability [271](#)
learner profiles [39](#)
learner support [30](#)
learner's experience [70](#)
learning and content management systems (LCMS) [xxi](#)
learning at the bedside [288](#)
learning community [50](#)
learning design [viii,272](#)
learning design theory [ix](#)
learning disabilities [82](#)
learning goals [4](#)
learning needs [ix](#)
learning object [viii,28,97](#)
learning object repositories [xxi](#)
learning organizations [xi,288](#)
learning orientation [71](#)
learning portals [xiii](#)
learning providers [xiv](#)
learning shell [229](#)
learning space [212](#)
learning style inventories [41](#)
learnware industry [48](#)
lecture [29](#)
legibility [147](#)
life-centered [71](#)
lifelong learning [xvii,278](#)
likert scale [265](#)
line lengths [147](#)
linear [119](#)
linguistic intelligence [79](#)
linking conventions [165](#)
literary genres [44](#)
live chat [xxiv](#)
local navigation system [234](#)

localization [278](#)
location [203](#)
location scheme [204](#)
logical scheme [210](#)
logical-mathematical intelligence [79](#)
lower order thinking [5](#)

<?xml version="1.0"?>

Team LiB

[!\[\]\(a8e3c0cb24be70021281b405b505c147_img.jpg\) PREVIOUS](#) [!\[\]\(adadb8ccfa2b6fcdd88faad4b297c928_img.jpg\) NEXT ▶](#)

Index

M

m-Learning^{xiii},[286](#)
Magolda, Marcia Baxter [64](#)
mapping tool [133](#)
March, Tom [212](#)
marginalia[151](#)
marginalized groups [86](#)
marginalized learners [91](#)
MASIE[154](#)
matrix[137](#)
McGraw-Hill Ryerson [297](#)
me-Learning^{xiii}
media attributes [176](#)
Melick Library at Eureka College [294](#)
mental representations [226](#)
menu structures [197](#)
message design [119,139](#)
metadata[95,101](#)
metaphor[133](#)
metaphor-driven organization [208](#)
metrics[88](#)
Microsoft Excel [276](#)
milestones[29,249](#)
mind tools [222](#)
minority cultures [49](#)
mnemonics[226](#)
mobile learning [xiii](#)
mobility^{ix},[290](#)
mobility impairments [82](#)
modalities^{xxiv}
modeling[185](#)
modular approach [99](#)
modular course design [95](#)
Mok, Clement [120](#)
Monolith[95](#)
monotreme[227](#)
motif[163](#)
motivation[71](#)
motor impairments [292](#)
multi-channel[177](#)
multimedia simulations [xxvii](#)
multimedial Web-based environments [71](#)

multimodalxxiv
multimodality136
multiple survey strategy 268
multipurpose devices 88
musical intelligence 79
<?xml version="1.0"?>

Team LiB

 PREVIOUS  NEXT 

Index

N

narration [184](#)
narrative power [185](#)
narrative scheme [210](#)
National Learning Infrastructure Initiative [xxi](#)
naturalistic intelligence [80](#)
navigation [46](#)
navigation bar [234](#)
navigation software [290](#)
Nielsen, Jacob [81](#)
nested organizational scheme [206](#)
new economy [xvii](#)
Nine Events of Instruction [211](#)
non-examples [227](#)
non-niche audience [164](#)
non-text blank space [147](#)
non-verbal data [264](#)
Norman, Donald [241](#)
Northern Alberta Institute of Technology (NAIT) [296](#)
note-taking [187](#)
notes outline [187](#)
novelty effect [294](#)
Nudist [276](#)

<?xml version="1.0"?>

Index

O

observable form [4](#)

off-line[34](#)

Open and Distance Learning Quality Council [55](#)

open-ended survey [268](#)

organization of concepts [147](#)

organizational scheme [196](#)

organize[77](#)

organizing metaphor [236](#)

orientation to learning [71](#)

outcome statement [4](#)

outcomes[1](#)

<?xml version="1.0"?>

Index

P

page design elements [149](#)
Palm [293](#)
paper prototype [273](#)
partial screens [82](#)
participatory design [41](#)
passive voice [156](#)
patterns of reasoning [64](#)
Paulsen, Morten Flate [16](#)
PDF format [134](#)
Pearson Education (Prentice-Hall) [297](#)
Pedrito [254](#)
peer evaluators [257](#)
peer review [xxi](#)
perceptual challenges [ix](#)
perceptual strategies [179](#)
performance measurement [260,269](#)
personal digital assistant (PDA) [286](#)
perspective-based inspection [262](#)
pervasive computing [xxvi](#)
PhotoShop [27](#)
Piaget [78](#)
Placeware [29](#)
pluralistic view of intelligence [78](#)
pluralistic walkthrough [262,270](#)
PocketClassroom [296](#)
polling system [296](#)
pop-up menus [136](#)
Portable Emergency Physician Information Database [296](#)
portable learning environments [288](#)
portals [xiii](#)
Power of the Internet, The [88](#)
PowerPoint [98](#)
practice community [229](#)
pre- and post-tests [270](#)
pre-instructional information [224](#)
print [xxv](#)
print conventions [121](#)
print-based [xxv](#)
prior experiences [228](#)
priority one checkpoints [84](#)
priority three checkpoints [84](#)

privacy^{xxviii}
problem-solving⁹
procedural actions [186](#)
productivity tools [51](#)
professional development [87](#)
Project Numina [297](#)
promotion^{xxviii}
proprietary software [296](#)
prototypes[245](#)
psychomotor taxonomy [6](#)
pull-down menus [136](#)
<?xml version="1.0"?>

Team LiB

PREVIOUS NEXT

Team LiB

◀ PREVIOUS ▶ NEXT ▶

Index

Q

qualitative data [244](#)

quality assurance [xi,256](#)

quantitative data [244](#)

question-asking [260,269](#)

questionnaires [263](#)

Quinn [286](#)

<?xml version="1.0"?>

Team LiB

◀ PREVIOUS ▶ NEXT ▶

Index

R

rapid instructional design [29](#)
rapid prototype [273](#)
rational stance [89](#)
re-purpose[viii,29](#)
re-usable digital resources [ix](#)
readability[46,118](#)
readability checkers [156](#)
readability level [ix](#)
reader disorientation [168](#)
reader preference [166](#)
readiness to learn [71](#)
real-time discussion [197](#)
real-time feedback [xxvii](#)
realistic scenario [270](#)
recall[180](#)
recognition rates [292](#)
redundancy[181](#)
redundant functionality [292](#)
reflection[ix](#)
refresh[126](#)
Rehabilitation Act [xv](#)
relational processing abilities [127](#)
relativistic-oriented traditions [89](#)
relevancy[71](#)
remote test [254](#)
repositories[xxi,97](#)
repurposing content [118](#)
restructuring[121](#)
retention of information [180](#)
retrieval[102,224](#)
retrospective test [254](#)
reuse[116](#)
reward structures [xxviii](#)
rich case studies [xxvii](#)
rich media [291](#)
richer information experience [180](#)
rights management [116](#)
Ring, Geoffrey [299](#)
Robinson, Alexa [200](#)
rollovers[136](#)
Rowland, Cyndi [81](#)

royalties [112](#)
royalty fees [112](#)
rule of three [233](#)
<?xml version="1.0"?>

Team LiB

[◀ PREVIOUS](#) [NEXT ▶](#)

Index

S

sans serif font [145](#)
satellite [29](#)
satisfaction [271](#)
scaffolding [227](#)
scaffolds [77](#)
scenario [33](#)
scenario building [260,269](#)
Schcolnik, Miriam [299](#)
Schrock, Kathy [148](#)
screen captures [164](#)
screen formats [170](#)
screen page [150](#)
screen real estate [150](#)
screen resolution [126](#)
screen-sharing [230](#)
scroll [168](#)
scrolling [135](#)
search engine [95](#)
search performance [147](#)
searchable storage [96](#)
Section 504 of the Rehab Act [47](#)
secure site [216](#)
security [xxviii](#)
security risks [292](#)
seizure disorders [82](#)
self-concept [70](#)
self-direction [70](#)
self-reflection [57](#)
semantic linking [119,237](#)
semantic networks [222](#)
semantic nodes [299](#)
semantic Web [133](#)
Seneca College [297](#)
sensory immersion [88](#)
sensory modality [177](#)
sequence of content [211](#)
serialized lists [160](#)
serif font [145](#)
set tasks [275](#)
sexix
shared desktops [274](#)

Shetterly, Will [131](#)
shorter[158](#)
sidebars[ix,136](#)
sideheads[151](#)
signal phrases [225](#)
single digital component [104](#)
site architecture [196](#)
site maps [234](#)
slides[xxv](#)
smart classrooms [xxii](#)
Smokeout Campaign [208](#)
social and political contexts [xi](#)
social learning [230](#)
social learning theory [70](#)
socio-political[xiv](#)
socioeconomic status [ix](#)
spatial intelligence [79](#)
spatial maps [76](#)
spatial metaphors [236](#)
spatial processing abilities [127](#)
specifications[48](#)
speech impairments [82](#)
speech production [292](#)
SPSS[276](#)
stability[292](#)
stakeholders[249](#)
stand-alone solution [290](#)
standards[48](#)
standpoint theory [91](#)
Stanford University [295](#)
Stansberry[43](#)
state of readiness [268](#)
storyboard[150](#)
streaming[95](#)
structural relationships [180](#)
structured interview [265](#)
student response pad [297](#)
Student Web Answer Technology Template [297](#)
style elements [145](#)
stylus[291](#)
sub-module[102](#)
success story [262](#)
survey[29](#)
sustainability[99](#)
SWATT[297](#)
synchronous tool [xxii](#)

systems behaviors [186](#)
<?xml version="1.0"?>

Team LiB

[◀ PREVIOUS](#) [NEXT ▶](#)

Index

T

tactile-kinesthetic [178](#)
target audience [39](#)
target learners [249](#)
task-oriented scheme [207](#)
teaching method [260,269](#)
technical layouts [53](#)
technical standards [xxvi](#)
technocentric approach [57](#)
technology enhanced education [116](#)
tenure[xxviii](#)
text captions [83](#)
text entry [292](#)
text-based tools [xxii](#)
text-to-text conversion [88](#)
thinking-aloud[269](#)
thinking-aloud protocol [260](#)
ThinkQuest[164](#)
third person [158](#)
threaded discussions [xxvii](#)
three-dimensionality[136](#)
thumbnails[183](#)
time[203](#)
time on task [272](#)
time-shifted discussion [197](#)
timelines[29](#)
title bars [291](#)
tools[viii,77](#)
topic sentences [161](#)
topical organization [207](#)
tracking[88,102](#)
trajectory[146](#)
transcriptions[83](#)
transfer[8,222](#)
transitional knowing [65](#)
trends[ix](#)
triangulation[244](#)
Turnbull, Don [125](#)
<?xml version="1.0"?>

Index

U

U.S.C. Section 794 [47](#)
umbrella scheme [205](#)
underlining [145](#)
unidirectional [128](#)
unit of content [168](#)
University of Western Australia [91](#)
unstructured interview [265](#)
uppercase [145](#)
usability [ix](#)
usability expert [28](#)
usability methods [258](#)
usability research [82](#)
usability testing [ix](#)
usage errors [272](#)
use case [262](#)
usefulness [271](#)
user choice [51](#)
user control [165](#)
user-centered design [viii](#)
user-centered design framework [39](#)
<?xml version="1.0"?>

Index

V

verbal [178](#)
verbal learners [178](#)
verification testing [270](#)
video [xxv](#)
video streaming [57](#)
videoconferencing [50](#)
virtual course [34](#)
Virtual Field Trip, The [212](#)
virtual reality display [288](#)
visibility [145](#)
visual [178](#)
visual acuity [144](#)
visual design [46](#)
visual e-Texts [182](#)
visual hierarchies [237](#)
visual impairment [56,82](#)
visual mass [146](#)
visual metaphors [184](#)
visual representation [236](#)
visualization [136](#)
vocabulary of hypertext [136](#)
vocabulary of print [124](#)
voice-over-IP [xxii](#)
<?xml version="1.0"?>

Index

W

W3C⁸⁴

Wake Forest University ²⁹⁶

WAP technology ²⁹⁹

ways of Knowing ⁶⁴

ways of understanding ^{xxv}

Web Accessibility In Mind (WebAIM) ⁸¹

web genre ⁴⁴

Web usability ²⁴³

Web-based learning ^{xiv}

Webcam¹⁸

WebCT^{xxi}

WebQuest²¹²

webserver²⁹⁶

Westlaw, Inc. ²⁹³

whitespace¹⁴³

Williams¹⁰⁵

wireless device ²⁸⁶

wireless technologies ^{xxvi}

workplace^{xiv}

workplace learning ²⁷⁸

World Wide Web Consortium ⁴⁷

Writer as Researcher ⁴³

writing for clarity ¹⁷⁰

Wurman¹⁹⁸

<?xml version="1.0"?>

List of Figures

Introduction

Figure 0.1: An English Course Delivered by WebCT at the Chinese University of Hong Kong Used with Permission, <http://www.cuhk.edu.hk/wbt/webct/cdemo.htm>

Figure 0.2: Fetal Pig Dissection Tutorial (<http://www.g3.com/education>) Used with Permission © Gordon G. Miller, III, President and CEO G3 Systems, Inc.

Chapter 1: Five Factors for Planning

Figure 1.1: Cognitive Taxonomy

Figure 1.2: Psychomotor Taxonomy

Figure 1.3: Affective Taxonomy

Chapter 2: User-Centered Design (Part 1 - Cultural Diversity)

Figure 2.1: Adventures in Problem-Solving

Figure 2.2: Adbusters Culture Jammers Headquarters Courtesy AdBusters @ <http://www.adbusters.org/home/>

Figure 2.3: Wearing Many Hats

Figure 2.4: Thumbs Down

Figure 2.5: Color and Culturally Sensitive e-Texts

Figure 2.6: ©WebCT at the University of Alberta <http://www.ualberta.ca/webct>

Chapter 3: User-Centered Design (Part 2 - Age, Gender and Accessibility)

Figure 3.1: Ways of Knowing— Learner Profile and Implications for e-Writing

Figure 3.2: Adult Learner Characteristics— Implications for Training

Chapter 4: Selecting and Evaluating Learning Objects

Figure 4.1: Interactive Resources

Figure 4.2: Modularizing

Figure 4.3: Versatility

Figure 4.4: Paris, a Single Digital Component

Figure 4.5: Instructional Problems

Figure 4.6: © Merlot (www.merlot.org)

Figure 4.7: © CAREO (www.careo.org)

Figure 4.8: © Alexandria (Alexandria.netera.ca/)

Figure 4.9: ©Blue Web'n (<http://www.kn.pacbell.com/wired/bluewebn/>)

[Figure 4.10: Face-to-Face](#)

[Figure 4.11: Distance Education](#)

[Figure 4.12: Group Work](#)

[Figure 4.13: Self-Directed or Remedial](#)

[Figure 4.14: General Course Development](#)

Chapter 5: From Text to e-Text - Message Design

[Figure 5.1: Information Seeking on the Web— An Integrated Model of Browsing and Searching](#)
http://firstmonday.org/issues/issue5_2/choo/index.html

[Figure 5.2: Examples of Hate Crimes Against African Americans Civilrights.org](#)
(http://www.civilrights.org/programs/hate_crimes/faces/black.html)

[Figure 5.3: Black History Treasure Hunt and Quiz Black History— Past to Present](#)
(http://www.kn.pacbell.com/wired/BHM/bh_hunt_quiz.html)

[Figure 5.4: Semantic Web](#)

[Figure 5.5: Linear Compared to Hypertext](#)

[Figure 5.6: The Language of Interactivity](#)

[Figure 5.7: Goal-driven Information Design](#)

[Figure 5.8: How to Write Usefully for the Web](#)©asper Sprengers, 2003 How to write usefully for the Web? (<http://www.abeleto.com/resources/tutorials/webwriting.html>)

[Figure 5.9: User Empowerment and the Fun Factor— Jakob Nielsen's Alertbox](#)© Jakob Nielsen, 2003 User empowerment and the Fun Factor— Jakob Nielsen's Alertbox
(<http://www.useit.com/alertbox/20020707.html>)

[Figure 5.10: All Things Web— Re-visioning Document Structure](#)©Terry Sullivan, 1998. All Rights Reserved. Used with Permission. All Things Web— Re-visioning Document Structure
(<http://www.pantos.org/atw/f-35421.html>)

[Figure 5.11: Kathy Schrock's Guide for Educators.](#) Used with permission of Kathy Schrock and DiscoverySchool.com Kathy Schrock's Guide for Educators
(<http://school.discovery.com/schrockguide/eval.html>)

[Figure 5.12: Online Education at the Teaching Portal](#) Online Education at the Teaching Portal
(<http://www.teachingportal.com/#define%20e-learning>)

[Figure 5.13: Applying Writing Guidelines to Web Pages](#)©Jakob Nielsen 2003 Applying Writing Guidelines to Web Pages (<http://www.useit.com/papers/webwriting/rewriting.html>)

[Figure 5.14: Institute of International Education](#) Institute of International Education
(<http://www.iie.org/Template.cfm?&Template=/programs/fulbright/default.htm>)

[Figure 5.15: ThinkQuest.](#) Used with Permission ThinkQuest
(http://www.thinkquest.org/library/lib/site_sum_outside.html?tname=26634&url=26634/awards.htm)

[Figure 5.16: Hypercybersupercalifragilisticexpialidocious.](#) Used with Permission Hypercyber-supercalifragilistic-expialidocious (<http://kbs.cs.tu-berlin.de/~jutta/ht/hypercyber.html>)

[Figure 5.17: Hypercybersupercalifragilisticexpialidocious.](#) Used with Permission Hypercyber-supercalifragilistic-expialidocious (<http://kbs.cs.tu-berlin.de/~jutta/ht/hypercyber.html>)

[Figure 5.18: webmonkey](#) (<http://hotwired.lycos.com/webmonkey/98/28/index0a.html>) Used with

Permission

Chapter 6: From Text to e-Text - Resisting Print

Figure 6.1: Perceptual Modalities

Chapter 7: Structuring the e-Learning Environment

Figure 7.1: A Bad Case of Film Noir (<http://www.actualreality.co.uk/filmnoir/>) © Alexa Robinson, author and interactive Web builder, 2003. Used with Permission.

Figure 7.2: Paradise Flossed - An Exploration (http://ourworld.compuserve.com/homepages/neil_wendy/page7.htm)

Figure 7.3: National Geographic Pearl Harbor Multimedia Timeline (<http://plasma.nationalgeographic.com/pearlharbor/>)

Figure 7.4: BBC World News (<http://news.bbc.co.uk/>)

Figure 7.5: Hyperhistory Chart (http://www.hyperhistory.com/online_n2/History_n2/a.html) Used with Permission, 2003

Figure 7.6: © MSN (<http://www.msn.com>)

Figure 7.7: MSWord 2000™

Figure 7.8: Fashion Planet (<http://www.fashionplanet.com>) © 1995–2003 - Digital Fashion, Inc.

Figure 7.9: Oyez Baseball (<http://baseball.oyez.org/>) The OYEZ™ Project © 1996–2003 by Jerry Goldman and Northwestern University

Figure 7.10: Welcome to the Mesoamerican Ballgame (<http://www.ballgame.org/>). The Sport of Life and Death— The Mesoamerican Ballgame, Mint Museum of Art, Charlotte, North Carolina Project Supported by— The National Endowment for the Humanities, The National Endowment for the Arts, TheRockefellerFoundation Website Design and Production by— Interactive Knowledge, Inc. ©

Chapter 8: The Active e-Reader

Figure 8.1: Case-based ModelNavigation

Figure 8.2: EDEL 435— Instruction in Elementary School Social Studies © University of Alberta, 2003 (<http://www.atl.ualberta.ca/project/detail.cfm?id=58>)

Figure 8.3: Homepage for EDES501 © University of Alberta, 2003 (<http://www.quasar.ualberta.ca/edes501>)

Figure 8.4: The Desktop Metaphor. Katy's Desktop

Figure 8.5: Academic Technologies for Learning © University of Alberta, 2003 (<http://www.atl.ualberta.ca>)

Chapter 9: Usability Testing

Figure 9.1: Questionnaire

E-effective Writing for e-Learning Environments Handbook

Figure 2.1: Ways of Knowing— Learner Profile and Implications for e-Writing

Figure S.1: Course Architecture

[Figure S.2: Topic Structure](#)

[Figure S.3: Notes Outline](#)

[Figure S.4: Threaded Discussions](#)

[Figure S.5: Session Planning](#)

[Figure S.6: Time to Develop a 3-Credit Course](#)

[Figure S.7: Course Content](#)

[Figure S.8: John's Usage Profile](#)

<?xml version="1.0"?>

Team LiB

[!\[\]\(728952230e3b2da782a168a9f425e9c0_img.jpg\) PREVIOUS](#) [!\[\]\(7c79a7642fe58f945d3e42b06b0b42c0_img.jpg\) NEXT !\[\]\(149c09dccb490154ae6ac5a617c32989_img.jpg\)](#)

List of Tables

Chapter 1: Five Factors for Planning

Table 1.1: Learning Activities and Formats Adapted from Horton, W. (2000). *Web-based training*. New York, NY: John Wiley and Sons, Inc., p. 15–16.

Table 1.2: Case Study: Writing for New Media

Chapter 8: The Active e-Reader

Table 8.1: CognitiveActivities Continuum

E-effective Writing for e-Learning Environments Handbook

Table 1.1: Learning Activities and Formats Adapted from Horton, W. (2000). *Web-based training*. New York, NY: John Wiley and Sons, Inc., p. 15–16.

<?xml version="1.0"?>

List of Examples

Chapter 1: Five Factors for Planning

[A Case Study Writing for New Media \(WNM\)](#)

[A Case Study Government Goes Online](#)

Chapter 2: User-Centered Design (Part 1 - Cultural Diversity)

[A Case Study Participatory Design in Law](#)

Chapter 5: From Text to e-Text - Message Design

[A Case Study Emille studies on the bus](#)

[A Case Study](#)

Chapter 6: From Text to e-Text - Resisting Print

[A Case Study Using PowerPoint as a Cognitive Tool](#)

Chapter 9: Usability Testing

[A Case Study Accounting in the Public Sector](#)

<?xml version="1.0"?>

List of Sidebars

Introduction

[Implications for e-Learning](#)

[Live e-Learning - Why Are Early Adopters So Excited?](#)

[Do Learners Want or Need a Blended Learning Approach?](#)

[Why Adults Take Online Courses](#)

Chapter 1: Five Factors for Planning

[Implications for e-Learning](#)

[Internet Teaching by Style: Profiling the Online Professor](#)

[Implications for e-Learning](#)

Chapter 2: User-Centered Design (Part 1 - Cultural Diversity)

[Design Tip](#)

[Implications for e-Learning](#)

[Implications for e-Learning](#)

[Implications for e-Learning](#)

[Text 1](#)

[Text 2](#)

Chapter 3: User-Centered Design (Part 2 - Age, Gender and Accessibility)

[Implications for e-Writing 8 Factors for the Most Motivating and Engaging Web sites](#)

[Implications for e-Writing](#)

[Accessibility and the Library](#)

[Example: 1.4](#)

[Example: 13.3](#)

[Example: 13.7](#)

[All Things Web](#)

[Blast into the Future](#)

Teaching with Diversity Checklist

Chapter 5: From Text to e-Text - Message Design

Shawna Studies Online

Implications for e-Writing

Implications for e-Writing

Sample Text

Implications for e-Writing

Implications for e-Writing

Session 1: Pedagogy

Text Sample

Implications for e-Writers

Implications for e-Writing

Implications for e-Writing

Implications for e-Writing

Chapter 6: From Text to e-Text - Resisting Print

Guideline #29

Implications for e-Writing

Guideline #34

Guideline #35

Implications for e-Writing

Chapter 7: Structuring the e-Learning Environment

The Garden

PallCare

Three Principles for Each Page of Content

Implications for e-Learning

Chapter 9: Usability Testing

They're Undergraduates...

Implications for e-Learning

WebQuest Collections

Chapter 10: e-Learning Trends — The Mobile Environment

Trends

Implications for m-Learning

Implications for Libraries:

Nine reasons to open an e-Book

E-ffective Writing for e-Learning Environments Handbook

Why synchronous?

<?xml version="1.0"?>

Team LiB

 PREVIOUS