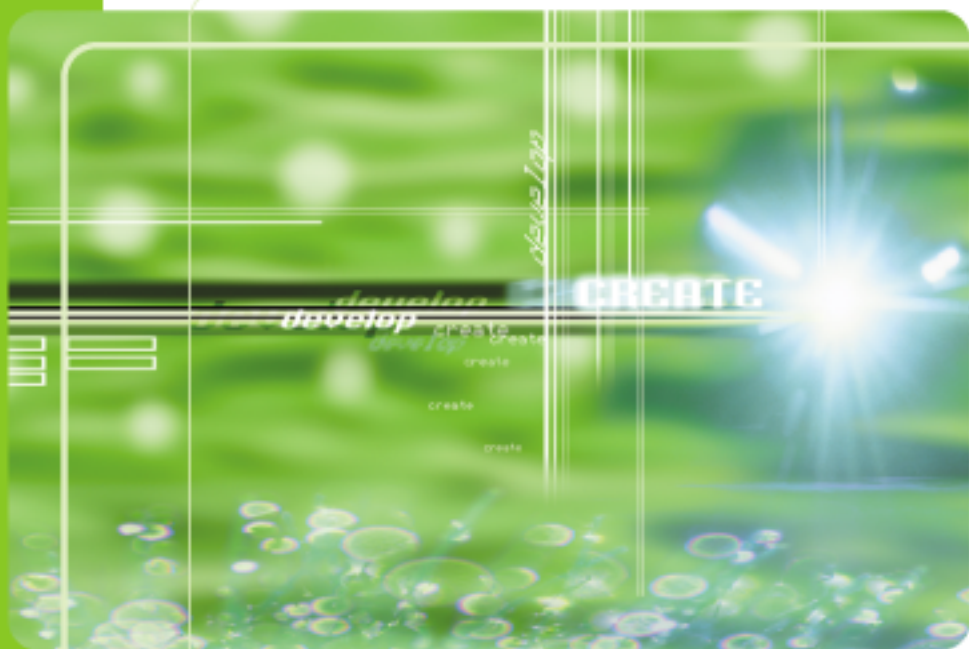




The Click2learn Guide to e-Learning ➡

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How to use this
online book

Contents

Introduction

- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Recommended reading

Index

Contents

Introduction

- What is e-Learning? **vii**
Why use e-Learning? **vii**
Solutions from Click2learn **ix**
About this book **xi**

Chapter 1

Planning, designing, and evaluating your e-Learning application

- At a glance **15**
Planning the project **16**
Developing content **22**
Designing the layout **34**
Evaluating the application **38**

Chapter 2

Distributing an e-Learning application over the Internet

- Advantages of Internet-based
learning applications **42**
Understanding the Internet
and the World Wide Web **43**
Understanding the parts of an
Internet e-Learning application **46**
Internet distribution options **48**
Tips for designing an e-Learning
application for the Internet **50**



How to use this
online book

Contents

Introduction

- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Recommended reading

Index

Chapter 3

Creating multimedia effects and interactive content

- About multimedia content **55**
- Using graphics **57**
- Using graphics on the Internet **60**
- Using sound **67**
- Using video **68**
- Using animation **71**
- Acquiring multimedia **73**
- Using interactive elements **74**

Chapter 4

Managing e-Learning results

- Working with a learning management system **78**

Recommended reading 83

Index 85



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Introduction

By teaming the knowledge in your organization with today's content development and delivery technologies, Click2learn can help you to achieve strategic goals: cost-effective training, secure distributed access to information, comprehensive learning management, and certifiable results.

This introduction describes how e-Learning can work for you and how our tools and services can produce your training material. In addition, a summary of each chapter's contents will reveal how this book can help you design, create, and manage online learning.

IN THIS CHAPTER

What is e-Learning? **vii**

Why use e-Learning? **vii**

Solutions from Click2learn **ix**

About this book **xi**



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

What is e-Learning?

Training materials and instructional information that is delivered electronically over the Web, through an organization's intranet, or via CD-ROM, is known as e-Learning. An online course is a popular type of e-Learning which can include test questions. Using multimedia and interactive technology to illuminate the topic, e-Learning can engage the learner with video and audio features, self-paced navigation, and options such as pop-up hints and hyperlinks to related topics.

Why use e-Learning?

In a world where access to information is the key to staying competitive, organizations rely on people who are continually learning new skills, crafting innovative solutions to changing circumstances, and staying informed and responsive. With e-Learning, you can provide affordable training to as many employees or business partners as you need, at any time, from any location. You can create an instant, state-of-the-art learning system in a fraction of the time needed to implement a more traditional solution. You also have access to solid reporting tools that allow you to easily track both student progress and your training budget.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Advantages of creating an e-Learning course

When you compare e-Learning with traditional classroom training, e-Learning has many advantages. One advantage is cost savings. Corporations and schools often need to stretch funds while maintaining high-quality training programs. The cost of developing, distributing, and maintaining an e-Learning application is often much less than the cost of an instructor-led training program. Online learning can help organizations get the most out of their budgets and can add valuable learning tools and techniques.

Another advantage to e-Learning is the ability to update any topic in your published content and deliver the results instantly over the Internet or an intranet. Now all of your learning material can be up-to-date without the expense of reprinting a book, storing inventory, or manually distributing an update.

In an online course, you can deliver an unlimited number of colorful graphics and special effects that direct attention to the important points in the learning material. Students can interact with new material right away, by answering practice questions and directing their own learning pace. When you include questions in a course, student answers can be automatically tracked with a learning management system such as Ingenium from Click2learn.



- 1 Planning, designing,
and evaluating
your e-Learning
application
- 2 Distributing an
e-Learning application
over the Internet
- 3 Creating multimedia
effects and interactive
content
- 4 Managing
e-Learning results

Solutions from Click2learn

Whether you need authoring or learning management software, custom content development, or want to publish a course on our e-Learning network, Click2learn has the solutions for you.

Software products

For the creation, delivery, and management of e-Learning, we have products that work for organizations of any size.

ToolBook II Instructor is a high-end authoring tool designed for the flexible creation of content-rich e-Learning applications. Its wide array of tools includes the Actions Editor for creating custom functionality that converts automatically to DHTML. You can quickly create an application by using the preprogrammed objects in the Instructor Catalog or the convenient templates. For specialized needs, Instructor includes the powerful OpenScript programming language for preparing simulations, utilizing ActiveX controls, and creating other types of object behavior. Instructor offers a full-featured development environment for creating sophisticated courseware that you can easily deliver over the Internet, an intranet, or CD-ROM.

ToolBook II Assistant is an e-Learning authoring tool that is specially designed for ease of use. Its intuitive interface is ideal for those who want to create interactive learning applications quickly and don't need the programming capabilities available with Instructor. Using the simple drag-and-drop interface in Assistant, almost anyone with information to convey can author effective courseware.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Ingenium is a learning management system which tracks every form of training: online or instructor-led classes as well as on-the-job training. The Ingenium Enterprise Edition can launch and track courses created with ToolBook II Instructor and Assistant, as well as Macromedia Authorware courses. The ability to track results for courses from NETg, SkillSoft, and SmartForce.com is also built-in. Using Ingenium features, such as skill gap analysis, allows any organization to advance their workforce competency goals.

Professional Services

Our development professionals and design experts can create an online learning solution that fits your organization's needs and specifications. To learn more, visit our Web site at www.click2learn.com, or contact a Click2learn sales representative.

Corporate e-Learning sites

A corporate e-Learning site is a Web site hosted by Click2learn that delivers information tailored to the interests of a specific company or institution. This customized site is a place where employees or even customers can go to learn just about anything. In essence, an e-Learning site functions as a virtual university for your entire company. Each site includes a built-in learning management system that can track individual progress. To learn more, visit our Web site at www.click2learn.com.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

The Click2learn e-Learning Marketplace

Choose from the thousands of learning materials available on our e-Learning Marketplace. You will find a variety of materials to enhance your personal learning, for example, courses and resources to gain certification as a Microsoft Certified Systems Engineer. Visit our e-learning Marketplace at www.click2learn.com/c2l to take a look at the all of the titles available.

About this book

This book is an introduction to creating, deploying, and managing e-Learning applications. Through discussions of planning considerations, design principles, distribution options, and organization methods, this resource can help you maximize the power of Click2learn authoring and course management tools and deliver exciting, effective applications to your learners. What is multimedia and how can it enhance your lessons? How can you use the Internet to share your application with your users? The chapters that follow address these and other topics, building a framework in which you can put your best ideas to work using the Click2learn family of products.

First, a word about the terms we use. An e-Learning application—that is, the instructional material that you develop for delivery to your users—may be just one lesson, or it may be a course comprising several lessons. In this guide, the end product you'll create may be described as an application, a course, a lesson, a book (because ToolBook II uses a “book” metaphor, with each screen a “page”), or simply “your project.” They all refer to the same thing—the product of your online courseware design and authoring process. Also, because e-Learning applications are used in a variety of settings, the end user of the application you create may be described as a user, a learner, a student, or even an employee.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Exploring the chapters

Chapter 1, “Planning, designing, and evaluating an e-Learning application,” is a high-level overview of factors to consider when producing your courseware. Here you’ll find guidance on how to plan wisely, identify project needs and resources, choose an appropriate teaching method, consider layout schemes, and evaluate your product for usability. Practical techniques—such as developing a user profile and creating a design plan—will help you to translate your ideas into tangible results.

Chapter 2, “Distributing an e-Learning application over the Internet,” describes the advantages and challenges of distributing your applications using the Internet. Flexibility, ease of access, cost control, and platform accessibility are advantages of an Internet distribution strategy. An introduction to the vocabulary of the Internet and the World Wide Web includes terms like browser, Hypertext Markup Language (HTML) and plug-ins. This chapter explains the architecture and terminology of the Internet and helps you to use the Internet as an integral part of your e-Learning strategy.

Chapter 3, “Creating multimedia effects and interactive content,” guides you through the many ways you can boost the presentation value of your applications. Multimedia elements such as sound and video can heighten your users’ interest, engage their attention, and, when used optimally, increase their retention. Interactive elements, such as questions that provide feedback for each answer, can establish an instructional dialogue between learner and content. By some estimates, learning time can be decreased up to 60 percent over instructor-led training simply by engaging learners effectively online. This chapter’s discussion of basic audio, video, graphic, and animation concepts serves as a foundation for your own explorations in creating a lively and effective learning environment.



How to use this
online book

Contents

Introduction

- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Recommended reading

Index

Chapter 4, “Managing e-Learning results,” explores the ways you can manage the organization, access, delivery, and evaluation of learning using one of two solutions from Click2learn. Here you’ll discover how Ingenium can help you to establish groups of instructors and students, determine the course prerequisites, and obtain feedback using the reporting system. Also discussed is the built-in learning management system provided to users of a Click2learn corporate e-Learning site. This chapter can help you to evaluate course effectiveness and track results by describing ways to collect, organize, and record information about the progress of your users.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Chapter 1

Planning, designing, and evaluating an e-Learning application

An e-Learning application represents an intersection of content, design, and function. Developing an application that successfully delivers ideas and information requires the joining of many diverse skills: careful planning and project management, mastery of the material to be presented, an understanding of the technical development issues, a good aesthetic sense, and a thoughtful approach to the use of design elements and special effects. In this chapter, you'll find guidance ranging from practical techniques for project planning and user profiling to the aesthetics of good page layout and appropriate instructional design. Discussions of content development and distribution methods will help you to translate your ideas into tangible results.

IN THIS CHAPTER

- At a glance **15**
- Planning the project **16**
- Developing content **22**
- Designing the layout **34**
- Evaluating the application **38**



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

At a glance

The ToolBook II authoring products, Instructor and Assistant, allow you to combine different media—such as text, still images, animation, video, and audio—to create e-Learning courses. While the sheer variety of choices may seem overwhelming at first, a few sound planning and design principles can help you identify and develop a strategy that's right for your project.

Depending on the scope of your project, the steps you take to design and produce an online application may be more or less formal. A process like the one outlined below, discussed in detail in the remainder of this chapter, can help guide your organization efforts and ensure a well-considered product.

1 Plan the project

- ◆ Evaluate resources and identify needs
- ◆ Consider distribution options
- ◆ Create a project plan

2 Develop content

- ◆ Distinguish between concepts and tasks
- ◆ Develop learning objectives
- ◆ Create lesson outlines
- ◆ Choose an instructional approach



How to use this
online book

Contents

Introduction

- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Recommended reading

Index

3 Design the layout

- ◆ Develop a visual theme that reflects your instructional approach

4 Evaluate the application

- ◆ Make sure the application works
- ◆ Test effectiveness

Planning the project

Project planning is a preliminary step in which you evaluate your resources, decide your distribution strategy, develop a user profile, and then document your research and choices. This process, while sometimes time consuming, is effort well spent: the result is a road map for your project that can help you to measure expectations, activities, and results. In addition, planning can help maximize resources—if you get it right the first time, you won't have to spend time and money doing it over. This section describes some factors to consider when planning your e-Learning course.



- 1 Planning, designing,
and evaluating
your e-Learning
application
- 2 Distributing an
e-Learning application
over the Internet
- 3 Creating multimedia
effects and interactive
content
- 4 Managing
e-Learning results

Evaluating your resources and identifying needs

A thorough audit of the people, tools, budget, and time available to you in the course design process is a good way to identify where gaps exist and where additional resources are needed.

- ◆ **People** ToolBook II makes it possible to create applications entirely by yourself, or you can involve writers, graphic artists, animators, programmers, and video and audio specialists. In addition, you may need to recruit and work with various subject-matter experts. A team approach—one that involves a project manager, content expert, and instructional designer—is often an effective working model. Evaluate both the short-term and permanent staffing implications for your project.
- ◆ **Tools** Beyond your choices for authoring and management tools, consider your other material requirements. You may want graphic and three-dimensional modeling programs, audio- and video-editing applications, and computers capable of running this software.
- ◆ **Budget** While an e-Learning application can be more cost-effective than traditional instructor-led training, its development and deployment involve thoughtful budget planning. The salaries of core team members, consulting fees for content experts, equipment investments, and fees for stock photos or video clips are some factors that can affect the project cost.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

- ◆ **Time** Although scheduling a project can seem like guesswork, there are formulas that can help. For high-end application development that involves substantial programming, industry sources estimate 2.5 hours of development per minute of completed course. By making extensive use of the catalog objects provided with ToolBook II Instructor and ToolBook II Assistant, however, you can reduce your development time to as little as 16 minutes per minute of completed course. Ultimately, the amount of time you'll need to develop an application depends on the scope of the project. Determine the role of online learning in your overall teaching strategy; is the course just one of the ways you'll present information, or is it your primary means of instruction? Is the course part of a series, or will it stand alone? Your expectations about the quality of the application will also affect your time allocation and resource planning. Is this a high-profile project? Will it be updated or expanded in the future, or is this your one opportunity to get it right?

Considering distribution options

An important part of planning an e-Learning application is deciding how to deliver it to your users. ToolBook II allows you to distribute your application over the Internet or an intranet, over a local area network, or on a CD-ROM. Another method is to distribute large media files on a CD-ROM while making the application available over an intranet or the Internet, to provide fast access to the media as well as the ability to quickly and inexpensively update the content on the server.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Choosing a method of deployment depends primarily on the environment in which the application will be used, the equipment available to your users, and the technological demands of your course.

- ◆ **Distribution using the Internet or an intranet** The Internet enables the delivery of interactive learning to any location, at any time. ToolBook II allows you to publish to the Internet in two ways: by exporting your application to DHTML or by using the ToolBook II Neuron browser plug-in to view a native ToolBook II application in a Web browser. For a description of these two distribution methods, see page 52 for more information.

Using the Internet to distribute your application has many advantages. Any changes you make to your application are available instantly, and changes are inexpensive to implement. Some challenges exist, though—for example, bandwidth limitations may make the transfer of large media files slow and tedious for the user. For more information about using the Internet to deploy your course, see Chapter 2, “Distributing an e-Learning application over the Internet.”

An intranet uses the same browser-based protocols used for Internet delivery, but an intranet is accessed by and maintained for a private group—usually a company or a university. Because these organizations generally have a faster connection within the intranet, bandwidth bottlenecks are less common than on the Internet.

- ◆ **Distribution using a local area network** A LAN is a group of computers linked by networking software and a system of access protocols. A ToolBook II application can be distributed on a LAN—meaning that the application itself and the run-time files required to read the application reside in a central location, where individual users can retrieve a copy to install on their hard drive. Some ancillary files used in the course, particularly large media files, may continue to reside on the network server until requested by the application.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

- ◆ **Distribution using a CD-ROM** ToolBook II courses can be delivered on a CD-ROM, which provides very quick access to the application and media.
- ◆ **Distribution using a CD-ROM hybrid** You can combine an application available over the Internet, an intranet, or a LAN with files on a CD-ROM, creating a course where some information is distributed using a network, and other information is distributed locally. This is particularly useful when your application contains large media files that may download slowly from a network. In such cases, your application, while running primarily in a browser, can “call” the media files from the CD-ROM, where access and display are unhindered by bandwidth limitations.

Regardless of which distribution method you choose, remember to plan for appropriate hardware. If you plan to use animation and video, for example, the computers used for viewing must be able to run these media files at acceptable speeds.

Developing a user profile

Understanding the people for whom you’re developing an e-Learning application is crucial to the success of the project. Developing a user profile will help you to keep focused on your audience and to judge the appropriateness of your content and methods. You can use both formal and informal methods to analyze your users—consider interviewing them, observing their work, visiting trade shows, or reading their professional journals or documentation materials.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

When gathering information for a user profile, determine some of the following. How experienced are they with the material? What age ranges or cultural groups do they represent? What is their level of education? What are their learning styles? How computer-savvy are they? Try to evaluate their environment as well. For example, do they sit, stand, or move around? Is it noisy or quiet, dark or bright? These factors affect your choice of content, instructional approach, and page layout.

Creating a project plan

Consolidate the results of your planning in a document that will help you to implement your ideas and measure progress. A project plan helps you to convey your understanding of what's needed for the e-Learning course to succeed and your approach for completing it. Distributing your plan to those involved in the project helps manage expectations and answer questions.

A project plan typically contains the following sections:

- ◆ **Background** Answer the question, "Why is this e-Learning application needed?" For example, you might want to include an explanation of how your application is a cost-saving alternative to printed materials or classroom training.
- ◆ **Resource list** Describe the resources you've determined you have and/or need for the project, including people, tools, budget, and time. These factors were discussed earlier in this chapter under "Evaluating your resources and identifying needs."
- ◆ **User profile** Include the information you've gathered about your target audience, as discussed earlier in this chapter under "Developing a user profile."
- ◆ **Learning objectives** Detail the learning objectives for each lesson and the course as a whole. Learning objectives are described later in this chapter under "Developing learning objectives."



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

- ◆ **Content outline** Outline the content of the course, detailing each lesson. Describe topics and subtopics, quizzes and feedback, overviews and summaries. For help, see “Creating lesson outlines,” later in this chapter.
- ◆ **Instructional approach** Determine the teaching model that best suits your content and learners. Several options are discussed later in this chapter under “Choosing an instructional approach.”
- ◆ **Layout design** Describe the layout approach that you’ve selected and explain why it is appropriate. Include sample pages to clarify how everything in your lesson will behave: menus, navigation buttons, media, and so on. Layout options are discussed later in this chapter under “Designing the layout.”
- ◆ **Evaluation strategy** Describe how you plan to test, debug, and evaluate your course before distributing it. For more information, see “Evaluating the application,” later in this chapter.
- ◆ **Schedule for development** Develop a detailed timeline that breaks down the project into blocks of time designated for planning, content development, graphic design, reviews, testing, and production.

Developing content

Based on your research and conclusions during the planning phase, you should now have a clear understanding of the needs of your users and your application-development goals. Your next step is to fashion the actual content for your course. This section provides ideas for developing course content and introduces some common instructional design approaches.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Distinguishing between concepts and tasks

There are generally two types of information you will want to convey in an e-Learning application: concepts and tasks.

Conceptual information comprises ideas, theories, background information, terminology, and other nonprocedural information. Often, concepts provide a context for doing a specific task; for example, a learner would need to know some basic financial concepts before fully understanding the process of billing a customer. Concepts answer the question, “Why do I perform this action?”

Tasks are procedural in nature and require that your learners follow a particular sequence of steps. Tasks are often related to specific processes, such as replacing a filter or tracking customers in a database. Tasks answer the question, “How do I perform this action?”

You will probably present some combination of conceptual and task information to your learner. Just remember to tailor your presentation according to the material. For example, while it's fine to use blocks of text to explain concepts, consider using graphics, sound, video, and animation to make the information come alive and keep your reader engaged. When presenting task information, break up larger topics into manageable segments. You could break up the process of landscaping a yard, for example, into planning the design, choosing plants, preparing the soil, and installing the plants.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Developing learning objectives

Developing learning objectives for each topic and each course is a way to establish benchmarks—a method for determining whether you are achieving your teaching goals. Learning objectives include the conditions under which the student must complete the assignment, the performance measurements used to determine whether the assignment has been successfully completed, and the standard by which the student's performance is evaluated.

For example, a well-crafted learning objective for a training course in human resources might state, "When presented with a series of interview questions for job applicants (condition), the interviewer will be able to differentiate between those that can be asked legally and those that cannot (performance) with 100 percent accuracy (standard). As you can see by this example, learning objectives must be concrete, specific, and observable to be effective.

Creating lesson outlines

Developing an outline of what you need to cover in each lesson is a good way to organize your ideas and shape your course content. Your outline should include main topics and subtopics, pretests or practice sessions, overviews, quizzes, and summaries.

One approach to developing a lesson outline is to make a video or audio recording of a subject matter expert who describes in detail the task or concept that you want to convey. You can then reorganize, edit, and add to the recorded material to match your objectives. By replaying sections of the recording, you can review the accuracy of the information and pinpoint any ambiguous areas that need to be clarified.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

When outlining your course, consider the following:

- ◆ **Remember your user profile** Continually draw upon the information you obtained about your user when you compiled your user profile. Make sure the language level, tone, and learning activities are appropriate.
- ◆ **Set up expectations** Much like a table of contents in a book lets you know what you're about to read, a main menu or list of topics in the front of your course helps the user see the length and content of the assignment. Also, list any prerequisites or prior knowledge the user must have, and state the learning objectives for the course and each lesson.
- ◆ **Provide some basic instructions** If you want the user to go through your lessons in a certain sequence, make that clear. If you have a specific method for exiting the application you'll want to explain this to the user. Ideally, you should not have to describe much about mechanics—users should focus on the subject matter, not the application.
- ◆ **Encourage user interaction** Students respond best and retain most when they actively participate in their learning. For example, using an instructional approach in which the student takes a pretest, reads a few short paragraphs, and then takes a short quiz is an excellent way to keep the student engaged in the content and to provide feedback. Asking a student to read for an hour and then take a lengthy exam will probably result in frustration and boredom.
- ◆ **Keep it short and simple** Keep your lessons short and the writing clear and simple. A good rule of thumb: keep the length of each lesson between 5 and 15 minutes.



- 1 Planning, designing,
and evaluating
your e-Learning
application
- 2 Distributing an
e-Learning application
over the Internet
- 3 Creating multimedia
effects and interactive
content
- 4 Managing
e-Learning results

Choosing an instructional approach

There are several approaches that you can take to design your e-Learning application, ranging from a simple “page-turner” presentation to a highly interactive multimedia production. You can combine self-paced learning material with interactive and collaborative features to promote active learning.



Figure 1
Example of an e-Learning course



- 1 Planning, designing,
and evaluating
your e-Learning
application
- 2 Distributing an
e-Learning application
over the Internet
- 3 Creating multimedia
effects and interactive
content
- 4 Managing
e-Learning results

On the following pages you'll see a variety of instructional approaches that will give you ideas for planning your own project.

Presentations

Presentations deliver information in a linear mode, rather like an illustrated lecture. They can introduce a concept or process, but do not include questions and therefore may not involve the user enough to master the subject or to develop a skill. Examples of presentations are slide shows, tours, feature overviews, and demonstrations of techniques or behaviors.

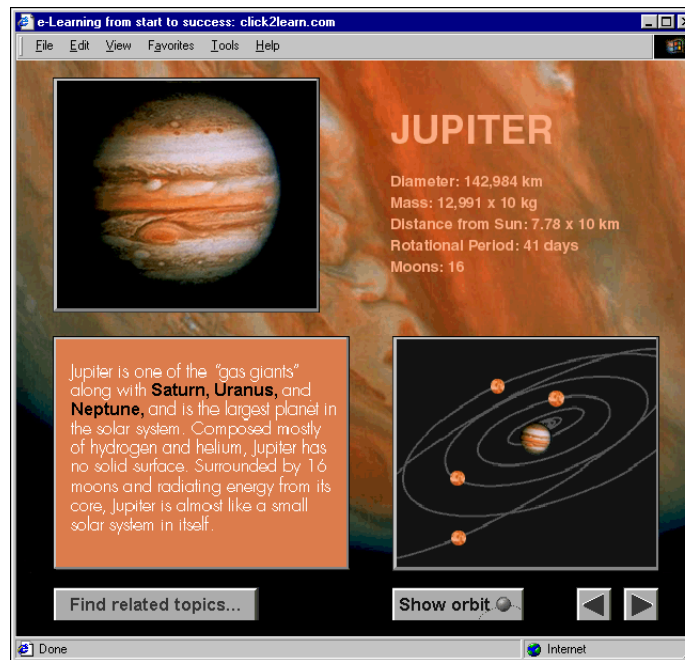


Figure 2
Sample presentation page

- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Tutorials

Tutorials are more interactive than presentations: they provide interaction with the student through practice exercises. Using menus and hyperlinks to move through the material, students can achieve a moderate level of mastery provided that they study all the pages, answer all of the questions, and participate in all of the practice exercises. There are several types of tutorials; some of the most common are included in this section.

A presentation-and-practice tutorial combines linear presentation with interactive practice.



Figure 3
Sample presentation-and-practice tutorial

How to use this
online book

Contents

Introduction

- 1 Planning, designing,
and evaluating
your e-Learning
application
- 2 Distributing an
e-Learning application
over the Internet
- 3 Creating multimedia
effects and interactive
content
- 4 Managing
e-Learning results

Recommended reading

Index

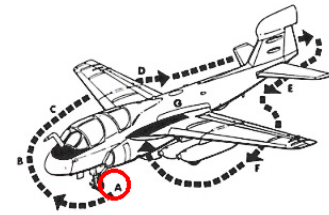
A skill-modeling tutorial combines practice exercises with step-by-step instruction to demonstrate how to perform a task, such as how to use a spreadsheet or conduct an inspection (illustrated below).

EA-6B Preflight Exterior Inspection - Microsoft Internet Explorer

A NAVAIR Training Module
The EA-6B Preflight Exterior Inspection - UNCLASSIFIED

Exit Start Over Back Next

A. LEFT FORWARD FUSELAGE



1. Click to view inspection video clip

Remember - not all items in the list are covered in the video.

2. Review the Check Options:

- CLEAR
- DOOR CLOSED
- INSTALLED
- SECURE
- CHECK

3. Think of the correct answer, then click on an item:

Check List item: Check:

A1. Boarding ladder _____ **CHECK**

A2. Access doors _____ **SECURE**

A3. CANOPY JETTISON handle _____ **DOOR CLOSED**

A4. Static port _____

A5. Total - temperature probe _____

A6. Engine inlet _____

A7. Chaff dispense safety pin _____

Note: IF EXPENDABLES ARE LOADED

4. Click to reset answers (optional): **Reset Check Status**

5. Click Next to continue

http://www.click2learn/lessons Internet

Figure 4
Sample skill-modeling tutorial



How to use this
online book

Contents

Introduction

- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Recommended reading

Index

A demonstration tutorial illustrates how processes work. Explanatory material may include photos, graphics, and videos to show details or demonstrate a procedure.



Figure 5
Sample demonstration tutorial



- 1 Planning, designing,
and evaluating
your e-Learning
application
- 2 Distributing an
e-Learning application
over the Internet
- 3 Creating multimedia
effects and interactive
content
- 4 Managing
e-Learning results

Simulations

A simulation demonstrates a process or a concept by imitating its attributes and behaviors in an interactive environment. Students react to a simulation as they would the real situation. This approach offers the highest level of mastery because it provides an experience that is close to the real experience. Feedback is built in: every user action causes a reaction from the simulation. Using a program interface and completing procedures are examples of tasks that can be practiced with a simulation.

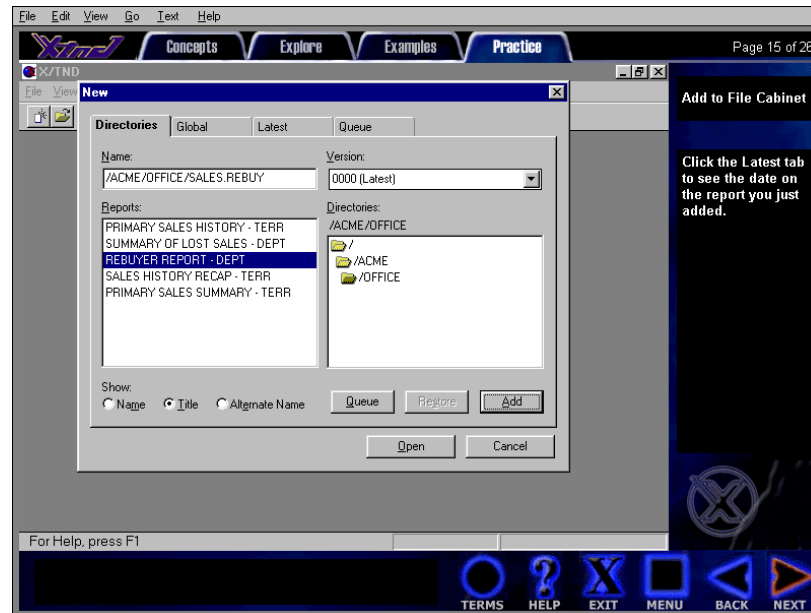


Figure 6
Sample software simulation



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Quizzes

ToolBook II provides many creative ways to ensure that users master the concepts and tasks in your material. The type of quiz you choose depends on many factors, including how simple you want the scoring to be, what kind of information you are trying to teach, and how sure you want to be that the student has mastered your content. True/false, multiple choice, fill-in-the-blank, short answer, and match item are just a few of the question types provided in the Catalog in ToolBook II Instructor and Assistant.

When you design a quiz, you can include feedback that displays in response to each question. Feedback tells users whether they have answered questions correctly and can also provide other useful information, such as further instruction or a hyperlink to related topics. ToolBook II allows you to include feedback using text, graphics, audio, or video.

Quizzes don't have to be intimidating to be effective. Allowing students to guess and try again at answering questions makes learning less stressful and aids memory retention. Also, consider permitting students to skip questions and go back to them later.



How to use this online book

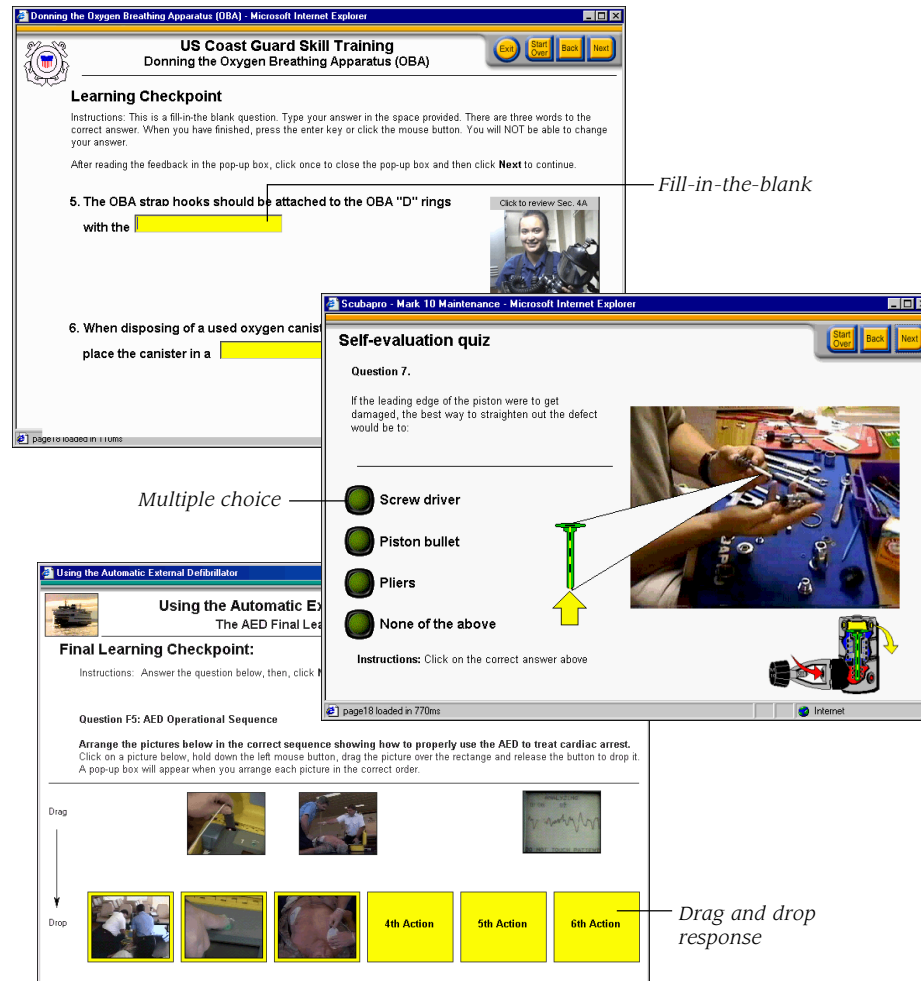
Contents

Introduction

- 1 Planning, designing, and evaluating your e-Learning application
- 2 Distributing an e-Learning application over the Internet
- 3 Creating multimedia effects and interactive content
- 4 Managing e-Learning results

Recommended reading

Index



The figure displays three screenshots of online learning modules. The top screenshot, titled 'US Coast Guard Skill Training: Donning the Oxygen Breathing Apparatus (OBA)', shows a 'Learning Checkpoint' with a fill-in-the-blank question: 'The OBA strap hooks should be attached to the OBA "D" rings with the []'. A yellow box highlights the blank, and a label 'Fill-in-the-blank' points to it. The middle screenshot, titled 'Scubapro - Mark 10 Maintenance', shows a 'Self-evaluation quiz' with a multiple-choice question: 'If the leading edge of the piston were to get damaged, the best way to straighten out the defect would be to:'. The options are 'Screw driver', 'Piston bullet', 'Pliers', and 'None of the above'. A yellow arrow points to the 'Piston bullet' option, and a label 'Multiple choice' points to the list. The bottom screenshot, titled 'Using the Automatic External Defibrillator', shows a 'Final Learning Checkpoint' with a drag-and-drop question: 'Arrange the pictures below in the correct sequence showing how to properly use the AED to treat cardiac arrest.' The question includes a sequence of images and a label '4th Action', '5th Action', and '6th Action'. A yellow box highlights the '4th Action' label, and a label 'Drag and drop response' points to it.

Figure 7
Examples of questions in an online quiz



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Designing the layout

Designing an appropriate layout for the course content is your next step. ToolBook II gives you the option to use design templates or to create your own custom designs. Whether you use a template or design your own layout for the application, you'll want to understand the basics of good design as well as the effective use of multimedia elements.

Some design tips for application layout:

- ◆ Keep the overall design of the application consistent and simple—don't change background layouts or typefaces from page to page.
- ◆ Consider the appropriateness of the design to your audience and purpose. Don't use a whimsical background, for example, to present a serious topic.
- ◆ Unify each page around one dominant element.
- ◆ Experiment! Most good designs emerge from lots of revision and input from users.

Using ToolBook II templates

Templates are useful when you don't have time to design a custom layout for your application or when you're not able to hire someone with the design skills you need. A template provides ready-made backgrounds, navigation features, page formatting, and book structure. ToolBook II makes a variety of templates available.



How to use this
online book

Contents

Introduction

- 1 Planning, designing,
and evaluating
your e-Learning
application
- 2 Distributing an
e-Learning application
over the Internet
- 3 Creating multimedia
effects and interactive
content
- 4 Managing
e-Learning results

Recommended reading

Index

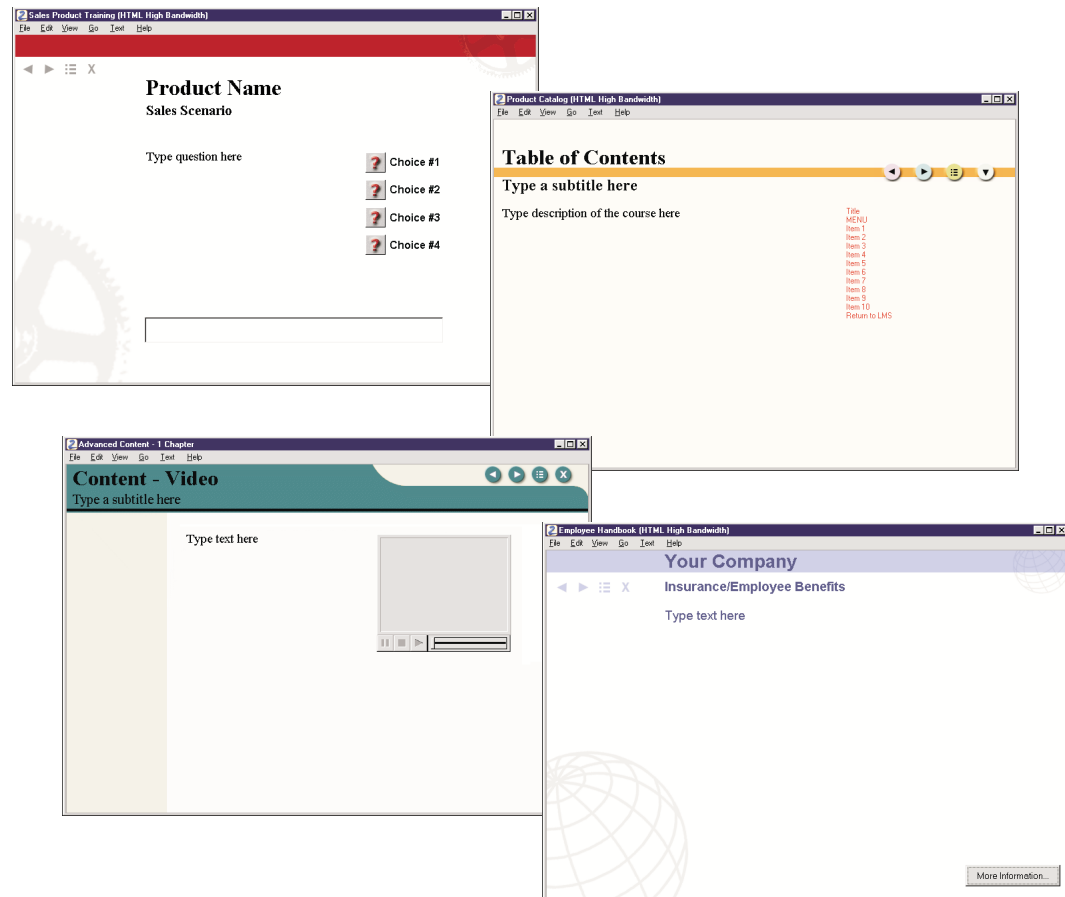


Figure 8
Template examples from ToolBook II



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Creating a new layout for a course

Creating a visual theme for a course is often assigned to graphic designers. Since everyone has an intuitive response to the overall look of a course, you'll want to find out how people react to specific designs, to make sure that the design furthers your learning objectives.

Working with color

Color can add visual interest and continuity to a course. When deciding on colors to use, choose colors that convey a visual message appropriate to the subject matter. Bright colors might distract the reader from reading the text on a page, but can be used effectively in small areas for highlighting important information.

Developing a page navigation style

By creating a page navigation style that is intuitive to the user, you allow the user to concentrate on the subject matter. The basic navigation buttons should be kept together in a group near one side of the page. Some people may find it easier to read a button caption rather than interpret a navigational graphic.

Using a grid

A grid is a series of uniformly spaced dots used to align objects on a page. Using a grid during the layout of a course can help establish consistency and can speed up the design process by aiding the placement of objects on the page.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Working with text

If the text you plan to use in your e-Learning application has already been written, you'll need to consider how to get that text into your application.

For text written with a word processing or desktop publishing program, you can import a TXT file or convert your file to Rich Text Format (RTF) for use in ToolBook II. Remember, however, that converting it to one of these formats may remove some or all formatting from the text.

If the material is in printed form, you can use an optical character recognition (OCR) scanner and software to capture the text electronically. OCR systems have some drawbacks, though. For example, OCR programs typically recognize only a few fonts, tend to drop formatting and special characters, and often introduce spelling errors. However, OCR systems offer a fast and relatively cost-effective way to transform large volumes of printed text into computer-ready text.

Consider the following when designing with text:

- ◆ Keep text brief. Some people find that reading text online is slower than reading text on the printed page, and everyone appreciates brevity.
- ◆ Use hyperlinks within the text to display a pop-up window with a definition or to jump to a related topic.
- ◆ Consider the readability of your fonts. Sans serif fonts or simple serif fonts work well onscreen. Avoid decorative or script fonts. Stick to one or two font styles and make them large enough to read onscreen (at least 12 points). Also consider that some styles (particularly italics) and colors are difficult to read onscreen.
- ◆ Use font size and style to convey hierarchy and structure.
- ◆ Since fonts are displayed according to what is installed on the user's machine, you may want to stick to common Windows fonts. If you want to use an unusual font, you can create a graphic that displays the text.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Including multimedia elements

Multimedia elements—graphics, sound, video, and animation—can make your online learning application more interesting and enjoyable for your users. Multimedia is a wonderful teaching tool, but it can become distracting or overbearing if misused. Remember that multimedia should always support your learning objectives—never use effects merely to dazzle your audience. You want your learners to interact with the course content, not with the special effects. Finally, remember that everyone learns differently. Visual learners need lots of graphics and video, while verbal learners need text and sound to understand concepts and relationships. Tailor your approach to suit your audience.

For more detailed information about using multimedia, see Chapter 3, “Creating multimedia effects and interactive content.”

Evaluating the application

After you create your application, you need to evaluate it thoroughly. Testing your application to make sure that it works and conveys your learning objectives provides you with valuable feedback for revising it.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Making sure the application works

To make sure your application works, you need to examine both content and function.

- ◆ **Objects** Check every graphic, button, hotword, hyperlink, and object on every page to make sure it is located in the right place, functions properly, and takes the user to the right destination.
- ◆ **Quizzes and practice questions** Try a variety of answers to every question to make sure that the correct feedback appears.
- ◆ **Video and animation** Run every video and animation element several times to make sure that it consistently runs in the right location, at the right speed.
- ◆ **Color** Make sure any color that appears behind text provides a sharp contrast with the font color, so the text is clear and easy to read.
- ◆ **Narration** Check each segment of narration to make sure that the audio levels are consistent, that the voice is comprehensible, and that it coincides with the planned event.
- ◆ **Scoring** Make sure that scores appear when and how you planned and that they are accurate.
- ◆ **Installation** Make sure the application installs properly and opens correctly after installation.
- ◆ **Screen resolution** View the application at several different display settings the audience may use to see if the graphics and text are clear at each setting.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Testing effectiveness

In addition to checking content and function, you need to make sure that your course is an effective teaching tool. You can do this by having a sample group of users work through the course and then provide feedback.

- ◆ **Mastery** Are users able to master the content as described in the objectives?
- ◆ **Transferability** Can users transfer knowledge and skills gained in taking the course to the real world?
- ◆ **Language** Are the language level and tone appropriate?
- ◆ **Media** Does the media you used support and enhance the content as planned?
- ◆ **Instructional approach** Does the approach you chose work well, or should you modify it to make it more effective?
- ◆ **Clarity** Are text and graphic elements clear, or do they need to be improved?
- ◆ **Motivation** Do the users find the lessons in the course enjoyable and challenging enough to complete the course?

The feedback you receive about your application will help you revise it to better meet the needs of your users.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Chapter 2

Distributing an e-Learning application over the Internet

The emergence of the Internet has revolutionized communications. New ways to present ideas, collect and share information, and achieve worldwide interactive access have reshaped the possibilities for e-Learning. This chapter serves as an introduction to the vocabulary and architecture of the Internet, describing basic terms and structural concepts. It also describes how the Internet can be an ideal distribution medium for your online learning application, providing the flexibility and functionality to maximize your content and design choices. Descriptions of the parts of an Internet-based application, along with practical guidance about potential deployment limitations, will help you to develop and manage an Internet distribution strategy.

IN THIS CHAPTER

- Advantages of Internet-based learning applications **42**
- Understanding the Internet and the World Wide Web **43**
- Understanding the parts of an Internet e-Learning application **46**
- Internet distribution options **48**
- Tips for designing an e-Learning application for the Internet **50**



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Advantages of Internet-based learning applications

Distributing e-Learning over the Internet has many advantages over traditional classroom training. One advantage is cost savings. Corporations and schools often need to stretch funds while maintaining high-quality training programs. The cost of developing, distributing, and maintaining an e-Learning application is often much less than the cost of an instructor-led training program. Online learning can help organizations get the most out of their budgets and can add valuable learning tools and techniques.

The Internet reduces development and distribution costs because it displays information on a wide range of computers. Course developers can create one version of their application, and users can access that application with a Web browser running on Windows, UNIX,[®] or other types of operating systems. Changes can be made at any time in a single location and an updated version published easily. There is no need for costly and time-consuming reprinting of printed materials or remanufacturing of CD-ROMs.

Universal access is another advantage. Using the Internet enables the delivery of interactive learning to anyone in any location, at any time. Once the application is placed on a Web server, it is available immediately to your audience. And the exchange is mutual: e-Learning allows course developers to track and evaluate student scores, giving them the information they need to measure the effectiveness of their courses.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

However, distributing an e-Learning application over the Internet is not the best choice for everyone. There are technological challenges to overcome, and your group of students may not be set up to use the Internet. This chapter discusses course distribution over the Internet and some of the challenges it presents. You may decide that distributing your online learning application via CD-ROM or an established local area network is a better choice for you and your group of learners. See “Considering distribution options” in Chapter 1 for more details.

Understanding the Internet and the World Wide Web

In order to create e-Learning applications for the Internet, you first need to understand what the Internet is and how it is used. This section presents an overview of these topics.

On the Internet, information is shared through a network of networks. Computers exchange information using agreed-upon hardware and software communication methods. The emergence of the World Wide Web—an extension of the Internet that allows for the transfer of graphics and media—has provided an ideal way to distribute interactive e-Learning applications.

How the World Wide Web is designed

The World Wide Web, the part of the Internet containing Web pages, is a distributed client-server network. Your browser is considered a Web client, and the computer that stores the Web pages is the Web server. The client communicates a request for information to the server. The server makes the documents available to the client, which displays the document.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

This interaction is characteristic of a distributed architecture. In a distributed system, the server is responsible for storing the information, and the client is responsible for presenting the information. The server and the client share the job of networking, thereby distributing the workload. On the Internet, the language spoken by both the client and server is called Hypertext Transfer Protocol (HTTP).

The Web page

The Web page is what you view when you browse on the Internet. A Web page can contain text, graphics, multimedia elements, and interactive programs. It can be as simple as a text-only report, or as complex as an interactive questionnaire. Web pages are used for educating, informing, advertising, and for fun.

The Web browser

A Web browser is a software program that displays Web pages. Using a browser, you can contact a Web server and request the data needed to display a Web page residing on the Web server. Two widely used browsers are Netscape Navigator® and Microsoft Internet Explorer.™ Sometimes different browsers display the same Web page slightly differently.

The Uniform Resource Locator

In order to locate Web pages on other computers, each computer and each document on that computer has an address, called a Uniform Resource Locator (URL). Much like your area code and telephone number identify your region and then your location, the URL of a Web page identifies a computer and a specific document residing on that computer. For example, www.click2learn.com is the URL for the Click2learn corporate home page.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Connecting to the Internet

Most businesses and universities, and many schools, already have access to the Internet. If you are not a member of an organization that has access to the Internet, you can connect to the Internet through an Internet service provider. Internet service providers are companies that maintain computers connected to the Internet and sell individuals access via their connection.

You will need a computer and a modem in order to connect to the Internet through an Internet service provider (ISP). Some providers, such as America Online® and CompuServe®, offer separate networks with links to the Internet. Other providers offer direct access to the Internet.

If you are creating applications for an institution, it is very likely that the institution will have its own Web server. If you are not sure about where your applications will be posted, see your system administrator or technology specialist.

Publishing on the Internet

To publish your information on the Internet, you need to place your Web documents on a Web server. The Web server is a computer that is set up to make the document available to anyone who requests it using a Web browser.

After you have made your Web documents available on a Web server, you can update the documents on the server to ensure that your content is always current.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Understanding the parts of an Internet e-Learning application

An Internet-based learning application is actually a collection of files that work together to display and run the course. It consists of HTML documents, multimedia files in Internet-ready formats, and can include DHTML and ActiveX controls that add functionality to the application.

Using ToolBook II, you do not need to program your Web documents using HTML or DHTML. Rather, you create the application in ToolBook II and then use a ToolBook II wizard to convert your application into DHTML automatically.

To better understand what you create when using ToolBook II, familiarize yourself with the elements of an Internet-based learning application described on the following pages.

The HTML document

Hypertext Markup Language (HTML) is a standard document format used to display pages on the World Wide Web. An HTML document combines your content with HTML markup codes, called tags, that specify how your content will be formatted. When you view an HTML document in a browser, you do not see the tags; you see only the formatting that the tags represent.

When you create a course in ToolBook II to be used on the Internet, ToolBook II converts each page of your application into a separate HTML document. The graphics, video, audio, and animations are stored in separate files and are referenced by the HTML document.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Hyperlinks

Within an HTML document, an author can define words or images that, when clicked, open other HTML documents. Clicking on a hyperlink “jump” opens another HTML document that can be located on the same computer or on any other computer connected to the Internet. The documents are identified by their URL.

When you export a ToolBook II application to an Internet-based file format, all jumps are automatically translated into hyperlinks.

Graphics and multimedia

Images, animations, digital video, and sound can all be transmitted over the Internet, with some restrictions. Internet support of media files involves certain requirements. For example, graphic images are generally saved in a file format that can be read by all browsers.

Multimedia files display in the browser by the presence of HTML markup tags in the Web document. When you create an application in ToolBook II to be used on the Internet, many of the multimedia elements are automatically translated into an Internet-ready format. For details about using graphics on the Internet, see Chapter 3, “Creating multimedia effects and interactive content.”



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

DHTML

Dynamic HTML, or DHTML, extends HTML by adding the ability to create interactive features such as buttons and pop-up responses to user input. DHTML provides developers with greater control over the appearance and functionality of HTML pages.

ToolBook II allows you to convert your application to the DHTML format automatically. Using the DHTML format provides you with the largest number of interactive features when exporting your application for the Web.

ActiveX controls

An ActiveX object (or control) adds functionality to another application, and can be executed by a Web browser that runs on the Windows platform. By adding ActiveX controls to your application, you can add sophisticated capabilities with little programming. For example, a third-party developer might create an ActiveX control that functions as a text editor. ToolBook II Instructor allows you to add this control to your book, draw a window for the editor on your page, and then work with it as you would work with a stand-alone text editor.

Internet distribution options

When you plan to distribute your application on the Internet, you have the choice to export your application automatically to an Internet-based file format, or deliver a native ToolBook II application that uses ToolBook II Neuron (a browser plug-in or ActiveX control) to display in a Web browser. The distribution method you select determines what kinds of functionality you can include with your application.



- 1 Planning, designing,
and evaluating
your e-Learning
application
- 2 Distributing an
e-Learning application
over the Internet
- 3 Creating multimedia
effects and interactive
content
- 4 Managing
e-Learning results

**Advantages and limitations of each
ToolBook II Internet distribution method**

Distribution method	Advantages	Limitations
A series of Web pages		
DHTML	Exporting your files as Web pages that incorporate DHTML allows you to use interactive objects available in the Catalog, and allows you to develop custom behavior using the Actions Editor (in Instructor). DHTML runs in a Web browser without a plug-in.	Browsers that are version 3.0 or earlier do not support DHTML. Custom OpenScript code will not export.
A native ToolBook II application (TBK file)		
Neuron	Using the Neuron plug-in or ActiveX control allows you to run a native ToolBook application over the Internet, and incorporate scripts written in OpenScript.	Neuron is available only for the Windows platform. Users must install Neuron on their computers.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Tips for designing an e-Learning application for the Internet

When designing an e-Learning application for the Internet, keep in mind that you are working with an emerging technology that is changing rapidly. You'll need to take into account connectivity issues, Internet software requirements, and your users' computer configuration.

Keep limited bandwidth in mind

The largest limiting factor of the Internet is bandwidth, which is the volume of information that can pass through the available communication device. Low bandwidth is what makes you wait for images, video, and sounds to arrive at your computer. Simply put, there's a bottleneck in the line. For example, a computer connected to the Internet with a 28.8 Kbps (kilobits per second) modem is able to download 3.6 KB (kilobytes) of data per second. It takes approximately 10 seconds for a small, 36 KB graphic file to download to that computer. If you have several larger graphics on a page plus the text and formatting information, a student may have to wait a minute or two just to view one page.

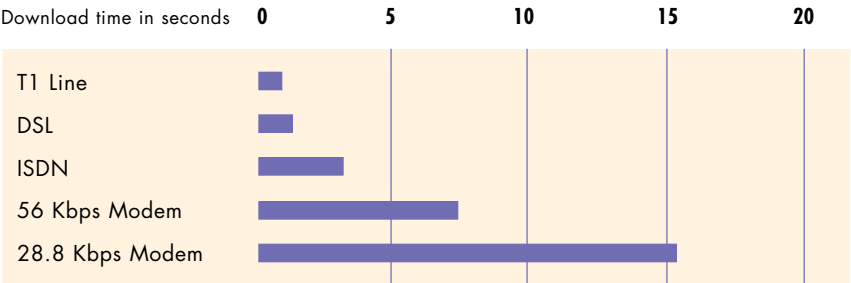


- 1 Planning, designing,
and evaluating
your e-Learning
application
- 2 Distributing an
e-Learning application
over the Internet
- 3 Creating multimedia
effects and interactive
content
- 4 Managing
e-Learning results



50 KB Graphic

Figure 1
Comparing the download time for a graphic



Most connections to the Internet are just not fast enough to handle all the high-quality graphics, video, and audio you can create for your e-Learning application. You need to design your application with these limitations in mind. Chapter 3, “Creating multimedia effects and interactive content,” provides some insight into those specific issues.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Assess the users' familiarity with computers

Assessing your users' familiarity with computer software is important in determining the design of your online learning application. You may find that your students are not completely comfortable using computers. In this case, you will want to provide instructions and design an easy-to-use interface for your application.

Students who are skilled at using computers pose a different challenge. If an accurate evaluation is required, you may need to anticipate security issues and safeguard against students who may have the computer skills to cheat on an online exam. Using Ingenium from Click2learn, you can build a secure setting in which to run a course over the Internet—even for the most computer-savvy student.

Assess the users' computer hardware

When designing an Internet-based learning application, keep in mind the typical computer and type of Internet connection your students will use to view your application. You may need to make choices about what type of multimedia content to use. For example, if the average student does not have a sound card and speakers for the computer, you will not want to use audio as an integral part of your application.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Acquire proper copyright protection and respect copyrights

When you publish your application on the Internet, you should establish copyright protection for your application. You should also be certain that you have permission to distribute any information, artwork, audio files, or software (including ActiveX controls) that you acquired from other sources.

You may use and distribute the clip art, templates, and other resources that come with your ToolBook II products in your e-Learning application. Some restrictions apply; see the software license agreement for details.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Chapter 3

Creating multimedia effects and interactive content

Online learning can make content come alive in ways that traditional instruction can't match. Multimedia additions to your application can animate and inspire, teach and motivate. This chapter discusses how to include graphics, video, animation, sound, and interactive elements in your course so you can deliver high-quality media to your learners. Included are descriptions of common media file formats, as well as some ideas about where to find existing multimedia content. Throughout the chapter, tips on preparing multimedia for the Internet will help you to deliver browser-based applications with impressive effects.

IN THIS CHAPTER

About multimedia content **55**

Using graphics **57**

Using graphics on the Internet **60**

Using sound **67**

Using video **68**

Using animation **71**

Acquiring multimedia **73**

Using interactive elements **74**



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

About multimedia content

Using graphics, sound, video, animation, and interactive effects in an e-Learning application poses new opportunities and challenges for the course developer. You may find yourself playing the role of the designer, writer, programmer, artist, and director all in one. While this area of computer technology adds great sophistication to the applications you can create, it also requires an understanding of file formats, Internet standards, and production techniques.

The information in this chapter will help you to understand some of the issues involved in creating multimedia effects and interactive content for your course, but nothing can replace the value of hands-on experience. The computer gives you the freedom to experiment, so use your imagination. Just remember to always save a copy of the original multimedia files; that way, if your creative explorations fail to satisfy, you can go back to the original file and try again.

Building an eye for design

It takes time to develop an eye for designing an online application using the many visual and interactive effects available with computer technology. To begin, keep it simple. Use only a few interactive elements and apply them sparingly until you determine how well they work for your audience. Be selective, and remember to focus on the message, not on the special effects. Too many visual and interactive elements can dilute the effectiveness of your course.



How to use this
online book

Contents

Introduction

- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Recommended reading

Index

One way to build your design sense is to study traditional techniques long used in motion pictures, graphics production, and audio engineering. Check your local library for design books and media journals to inform your choices and inspire your imagination. Also, explore information available on the Internet. Not only are there multimedia design resources there, but many of the Web sites and pages themselves are good examples of online design and production.

Be creative, but stay practical. When you plan the design of your application, keep in mind the limitations of the computer and consider the amount of time it takes for a complex image to display.

Using multimedia effects and interactive elements on the Internet

When designing an e-Learning application to be distributed on the Internet, you must balance the creative possibilities with the reality of the limited bandwidth on the Internet. It is possible to design an attractive, informative, and useful e-Learning application that runs quickly and smoothly on the Internet, but careful preparation and planning of all multimedia files is necessary. Internet considerations are discussed where appropriate throughout this chapter.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Using graphics

Graphics serve a variety of purposes in a course, from illustrating the content to providing a backdrop for the main action. You can import photos taken with a digital camera, use graphics from a clip art library, draw your own graphics onscreen, or import them using a scanner.

Types of graphics

In general, graphics fall into two categories: bitmaps and vector graphics. Each type has qualities that influence your choice of graphics format. Here is a brief description of these two graphic types and some tips on when to use them.

Bitmaps

The easiest way to visualize a bitmap is as a multitude of small, discrete dots arranged in rows and columns. Each dot corresponds to a pixel on your computer screen and contains one or more bits of information that determine the color and intensity of that dot (or pixel). The more bits that represent each pixel, the more shades of color you can see.

You can create bitmaps by drawing them in a paint program (such as Microsoft Paint™), by scanning existing art on a scanner, or by capturing a single frame in a digital video.

In addition to the bitmap file format (BMP), GIF (Graphics Interchange Format) and JPEG (Joint Photographic Experts Group) file formats are also considered bitmaps. GIF and JPEG files are the two standard graphic file formats used on the Internet.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Using bitmaps

Benefits:

- ◆ Complex bitmapped graphics display more quickly than comparable vector graphics.
- ◆ If the file size is small, a bitmap will display quickly in Internet-based applications.

Drawbacks:

- ◆ Bitmap files contain information for each pixel displayed onscreen, resulting in large file sizes.
- ◆ They are difficult to edit or resize without distortion. For example, if you want to make a bitmap larger, the information specified for one pixel must then describe more than one pixel. This results in a picture that looks jagged.

Vector graphics

When you create an image in a drawing program, such as Adobe® Illustrator® or CorelDRAW®, the program maps the shapes you draw on an invisible grid and stores them as a set of instructions. Those instructions precisely describe the size, position, and shape of each line, circle, and polygon in the image. The instructions also include other important information, such as line weights and fill colors. Vector graphics are stored as sets of instructions rather than as sets of dots that correlate to the pixels on your screen.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

For simple images, vector graphics are the ideal choice because they are easy to work with, they display quickly, and they require minimal storage space. However, for more complex graphics and graphics displayed in a Web browser, bitmaps are a better choice. You can convert a vector graphic into a bitmap by simply saving it in a bitmap file format from ToolBook II or your drawing program. (Most programs support this; see the documentation accompanying your drawing software for details.) Converting a bitmap into a vector graphic is more difficult; it can be done, but only with bitmaps that are essentially line drawings.

Using vector graphics

Benefits:

- ◆ You can edit individual parts of vector graphics, and you can resize, rotate, skew, and otherwise transform them without distortion.
- ◆ They offer smaller file sizes than bitmaps because they don't store information for each pixel in the graphic.
- ◆ They display correctly regardless of the screen resolution. (For details on how screen resolution affects bitmaps, see "Choosing the right image size," later in this chapter.)
- ◆ You can easily convert a vector graphic into a bitmap.

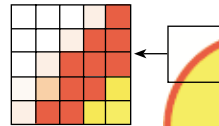
Drawbacks:

- ◆ The more complicated they are, the longer they take to display onscreen.
- ◆ They cannot deliver photorealistic detail.
- ◆ There are no Internet-standard file formats for vector graphics. To use a vector graphic on the Internet, you must first convert it into an Internet-compatible bitmap file format.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

*A bitmap is composed
of a p[attern] of dots*



*A vector graphic uses geometric
formulas to represent an image*

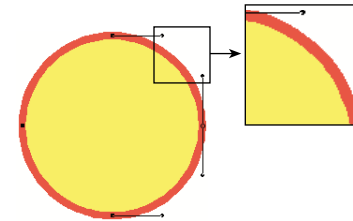


Figure 1

Two basic techniques are used to store graphics

Using graphics on the Internet

When using graphic files in an online learning application that will be distributed over the Internet, you'll want to consider the size of the file in relation to the type of Internet connection the audience will use. For users with a slow connection, you may want to keep the file sizes as small as possible to reduce the amount of time spent waiting for graphic files to download.

There are two main graphic file formats for the Internet: GIF and JPEG. These are compressed file formats that maintain small file sizes, resulting in a shorter download time. In ToolBook, all graphics are automatically converted to GIF or JPEG when you export a book for the Web.

- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Using GIF files

GIF graphics are widely used on the Internet and are a good choice for simple images where high-quality color is not required. You can use the GIF file format for images using 256 colors or less. Line drawings and illustrations that include sharp edges display well in the GIF format.

Using GIF files, you can create the appearance of transparency by selecting one color in a graphic that will not display as a solid color, but instead will display as the color or pattern of the background. Transparent GIF files create the appearance of an image that “floats” on the background.

Plain GIF graphic



Transparent GIF graphic



Figure 2

A GIF file can display one color as transparent

Transparent GIF files are slower to download than nontransparent GIF files. If you want to avoid using transparent GIF files, you can create the effect of transparency by matching the background color of your image with the background color of your page.

- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

An interlaced GIF file displays differently in a browser than a non-interlaced GIF file. A noninterlaced GIF file appears one pixel at a time, starting from left to right. An interlaced GIF file displays a low-resolution version of the image quickly and fills in details as the remainder downloads to your computer. Interlaced GIF files don't download any faster than noninterlaced GIF files; they just give the illusion of downloading faster because the low-resolution image appears quickly, before the file is completely downloaded.



Figure 3

An interlaced GIF file gains clarity as the file downloads

Using JPEG files

The JPEG file format has the ability to display photographic-quality images containing a large number of colors with relatively small file sizes. Use the JPEG format for complex illustrations and photographic images that include up to 16.7 million colors. The JPEG format is not a good choice for images with high contrast, sharp lines, or bright, solid colors.

The JPEG format uses a very effective compression technology that allows you to select the level of compression you want to apply to an image. High compression does affect the quality of an image, most noticeably by distorting sharp lines or areas of color shading and gradation.

How to use this
online book

Contents

Introduction

- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Recommended reading

Index



Figure 4

Use the JPEG format for photographic-quality images

Making decisions about file size and quality

In general, the higher the quality of an image, the larger the file size. When making decisions about file size and quality, you'll want to consider the image size and color depth of your graphics.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Choosing the right image size

The number of pixels in the width and height of a bitmap determines its image size. For example, the image size of a bitmap might be 320 pixels by 240 pixels. (If you're unsure of a bitmap's image size, you can check it by opening it in a program such as Adobe Photoshop.®)

Image size plays a critical role in the appearance of a bitmap because of its relationship to screen resolution, which is typically defined as the number of pixels displaying horizontally and vertically on your screen. That relationship determines how much space a bitmap occupies onscreen.

For example, on a monitor running at a screen resolution of 640 pixels by 480 pixels, an image measuring 320 pixels by 240 pixels occupies one-quarter of the screen. If you then change the screen resolution to 1024 by 768, the image occupies a smaller area of the screen.

Note that the display of the desktop, not just the image, changes size at different resolutions. Applications, icons, and dialog boxes all appear larger at lower screen resolutions, and smaller at higher screen resolutions.



Tip Identify the screen resolutions at which your course will display so you can choose appropriate image sizes. You can specify those screen resolutions in the system recommendations for your course.



How to use this
online book

Contents

Introduction

- 1 Planning, designing,
and evaluating
your e-Learning
application
- 2 Distributing an
e-Learning application
over the Internet
- 3 Creating multimedia
effects and interactive
content
- 4 Managing
e-Learning results

Recommended reading

Index

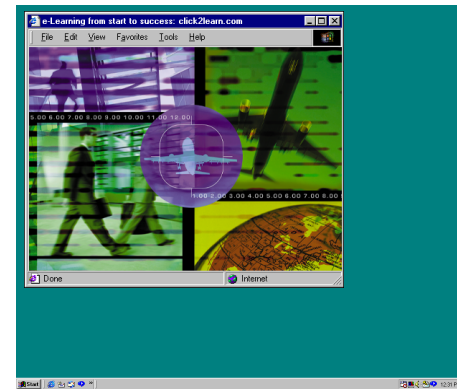
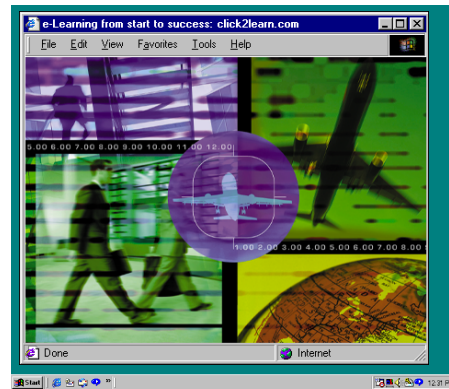


Figure 5

Screen resolution determines desktop display size

Choosing the right color depth

The amount of color information you associate with each pixel in a bitmap is called the color depth (or image depth). It can range from one bit of information (monochrome) to 24 or even 32 bits of information (millions of colors).

Choosing a color depth involves making a few trade-offs. While 24-bit images offer lush, realistic detail that 8-bit (256-color) images can't match, they also require large amounts of storage space and take a longer time to display. Furthermore, you need a video adapter card that supports 24-bit color to see the detail. To keep file sizes to a minimum, use the lowest bit depth required to display your images without distorting the colors.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

For the best results, scan or capture images in 24-bit color to include as much detail as possible for the image-editing process. You can then reduce the bitmaps to 8-bit or 4-bit images for the final course. With lower color depths and smaller file sizes, your course will display images faster. Moreover, by using 8-bit images you'll be supporting the lowest video adapter cards your students may be using.

Estimating file sizes:

File sizes for graphics affect how quickly your course can load an image into memory and display it onscreen. To estimate file sizes in bytes, use the following formula: Image size in pixels $\times$ color depth in bits/8 = file size in bytes. (A byte equals 8 bits.)

Here are some examples of how color depth can substantially increase the file size of a bitmap measuring 320 pixels by 240 pixels.

- ◆ 4-bit image $(320 \text{ pixels} \times 240 \text{ pixels} \times 4 \text{ bits})/8 = 38,400 \text{ bytes}$
(37.5 KB)
- ◆ 8-bit image $(320 \text{ pixels} \times 240 \text{ pixels} \times 8 \text{ bits})/8 = 76,800 \text{ bytes}$
(75 KB)
- ◆ 24-bit image $(320 \text{ pixels} \times 240 \text{ pixels} \times 24 \text{ bits})/8 = 230,400 \text{ bytes}$ (225 KB)



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Using sound

Sound can be both practical and fun in an online learning application. Voiceovers, for example, can serve as an alternative to onscreen text. Music can set the mood and tone of the course material. Sound effects can add whimsy or provide emphasis. Used effectively, sound enhances the interaction between your audience and the onscreen content.

Preparing sound files to play on a computer is relatively easy. If you have a sound card installed in your computer, you can plug a microphone into the sound card port, start a sound capture program, and record yourself speaking. As long as you have speakers, you can play back the digital sound file you create. The only issue you face is how to get the sound quality you want. Alternatively, you can obtain sound that's already recorded on an audio compact disc or as a digital file from sound clip libraries.

Incorporating audio formats

Digital techniques used to capture, record, and play back sound make it possible to incorporate high-quality audio into your course. Some common sound sources you can incorporate into your online learning application are streaming audio, wave audio (WAV), Musical Instrument Digital Interface (MIDI), and CD audio.

Streaming audio is used on the Internet to allow the browser to start playing a sound file before the entire file is downloaded. With streaming audio, less time is spent waiting for large files to be transmitted. The RealAudio™ file format from RealNetworks is one popular standard for streaming audio files.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

WAV files are recorded sounds that you convert into a digital format to play on a computer. You can use WAV files for voiceovers, sound effects, and music. MIDI files are created using devices that create, record, and play back music. Using a MIDI device, music from instruments and synthesizers can be recorded through computer ports and captured as digital information.

CD audio is digital sound that is stored on a compact disc. To use CD audio in a course, you create a link between your course and a particular track (or portion of a track) on a compact disc. When you play the track, the CD-ROM drive plays the sound, freeing your computer to perform other tasks.

Using video

Digital video, like film, creates an illusion: Flash a series of still images onto a screen quickly enough, and the human eye perceives motion. Synchronize sound with the moving images, and stories unfold.

Computer technology has evolved significantly to support video, but that evolution is not yet complete—and creating high-quality video footage in the first place can often be a challenge. However, if you work within certain technical constraints, you can include excellent video effects in your courses today. As the technology improves and your experience grows, the sophistication of your digital video effects will improve too.

You can create a digital video file by filming an event with a digital camcorder or camera and using digital editing software to refine the results. Another way to create digital video is to capture footage on tape, and then convert your film to a digital format on a computer with a video capture card.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Video production tips:

- ◆ Remember that video is displayed in a small window on the computer. Avoid wide panoramic shots; instead, focus on one object. When filming a person talking, keep the camera focused on the head and shoulders instead of filming from a distance.
- ◆ Pay close attention to composition, lighting, color combinations, and sound levels.
- ◆ Keep the background uncluttered to focus attention on the main action.
- ◆ Discourage your subject from making dramatic gestures—they are distracting to watch and hard to edit.
- ◆ Shoot the same scene from different angles to facilitate editing.
- ◆ Use the best equipment you can afford.
- ◆ Consider working with a professional videographer.

One common file format for digital video is the MPEG (Motion Picture Experts Group) format. By storing only the changes from one frame to the next, MPEG achieves a high compression rate that reduces the file size of the video. You can include MPEG files in any type of e-Learning application.

Using video on the Internet

Video can be included in an e-Learning application and played over the Internet. Depending on the speed of Internet access, bandwidth constraints can limit what you can present due to the large file sizes of digital videos. If your audience will use a high-speed carrier such as a T-1, DSL, or fiber optic cable line, it's more practical to incorporate lengthy streaming video files. When the audience will use a slow Internet connection, use short video clips to add action, or distribute larger video files on a CD-ROM that will be played from your Web application.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Streaming media technology allows video and audio to play over the Internet using progressive file download, meaning the file will begin to play before the entire file is transmitted. RealNetworks and Microsoft both offer players for streaming video files that allow you to fast forward, rewind, start and stop the video.

You can include a streaming slide show in your application if limited bandwidth precludes the use of video. A slide show allows you to synchronize audio with digital pictures, and the file size is often much smaller than most digital video files. One program that provides the tools to produce this type of streaming file is the RealSlideshow™ program from RealNetworks.

Deciding whether or not to use video

There are many good reasons to use video in an e-Learning application. Video can greatly enhance understanding and retention of new material. It also provides an opportunity for the delivery of a personal message to a large audience. Video is an effective way to demonstrate how something functions, show an object or place from several different points of view, or reveal how something appears in live action. Finally, video can convey information that would be impractical or expensive for learners to experience in a real-world setting.

As valuable as video can be, it is often expensive and time consuming to produce. In addition, as noted earlier, video file sizes can be large to download and store on a hard drive.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Using animation

Animation can make a vital contribution to your application because it allows you to present more information than you can with static graphics—but without the large file sizes and processing power required to play video sequences well.

Animation techniques can help you present information in a more dynamic way. Bullet points can fly onto a screen. Charts can grow or shrink to underscore business points. Further, animations can illustrate the processes that video cannot record, such as the movement of electrons or planets.

Understanding animation basics

To create animation effects for your application, you can do one of the following:

- ◆ Develop simple object animations in your authoring program. Object animation involves moving an otherwise unchanging element on the screen.
- ◆ Use an animation program to create animation files that you import into your application.

Object animation

One of the most basic and effective animation techniques you can use is object animation. Instead of creating a separate animation file that you import into your course, you can animate objects on the screen using ToolBook II.



- 1 Planning, designing,
and evaluating
your e-Learning
application
- 2 Distributing an
e-Learning application
over the Internet
- 3 Creating multimedia
effects and interactive
content
- 4 Managing
e-Learning results

Object animation usually involves moving a shape, an image, or any object along a path. You may be able to rotate it as it moves or even resize it. Object animation can add simple drama to your work. You can create impressive effects, such as a graphic appearing in the center of the screen and then moving aside for another graphic to appear, with minimal effort.



Circle moves to show migration path

Figure 6
An example of object-based animation

Using animation on the Internet

Several types of animation formats will play in a Web browser. One common format is the animated GIF file, which displays a succession of individual GIF files in the same space, creating the illusion of movement. There are several software programs that allow you to assemble individual images into an animated GIF file; one such program is called GIF Animator.

Other animation file formats include MPEG and Macromedia® Flash® animations. Both of these formats can be included in a ToolBook II application.

- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Object animations created in ToolBook II Instructor with the path animation utility will play in a Web browser after exporting your application to DHTML or when using Neuron to display your application over the Internet.

Acquiring multimedia

There are many ways to acquire multimedia. You can create your own, convert existing material, hire professionals to create material, acquire effects from a professional service, or use public domain software.

If you intend to use multimedia content that you didn't create yourself, investigate its copyright thoroughly. Almost every image distributed in a book, magazine, or online forum is copyrighted. When asking permission to use content, be sure to indicate whether you intend to use the sound or image for yourself or distribute it as part of an application. Don't assume that because you were able to download multimedia content from a public forum (such as the Internet), you automatically have permission to use it freely.

Where to find multimedia

- ◆ **Develop your own effects** With a creative idea, the right equipment, and a knowledgeable team, you can create original multimedia effects for your course. Creating your own effects offers two advantages: you control the concept and quality, and you own the copyright to your materials.
- ◆ **Convert existing material** Sometimes e-Learning applications are rooted in existing printed, taped, or recorded materials that you can digitize to use on a computer. For example, you can use a scanner or video frame grabber to convert existing artwork to computer-ready graphics. Make sure you have written permission when you work with copyrighted material.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

- ◆ **Acquire effects from a professional service** You can contact professional services that sell or license books, music, sound effects, voice narration, film clips, and other effects to use in your titles.
- ◆ **Hire professionals to prepare effects** Hiring professionals can be expensive, but it provides some indisputable benefits: high quality, copyright ownership, and computer-ready files. This option makes particular sense when you are preparing sound or video effects—experience and a controlled working environment make a significant difference in the quality of these effects.
- ◆ **Locate public domain materials** You can use any material that is in the public domain. For example, many of the materials that the United States government produces are available for anyone to use. Regulations governing use of materials in the public domain can be difficult to navigate; you may want to get legal advice.

Using interactive elements

Interactive elements enliven the e-Learning experience. Using a button to display additional text in a pop-up window, for example, encourages a student to control the amount of information displayed on the screen. You can add behavior to buttons and other objects in several ways. One simple method is to use preprogrammed objects from an authoring product.

You can create new interactive elements to use in your online learning application by writing your own programming code to specify behavior. If you decide that you need to create new behavior, you'll want to decide on the type of distribution for your e-Learning course before choosing a programming language.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Another way to add interactive elements to a course is to use third-party software. Many software companies provide browser plug-ins or ActiveX controls that allow you to play their software within a browser.

Interactive file formats on the Web

HTML defines the look of text in a Web document and the layout of the page, but does not have the ability to produce interactive behavior. A Web page can respond to user input, such as a mouse click, for example, only when a response to the click is defined in a program written in one of the Dynamic HTML technologies, or through a plug-in or ActiveX control. These technologies are introduced on the following pages.

DHTML files

Dynamic HTML, or DHTML, extends HTML by adding the ability to create interactive features such as buttons, pop-up windows, and scrolling text. With ToolBook II, you can export an application to DHTML automatically by selecting options in a wizard. In ToolBook you drag objects from a catalog to build an application that you plan to export to DHTML. No plug-in is necessary to view this type of application in a Web browser.

By using the Actions Editor in ToolBook II Instructor, you can develop custom behavior for objects and automatically export this behavior to DHTML. The Actions Editor allows you to select responses to events, as well as create conditions and loops for your own action sequences.



How to use this
online book

Contents

Introduction

- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Recommended reading

Index

ActiveX controls

ActiveX controls add functionality to an application that runs in a Windows environment. You can use an ActiveX control to enhance a native ToolBook II application as well. For example, you could include an ActiveX control that displays a tip of the day within your ToolBook II application. Simply include the ActiveX control in your book and identify the file to display. A summary of the ActiveX technology is provided in Chapter 2, “Distributing an e-Learning application over the Internet.”



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Chapter 4

Managing e-Learning results

With the Internet and the right tools, not only can you deliver e-Learning applications around the world, but you can also receive data about student performance to help you monitor progress and manage results. This chapter introduces two learning management systems that can help your company or educational institution organize learning applications and capture the information generated by student activity.

IN THIS CHAPTER

Working with a learning management system **78**



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Working with a learning management system

You can review and evaluate student performance after your course has been distributed by using a learning management system. Monitoring information about quiz scores, course completion or job skill certification adds measurability to any kind of training program. Two learning management solutions are available from Click2learn:

- ◆ Ingenium, a full-featured product for managing all types of courses and instruction, including online classes, instructor-led classes, and on-the-job training
- ◆ a Click2learn corporate e-Learning site, which includes built-in tracking of student progress and access to reports showing scores, course usage, and expenses

Using Ingenium, employees or students can access self-directed training and career development courses over the Internet or an intranet. Managers and training administrators use Ingenium to review employee or student progress and develop learning plans. By automating the processes of course registration, scheduling, cost tracking, e-mail notification, and performance tracking, the time required to administer courses is drastically reduced. Through skill-gap analysis, Ingenium can track employee skills and facilitate learning to close any gaps in skill requirements.

When using a Click2learn corporate e-Learning site, the click2learn.manager reporting software is available. You can use click2learn.manager to generate several different reports, such as the completion status or progress of each person who takes a course. Another type of report from click2learn.manager allows training expenses to be tracked by cost center. For more information, see “Using a Click2learn corporate e-Learning site to manage Web courses,” later in this chapter.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Using Ingenium to manage Web courses

Ingenium automatically tracks the results of interaction with Web content from a wide variety of content providers, as well as custom courses created in ToolBook II or Authorware. Ingenium can track the results of any learning material developed to the AICC technology standard.

By using the built-in evaluation tools in Ingenium, such as skill gap analysis, managers and administrators can quickly produce sophisticated reports on the current skills and projected preparedness of the workforce.

Connecting students to Ingenium

Employees or students use Ingenium Web Connect to determine what classes are assigned, view prerequisites, launch courses, and keep track of scores and progress. All of this information is available using a Web browser, allowing participation from any location with a computer and Internet access.

Managing training with Ingenium

An administrator or manager uses Ingenium to evaluate the interaction between the students and the course. Once an online learning application is available in Ingenium, the administrator assigns the material and reviews the results. This process is described in more detail below.

Creating the organization and assigning the members

The administrator creates an organization by identifying or entering a list of the people who will take the course. This list may also contain contact information, such as e-mail addresses and telephone numbers. The organizations created in Ingenium will often match the organizational structure of your company or educational institution.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Designating a course

The administrator designates a course by identifying individual online learning applications or other content. The administrator may also identify any restrictions, such as prerequisites or the order in which the students may view the information.

Assigning the course to the organization

The administrator assigns the course to the organization. The students then use a browser, such as Netscape Navigator or Microsoft Internet Explorer, to log in to the Ingenium interface. There, the students see the courses assigned to them and, by selecting a lesson, launch the online learning application.

Monitoring progress

While the students are taking a course, Ingenium keeps track of their progress, recording their activities and maintaining security. Question objects created in ToolBook II or another authoring program communicate each student's answers to the Ingenium database, and Ingenium updates the appropriate records.

Reporting and evaluating

After students launch a course, Ingenium can report their activities and progress to the instructor. The report could include answers to specific questions, scores, the amount of time spent on a question, and other information.



- 1 Planning, designing,
and evaluating
your e-Learning
application
- 2 Distributing an
e-Learning application
over the Internet
- 3 Creating multimedia
effects and interactive
content
- 4 Managing
e-Learning results

Using a Click2learn corporate e-Learning site to manage Web courses

A built-in learning management system records information about course usage for each corporate e-Learning site hosted by Click2learn. When an employee takes a course through a corporate e-Learning site and answers quiz questions, the score is available to managers through a transcript generated from the click2learn.manager reporting software. There are other reports from click2learn.manager that display online training expenses sorted by cost center or by the name of the course.

click2learn .manager

Administration Tools:
home site configuration new content **reports** subscribers cost centers support

report manager User Guide Close

Training Report by Item

Site information Number of Cost Centers: 33 Total Spent: \$49,805.42 Monthly Spending Limit: \$50,000.00 Credit Card Purchases: \$0.00 Corporate Credit Purchases: \$3,272.47 Current Month Total: \$3,272.47 Amount Remaining: \$46,727.53 Number of Purchased Items: 17 Total Subscribers: 9766	1 Report On: ☐ Cost Centers ☒ Subscribers ☐ Items with activity	2 Display: ☐ All Results ☒ Search For (* = wildcard)	3 Generate Report: go
---	--	---	--

Figure 1
Building a report with click2learn.manager



How to use this
online book

Contents

Introduction

- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Recommended reading

Index

Reports generated from click2learn.manager can be downloaded into an Excel™ spreadsheet. Another option for making scores and course completion information available is to allow an employee to print out a certificate after finishing a course.

A Click2learn corporate e-Learning site is based on an application service provider (ASP) model. For more information about Click2learn corporate e-Learning sites and Ingenium, visit www.click2learn.com.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Recommended reading

The following books provide additional insight into online content creation and presentation:

Dick, Walter, and Lou Carey. *The Systematic Design of Instruction*. HarperCollins, 1996.

Gagné, Robert M. *The Conditions of Learning and Theory of Instruction*. Holt Rinehart & Winston, 1997.

Gagné, Robert M., and Karen L. Medsker. *The Conditions of Learning: Training Applications*. Harcourt Brace, 1996.

Gery, Gloria. *Making CBT Happen: Prescriptions for Successful Implementation of Computer-Based Training in Your Organization*. Gery Associates, 1987.

Hall, Brandon. *Web-Based Training Cookbook*. John Wiley & Sons, Inc., 1997.

Kemp, Jerrold E., Gary R. Morrison, and Steven M. Ross. *Designing Effective Instruction*. Merrill Publishing Company, 1998.

Kristof, Ray, and Amy Satran. *Interactivity by Design: Creating and Communicating with New Media*. Adobe Press, 1995.

Laurel, Brenda. *The Art of Human-Computer Interface Design*. Addison-Wesley, 1990.

McLellan, Hilary, ed. *Situated Learning Perspectives*. Educational Technology Publications, 1996.

Merrill, M. David. *Instructional Design Theory*. Edited by David G. Twitchell. Educational Technology Publications, 1994.



How to use this
online book

Contents

Introduction

- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Recommended reading

Index

Newby, Timothy J., Donald A. Stepich, and James D. Lehman.
*Instructional Technology for Teaching and Learning:
Designing Instruction, Integrating Computers, and Using Media*. Prentice
Hall, 1999.

Porter, Lynnette R. *Creating the Virtual Classroom: Distance Learning with
the Internet*. John Wiley & Sons, Inc., 1997.

Reigeluth, Charles. *Instructional-Design Theories and Models:
A New Paradigm of Instructional Theory*, Lawrence Eribaum
Associates, 1999.

Tufte, Edward. *The Visual Display of Quantitative Information*.
Graphics Press, 1992.



How to use this
online book

Contents

Introduction

- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Recommended reading

Index

Index

A

ActiveX technology 48
Animation 71
Audio 67
 CD audio 67, 68
 MIDI 67, 68
 Streaming audio 67
 WAV 67, 68

B

Bandwidth constraints 50
Bitmaps 57

C

CD audio 67, 68
Click2learn e-Learning Marketplace xi
Copyrights 53, 73
Corporate e-Learning sites 81
Course content
 concepts 23
 creating lesson outlines 24
 designing layout for 34
 developing learning objectives 24
 tasks 23

D

Design process 34
Design recommendations 34
DHTML 48, 49, 75
Digital sound 67
Digital video 68
Distribution of applications
 options 18
 via CD-ROM 20
 via Internet 19, 42
 via intranet 19
 via LAN 19

E

e-Learning applications
 adding text in 37
 advantages of Internet-based 42
 computer hardware 52
 copyright protection 53, 73
 creating project plan 21
 developing content 22
 developing user profile 20
 evaluating 38
 identifying needs 17
 instructional approaches 26
 Internet distribution 48
 planning 16
 resources 17
 using quizzes in 32



How to use this
online book

Contents

Introduction

- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Recommended reading

Index

G

GIF 60
Graphic file formats
 BMP 57
 GIF 60
 JPEG 62
Graphics 57

H

HTML 46
HTTP 44
Hyperlinks 47

I

Ingenium x, 79
Instructional approaches
 presentations 27
 quizzes 32
 simulations 31
 tutorials 28
Interactive elements 74
Internet
 applications and 42
 connecting to 45
 distribution options 48
 limited bandwidth on 50
 publishing on 45
 transmitting multimedia 47
Internet distribution 42
 advantages 42
 bandwidth constraints 50
 computer hardware 52
 copyright protection 53
 native ToolBook II with Neuron 48

J

JPEG 62

L

Layout of application 34
 design tips 34
Learning management systems 78
Local area network (LAN) 19

M

MIDI 67, 68
MPEG 69
Multimedia
 about 38
 acquiring 73
 copyrights 73

N

Neuron player 48, 49

O

Object animation 72
Optical character recognition (OCR) 37

P

Planning a project 16
Presentations 27
Public domain materials 73

Q

Quizzes 32



How to use this
online book

Contents

Introduction

- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Recommended reading

Index

R

Reports 80
Rich Text Format (RTF) 37

S

Scores 80, 81
Simulations 31
Skill-modeling tutorial 29
Sound 67
 CD audio 67, 68
 MIDI 67, 68
 Streaming audio 67
 WAV 67, 68
Streaming audio 67
Streaming video 70

T

Templates 34
Text
 about adding to applications 37
 designing with 37
 readability 37
ToolBook II Assistant
 ix, 18, 19, 32, 34, 35, 37, 46, 71, 73, 76, 79
ToolBook II Instructor
 ix, 18, 19, 32, 34, 35, 37, 46, 71, 73, 76, 79
ToolBook II Neuron 48, 49
Tutorials 28, 30

U

Uniform Resource Locator (URL) 44
User profile 25
 developing 20

V

Vector graphics 58
Video 68

W

WAV 67, 68
Web browser 44
Web page 44
World Wide Web (WWW) 43



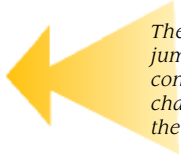
- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

How to use this online book

This online book is designed to help you access information quickly. Use the features described here to jump to the chapter, topic, or resource you need.

Along the left side of every page is the chapter bar, where you can click a chapter you want to look at and jump immediately to the first page of that chapter. At the lower right of each page are navigation buttons that move you to the next or previous page.

On the first page of each chapter is a list of the chapter's contents. Click a topic or its page number to jump directly to that topic.



The chapter bar provides jumps to the main table of contents, specific parts and chapters, the glossary, and the index.

CONTENTS

Navigating from the main table of contents **G.2**

Navigating from the index **G.3**

Using Adobe Acrobat Reader **G.4**

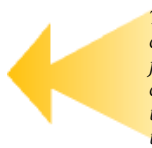


The chapter table of contents provides jumps to main topics within a chapter.

Navigation buttons take you to the next or previous page.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results



*The main table of
contents provides
jumps to parts and
chapters, main topics,
the glossary, and
the index.*

Navigating from the main table of contents

In addition to the chapter bar and the chapter table of contents, you can navigate using the main table of contents, which lists all the chapters in the book and the main topics of each chapter. To quickly jump to the main table of contents, click Contents at the top of the chapter bar.

From the main table of contents, click a chapter title or chapter topic to jump immediately to that chapter or topic.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Navigating from the index

The index lists key words and phrases in this guide. Each item is linked to the page where it appears. From the index, click a word or phrase to jump to the location of the word or phrase.

Index

A

Adobe Acrobat Reader G.4

B

Button, Find G.6
Buttons, navigation G.4

C

Chapter bar G.1

F

Find button G.6
Find dialog box G.6
Forms G.6

N

Navigating G.2, G.3
Navigation buttons G.1

P

Print G.6

R

Reader Online Guide G.4, G.6

S

Search G.6
Setup G.4

T

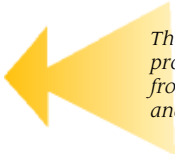
Text selection G.5
Toolbar, Acrobat G.4
Tools
 page sizing G.6
 Text selection G.5
 Zoom in G.5
 Zoom out G.5

W

Web site G.6

Z

Zoom-in tool G.5
Zoom-out tool G.5



*The index
provides jumps
from key words
and phrases.*



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

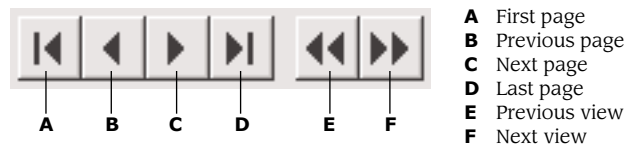
Using Adobe Acrobat Reader

Adobe® Acrobat® Reader is a software program that allows you to view this online guide. Acrobat Reader is installed on your computer during Setup. It comes with a Reader Online Guide, available from the Help menu, which explains how to use the program. The Acrobat toolbar provides some helpful features, described in the next section.

The Acrobat toolbar

In addition to the navigation features in this guide, you will find useful navigation tools on the Acrobat toolbar.

Navigation buttons

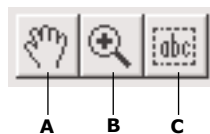


The First, Previous, Next, and Last buttons allow you to move quickly within the online book. Additionally, Acrobat allows you to move to the previous page visited and back again using the Previous view and Next view buttons. This type of navigation is convenient when jumping between chapters or nonsequentially within a chapter.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Zoom and text tools



- A** *Hand tool*
- B** *Zoom-in tool*
- C** *Text selection tool*

Acrobat also comes with tools you can use to zoom in and out of a page, and to move about a page. Use the Hand tool to move around the page by clicking and dragging. The Zoom-in tool magnifies the page with each click. Select the Zoom-in tool and hold down the CTRL key to show the Zoom-out tool.

Another useful tool is the Text selection tool. Use this feature to select a block of text. Then, copy the text to another program.

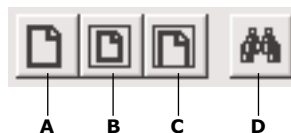
Here's a tip for those of you with tired eyes.

Grab the Zoom-in tool and select this paragraph (as shown). This will magnify the page to the specified area. Use the scroll bars or the Hand tool to move around as you read.



- 1** Planning, designing,
and evaluating
your e-Learning
application
- 2** Distributing an
e-Learning application
over the Internet
- 3** Creating multimedia
effects and interactive
content
- 4** Managing
e-Learning results

Page-sizing tools



- A** *Zoom 100%*
- B** *Fit page*
- C** *Fit width*
- D** *Find*

Using the page-sizing tools, you can quickly change the size of the page you are viewing. This feature comes in handy when you want to restore the view of the whole page after using the Zoom-in tool. This guide is designed to be viewed at the Fit page size. At this size, you can see all of the navigation tools available to you.

The Find button opens the Find dialog box, where you can enter a word or phrase to search for.

Additional Acrobat features

Using features in Adobe Acrobat, you can do many other things, such as print the document, fill in forms, jump to a Web site, and open other files. For more information on these and other features, see the Reader Online Guide, available from the Help menu.

