CATALOG OF E-LEARNING COMPONENTS

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E-learning is not a single program or technology. Each e-learning solution is a unique combination of different technologies, techniques, and content. This white paper catalogs the components of successful e-learning solutions and includes a few tips on where and how to use them in your solutions. Here you can see the possible breadth of e-learning and fill in any gaps in your view of e-learning.

CONTENTS

ONLINE PRESENTATIONS

Online presentations explain information to learners in a clear, linear way. They are the online equivalent of lectures in the classroom and are a staple of instruction. In the classroom presentation, the instructor controls the sequence and pace of experiences. In the online presentation, the designer controls the sequence, but the learner controls the pace.

Online presentations rely primarily on simple text and graphics, but they can also include audio, animation, and video. Take a closer look at some different forms of online presentations.

Page Sequences

The simplest presentations consist of linked Webpages incorporating text, graphics, and perhaps narration. Each page explains one main idea. Figure 1 shows a page from a page sequence that teaches learners about the architecture of a knowledge product. This sequence includes text, graphics, and narration.

Figure 1. Presentation as a sequence of pages.
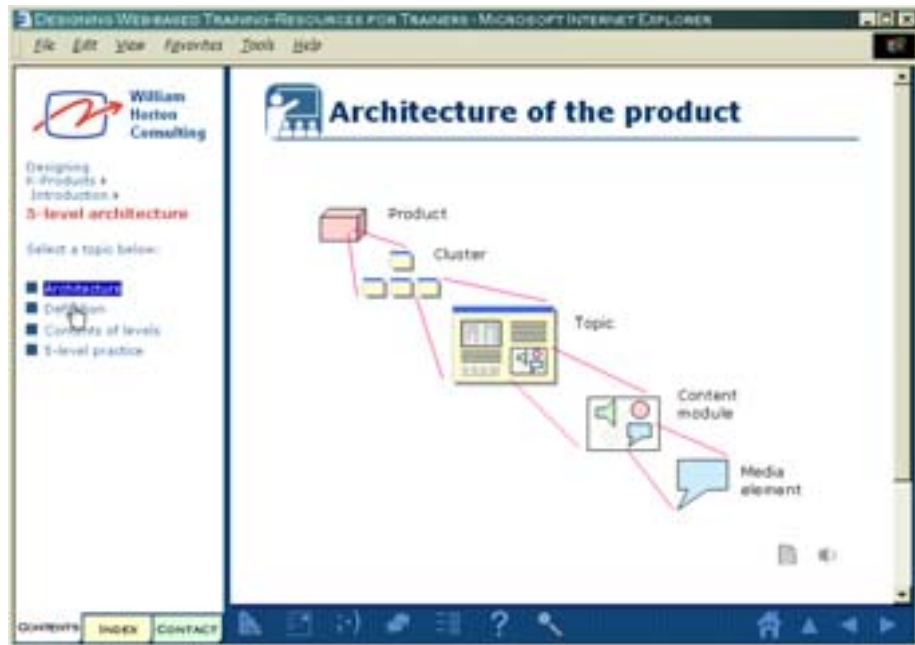
A similar example can be seen at:
http://www.designingwbt.com/html/exampleActivityPresentation.htm

Animations

Animations are often used to convey dynamic concepts like assembling or disassembling pieces of equipment or revealing the effects of changes over time. In the example shown in figure 2, learners are introduced to how Gantt charts document project tasks occurring over a specified period of time. This animation created in Macromedia Flash has voice-over narration, VCR-like buttons to control the pace, and reveal a transcription of the voice narration.

Figure 2. Animated explanation showing a transcript of narration.
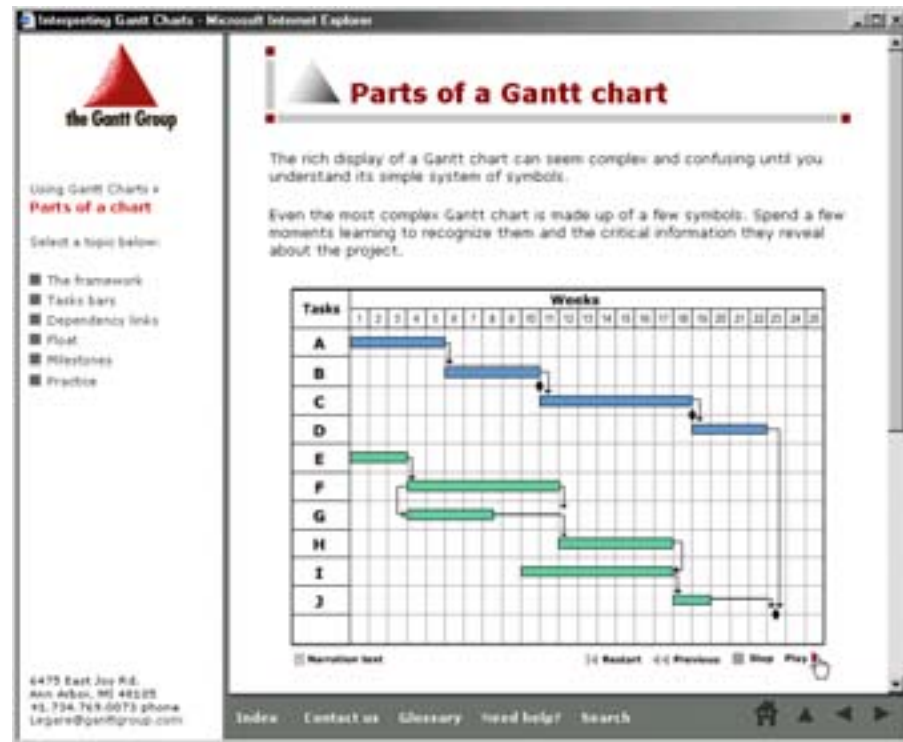
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Video Sequences

Video is one of the most common vehicles for e-learning presentations because it is the easiest to prepare, although it is not necessarily the cheapest or the best. Unless the learner has a 128 Kbs or faster connection, the small, grainy, stuttering, jerky video they experience may be more annoying than instructive.

Where the connection speed is adequate, video has found its place in e-learning. It can effectively convey emotion (if the video and audio are high quality), depict historical events, show the natural movement of the subject, or introduce the teacher or facilitator for a course. In the example shown in figure 3, the instructor introduces herself and explains why Gantt charts are a useful project-management tool.

Figure 3. Video introduction by the instructor.

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ONLINE READINGS

Internet technologies make it much easier to provide learners with access to outside readings and other sources of information. Instructors no longer have to print, bind, and distribute class notes and additional articles. Instead, learners can access, download, and print any readings that they want to study further.

These readings can be provided in several ways: by converting existing materials to a Web-ready format, linking to material existing on the Internet or local intranet, or providing search queries that retrieve current and timely information. Take a closer look at these possibilities described in the following sections.

Web-Ready Materials

Most word processors allow users to save their documents either as hypertext mark-up language (HTML) or as Adobe Acrobat Portable Document Format (PDF). Both formats are Web-ready. HTML is the native language of the Web and can be viewed in a browser. PDF, which is a proprietary file format, needs the free browser plug-in from Adobe to open and read the file. In either case, course developers need only to provide links to the material, and learners can then read it at their leisure.

The "Save as HTML" approach usually produces a document suitable for viewing. If, however, the source material is highly formatted and learners are

more adept at reading it from paper rather than from the screen, convert the material to PDF.

Figures 4A and 4B show an example of readings in an e-learning course. In figure 4A, learners click on a link to access a PDF version of the recommended article, which appears in the browser window as shown in figure 4B. The learner can either read the article on the screen or print it.

Figure 4A. List of available online readings.

Figure 4B. Reading in Acrobat PDF.
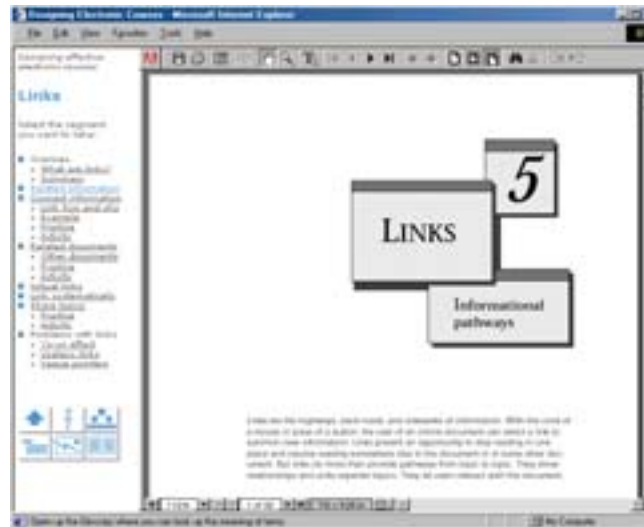
A word of caution is needed here. If you are not the copyright holder, you will need permission to make electronic versions of the material available on the Web.

Linked Web Materials

The Internet is a vast storehouse of information. If it were all printed out, the stack of pages would stand more than 100,000 kilometers (63,000 miles) high. Given that quantity of material, it is highly likely you can find useful case studies, examples, reports, white papers, articles, dissertations, and other reference material somewhere on the Web. In figure 5, the instructor prepared a jump page of additional sources of information on desktop document design. On the course resources page, the learner clicked on the link for "Journals, White Papers, and Articles" to scroll to a list of specific items.

Figure 5. Accessing linked Web materials.

This example can be seen at:
http://www.designingwbt.com/html/exampleResources.htm
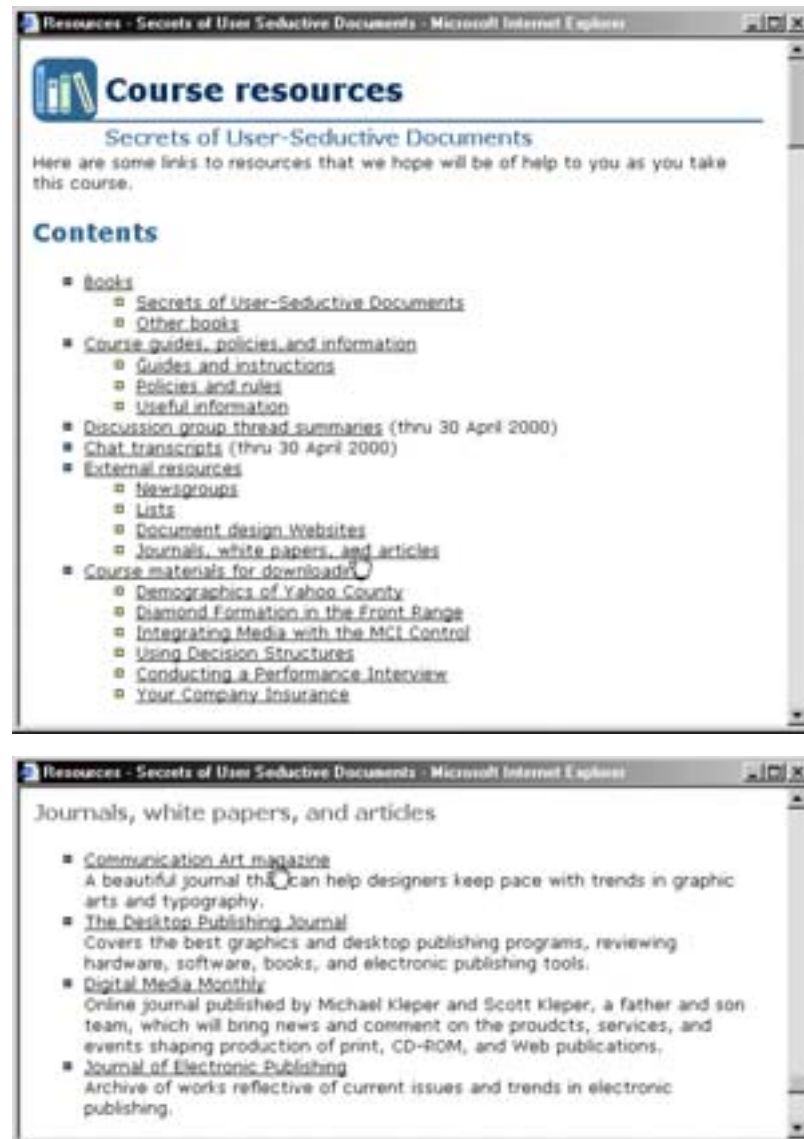
Network Search Queries

For subject matter that is highly volatile and rapidly evolving, a list of readings that was prepared last week may already be out of date. A way around this information obsolescence is to provide learners with search queries that retrieve timely articles and papers pertaining to your industry, a list of books on a particular subject, or even a listing of available courses and tutorials.

In the project management course shown in figure 6, the link for software resources in the left panel triggers a query to About.com, which returns the list of software sites, displayed in the panel to the right.

Figure 6. Query retrieves list of up-to-date resources from a search site.

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WEB MEETINGS

Web meetings are gatherings of people at the same time but at different places. Communication among them is through Internet or intranet connections. Web meetings can be as simple as a live slide presentation or as complex as an interactive seminar where the facilitator fields questions and selects and displays assets "on the fly" in response to requests from learners.

There are three common forms of Web meetings: presentations, briefings, and seminars. Which form you use depends upon the kind of information you are presenting and your instructional goal.

Live Online Presentations

Live online presentations are just what they sound like: narrated slide shows or demonstrations presented over the Internet. Most Web conferencing software allows instructors to either upload their PowerPoint slides or show them from their desktop using application sharing. The audio portion of the presentation can be accomplished in two ways. The attendees and instructor can be connected via a telephone conference call, or the audio can be delivered over the Internet connection using voice-over-IP (VoIP) technology. The latter approach is good if all the participants have at least 56 Kbs connections and sound cards. Some Web meeting software packages make it possible to record live presentations for playback by learners at a later time.

The example shown in figure 7 depicts a presentation introducing learners to a new document publishing scheme. In this example, the information is flowing primarily one way—from the instructor to the learner. The presentation is being delivered through Microsoft PowerPoint's Online Broadcast facility. Participants were sent an email message invitation, which included a link to the presentation server.

Figure 7. Web-conducted presentation.
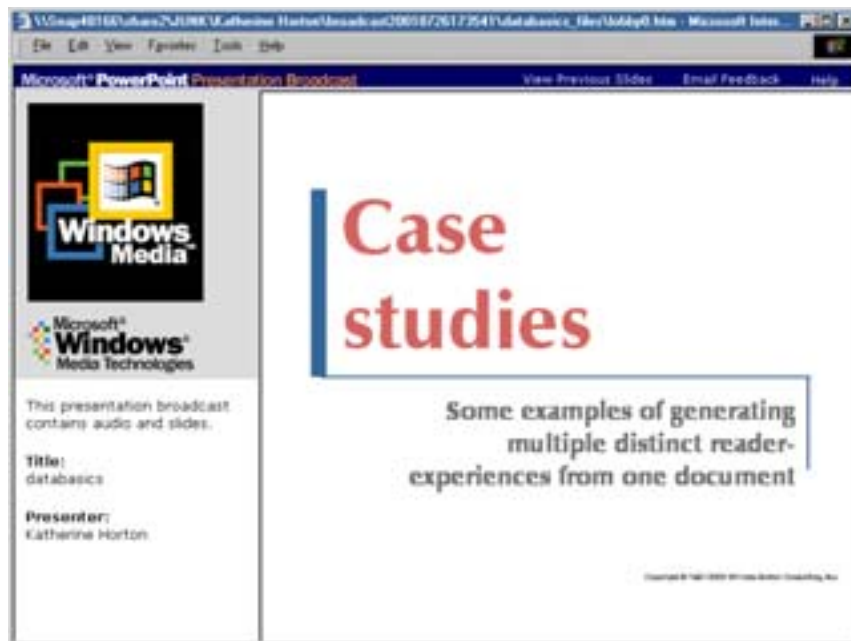
A recorded version of a Web-conducted presentation similar to this example can be seen at: http://www.interwise.com/live/ViewClass.asp?id=432

Many live online presentations are Web broadcasts, or *Webcasts*. Most are one-way presentations, much like television or radio transmitted by the Internet. They have no back channel or other mechanism for those receiving the broadcast to ask questions, make comments, or participate in any way. In e-learning, broadcasts are useful to deliver lectures, speeches, and announcements. Their lack of interaction, however, limits them to activities in which the learner passively observes or absorbs knowledge.

Online Briefings

Online briefings are more informational than instructional. They can use any combination of conferencing tools discussed later. However, because participants may need to ask questions, briefings commonly provide some real-time feedback mechanism, like instant messaging. Alternatively, participants may use a telephone conference call for both the audio portion of the presentation and for the audience feedback.

In the example shown in figure 8, a Webpage announcing the briefing was posted on an intranet with the Microsoft NetMeeting conferencing control embedded right in the page. Participants joined the meeting directly from that page at the appointed time. Questions were routed to the presenter using NetMeeting's built-in chat facility.

Figure 8. Web-conducted briefing.

This example can be seen at:
http://www.designingwbt.com/html/exampleActivityWebcast.htm

Online Seminars

How does an online seminar differ from a presentation or a briefing? A seminar is more conversational than either the presentation or the briefing. Learners not only interact with the instructor or facilitator but also interact with one another. And, instructors dynamically adjust and augment their presentation to answer specific issues raised by learners.

Figure 9 shows a seminar in progress. The facilitator leads a discussion on how to prepare Adobe's Photoshop files for a particular multilanguage project. At any time, participants can indicate they have a question, and the facilitator allows them to speak in turn. Later in the seminar, the facilitator shares the real application and asks learners to demonstrate its use.

Figure 9. Web-conducted seminar.
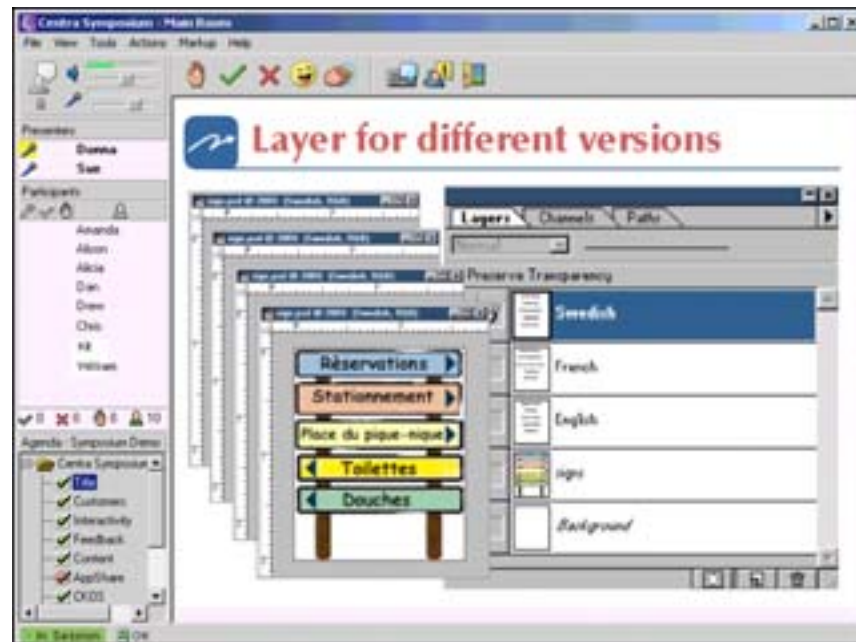
CONFERENCING ACTIVITIES

Conferencing activities use the components or elements found in Web meetings. They allow individuals to communicate text, pictures, voice, and actions in real time. They let designers and facilitators customize learning experiences to the needs of a particular class of learners. Conferencing activities come into play when learners need to get together and work on a class project. They are also effective for instructor-to-learner counseling sessions.

Chat and Instant Messaging

Every day 90 million America Online (AOL) users get together in chat rooms to whine, pontificate, flirt, and who-knows-what. Chat and instant messaging provide an immediate, spontaneous exchange of messages, much like instantaneous email.

Chat can work in training for well-designed activities, such as role plays or brainstorming activities, in which a few learners have precisely defined tasks to carry out. In the example shown in figure 10, learners are asked to brainstorm what could be done to improve the look of the house shown on the page.

Figure 10. Live chat in an e-learning assignment.

Remember that for group chats, participants must be fluent in the same language, and they must be good typists. Otherwise, the conversation is filled with awkward pauses. As a rule, only about five to seven people can be actively involved in a conversation.

One-to-one chats work well for individual coaching or for virtual office hours. They are quick, and both sides have a written record of the questions and answers.

Whiteboards

A whiteboard is a shared drawing area on the screen. Participants can all see the area, and they take turns drawing in the area. They can draw freehand, click-and-drag to create shapes, type text, and paste in existing graphics.

Whiteboards are used for collaborating on a visual subject, such as a chart, a photograph, or a screen design. A large class can watch what is happening on the whiteboard, but only three or four learners can actively participate. In the example shown in figure 11, the whiteboard session is used to identify and analyze architectural details.

Figure 11. Using a whiteboard to discuss visual issues.
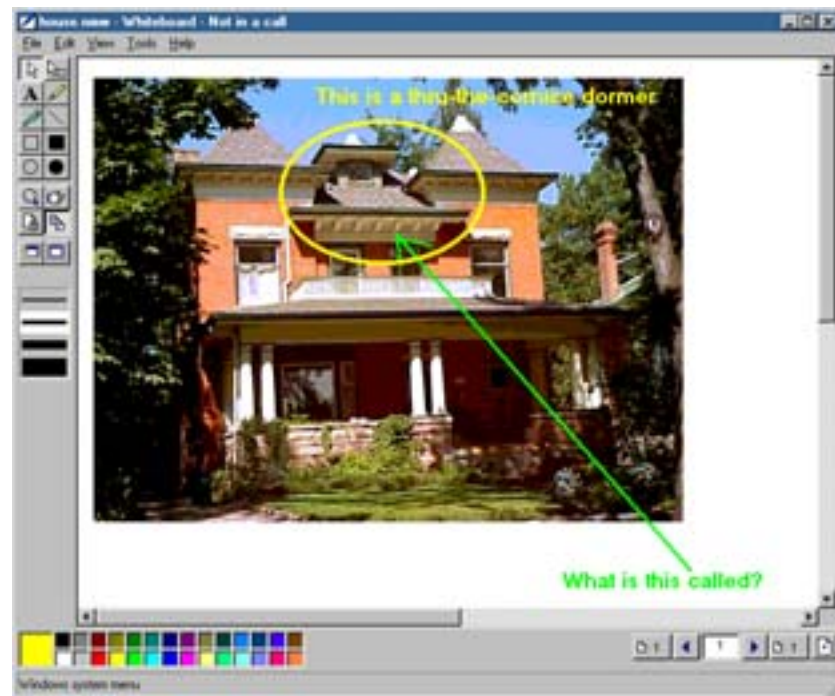
Screen Sharing

Screen sharing is just what it sounds like. One of the participants, usually the one initiating the session, can choose to display his or her entire computer desktop or just a particular window or program. The participant can further decide whether others attending the session can interact with shared programs or just observe. In figure 12, a learner is sharing a programming workspace, and a fellow learner is manipulating it.

Figure 12. Sharing a screen over the Internet.
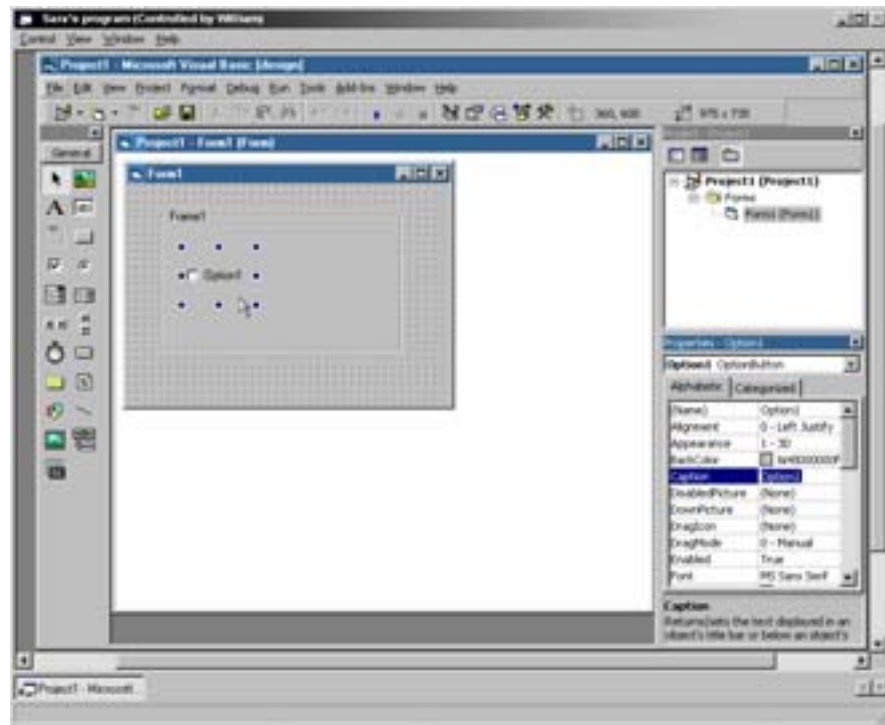
Screen sharing is an excellent way to quickly demonstrate an on-screen technique, introduce a computer program, or just to show a computer file to someone who does not have the application necessary to open it. If you perform the same demonstration frequently, investigate one of the screen capture utilities that records your screen activity and saves it as a highly optimized movie that you can replay in live presentations and integrate into your asynchronous lessons as well.

Videoconferencing

Videoconferencing lets learners view live video images over the Internet. Both one-way and two-way transmissions are possible, although one-way broadcasts from instructor to learners are the most common form.

Videoconferencing is frequently used if the message being delivered is motivational or emotionally charged, or if the skill being demonstrated involves manipulating a three-dimensional object. The quality of the resulting video images depends on the network speed, quality of the video camera, speed of the participant's computer, and speed of the server transmitting the video feed. In figure 13, the instructor demonstrates how to remove a hard disk from a laptop computer.

Figure 13. Videoconferencing to demonstrate a physical procedure.

ONLINE DISCUSSIONS

The conferencing components discussed so far do not afford learners much time to reflect on what they want to say, compose detailed responses, or review their responses before sending them. Asynchronous discussion tools such as email and discussion forums fill that role.

Email Exchanges

Email is ubiquitous. It has been said that it was the first "killer app" of the Internet. It has been the subject of sociological studies and romantic movies. Well, no wonder! It is simple and easy to use. In e-learning there are two types of email exchanges you can use: private messages and broadcasts.

Use one-to-one, private messages for immediacy, intimacy, and impact. Use them to ask and answer individual question, but not to ask questions of general interest. Use them for issues that require the learner's special attention, not for routine messages that could just as easily be posted to a discussion forum.

Use email broadcasts to quickly disseminate critical information such as schedule changes, important events, and upcoming tests. And, remember that email is not limited to text. Most email readers today can display HTML and transmit other file formats as attachments. Figure 14 shows a sample email message welcoming a learner to the class and attaching additional information for the learner's records.

Figure 14. Email message in an e-learning course.
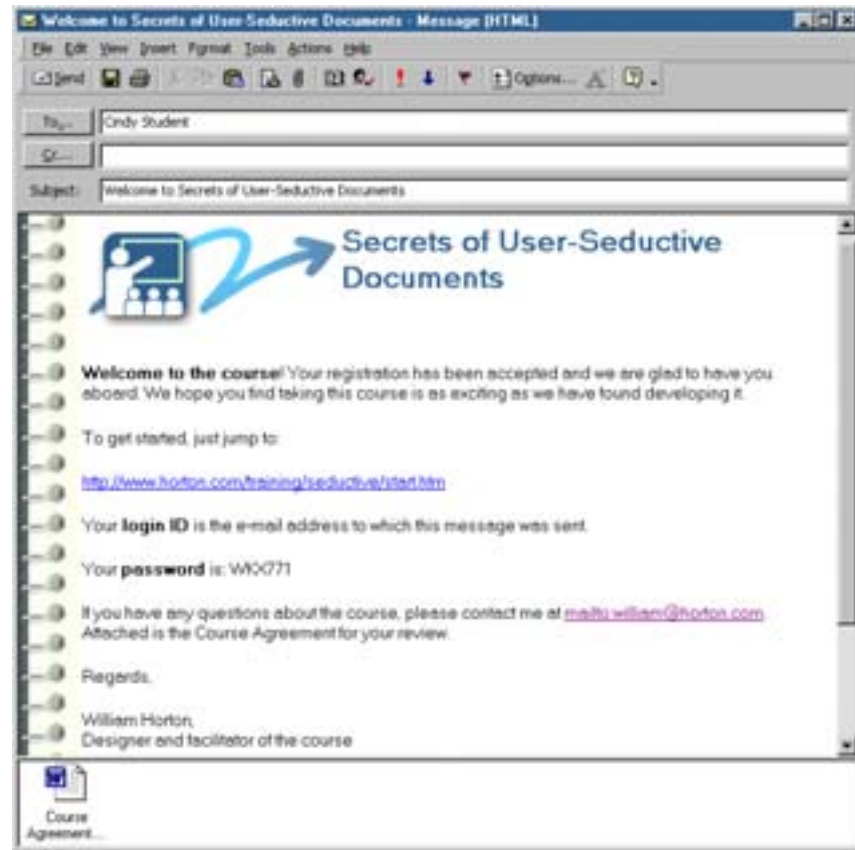
Discussion Forums

Discussion forums provide a place where one person can post a question or an opinion. Others can read it and reply to it. Still others can add their own comments to the replies and so on. These descendants of computer bulletin boards, email listservs, and Internet newsgroups, typically provide a Web interface to a highly organized collection of messages. Most organize messages into indented lists, or threads, concerning a particular subject.

Discussion forums can play multiple roles in your e-learning program. They can provide a place for class announcements, they can serve as a "student lounge" where learners can discuss issues informally, and they can support a collaborative class project. Figure 15 shows an example of a discussion forum used in a course for building contractors. It has threads for administration and technical support issues, for general comments, and for specific assignments and activities.

Figure 15. Discussion forum in an e-learning course.

Test Questions

Tests, practices, quizzes, or drills are an essential ingredient for measuring a learner's progress. They, along with the other activities to be discussed, give learners the opportunity to apply the concepts, skills, or attitudes they are studying. Test scores can be sent back to the instructor or learning management system or shared only with the learner.

Although many types of test questions are possible, some are more common than others. These are ones that can be automatically scored by the computer. Table 1 lists these common types. Just remember that with human evaluation, many more types are possible.

Table 2-1. Common kinds of automatically scored test questions.

Type Question	Description	Used for Testing:
True/False	The learner chooses whether a statement is true or false. Or the learner may pick between any other total opposites.	Recognizing the truth of statements as well as making binary decisions such as yes/no, go/no-go, and accept/reject.
Pick one	The learner picks the correct answer from as list of possible answers.	Recognizing right answer among plausible candidates. Good for knowledge with distinct categories.
Pick multiple	The learner selects correct answers from a list of possible answers.	Recognizing conditions that apply in a situation and for overlapping categories.
Pick in picture	The learner identifies an object or area in a graphic.	Recognizing objects or boundaries within a visual image.
Short answer	The learner types in a number, word, or short phrase.	Recall of facts and figures.
Matching list	The learner matches items from one list to items in an adjoining list.	Ability to spot relationships, such as between terms and definitions.
Sequence	The learner puts items into a logical sequence.	Recognition of causal, prerequisite or time relationships.
Drag-and-drop	The learner drags images into place over or within a larger graphic.	Recall of spatial, visual, or logical relationships.

To see examples of these types of questions, go to:
http://www.designingwbt.com/html/exampleTests.htm.

PRACTICE ACTIVITIES

E-learning technologies can be combined for an infinite variety of learning activities, which teach by interacting with learners or enabling learners to interact with one another in specific, structured ways.

The activities listed here are only the most common among those that have proved themselves as effective with factory workers as preschoolers and that have demonstrated an ability to teach a wide variety of subject matters.

Simulations of Hands-On Activities

Simulations provide a safe, nonjudgmental environment for learners to practice a complex activity, or one that might prove harmful if performed using the real application or equipment. The example shown in figure 16 lets learners practice a computer work activity. In this simulation, learners are asked to define a data source name. The Microsoft Agent, Peedy, introduces the simulations and explains what all the buttons do. If the learner clicks the "Help" button, Peedy explains what to do next.

Figure 16. Simulation of a hands-on activity.

To this example, go to:
http://www.designingwbt.com/html/exampleActivityHandson.htm

Role Playing

Role playing activities allow groups of learners to practice teamwork and organizational dynamics. They encourage participants to see things from the viewpoint of others.

In the example in figure 17, learners play the roles of the members of a municipal architectural review committee, the homeowners, and interested neighbors. Their assignment is to decide whether the homeowner will get the variance necessary to make improvements on this house.

Figure 17. Role-playing activity.

To see this example go to:
http://www.designingwbt.com/html/exampleActivityRolePlaying.htm

Voting

Voting activities allow learners to gauge the opinions of their fellow learners while expressing their own opinions. Such activities can spur learners to seek additional information on a subject, especially if they see that others do not agree with them.

In the example shown in figure 18, learners have been given a number of Internet links to information about forestry, fire management, and the 1988 Yellowstone fire. Now they are being asked to express their opinion about controlled burns in a particular wilderness area.

Figure 18. Voting in an e-learning course.
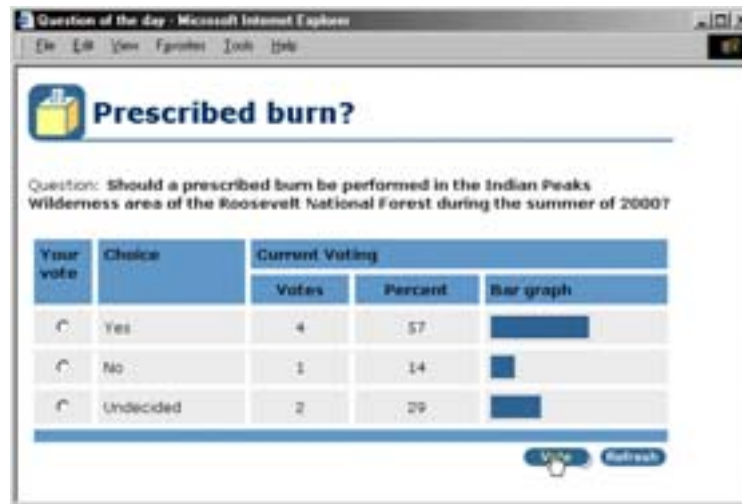
Storytelling

Since the day after human beings invented language, they have used storytelling to transmit knowledge, values, and perspectives. No surprise then that storytelling is finding its place in e-learning. Figure 19A shows a storytelling page. The learner sees a picture of the storyteller whose voice tells a story.

**Figure 19A**. Storytelling in e-learning.

To see this example go to:
http://www.designingwbt.com/html/exampleActivityStory.htm

But how can you turn storytelling into an activity? You do it by asking the learner to tell a similar story, thereby adding the missing component in many e-learning activities--reflection. Figure 19B shows the second half of the storytelling activity.

Here learners are invited to share a story of their own on the same subject by typing it in or by attaching an audio recording.

Figure 19B. Learners are invited to share a story of their own.
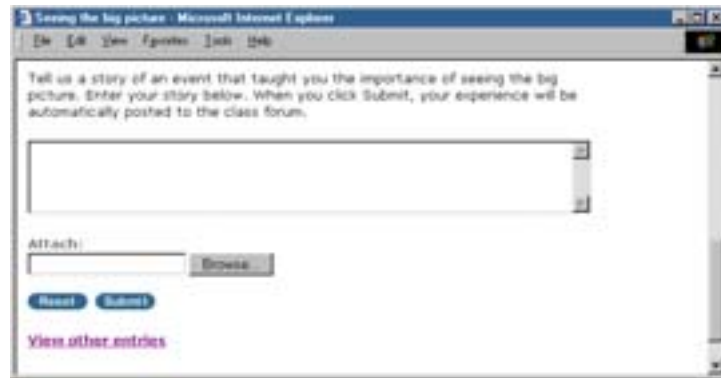
Learning Puzzles

Puzzles can make learning challenging and fun. They enable solitary learners to practice and test applying concepts and facts in a highly interactive fashion. For example, jigsaw puzzles can help learners visualize relationships, as well as teach and test whole-to-part and part-to-part relationships. Figure 20 shows a jigsaw puzzle that requires learners to assemble an organization chart.

**Figure 20**. Jigsaw puzzle used in e-learning.

To see this example go to:
http://www.designingwbt.com/html/exampleActivityLearningGameJigsaw.htm

Word games like crossword puzzles make learning terminology and vocabulary fun. In the example in figure 21, learners practice their understanding of Visual Basic methods, properties, and events.

**Figure 21**. Crossword puzzle used in e-learning.

To see this example go to:
http://www.designingwbt.com/html/exampleTestsCrossword.htm
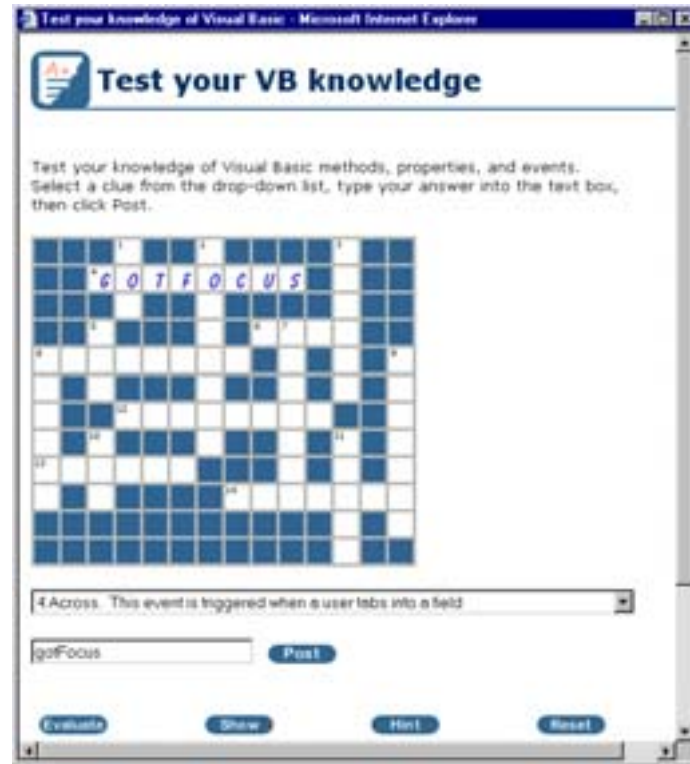
Adventure Games

Adventure games put learning in a challenging, real-world context. The example shown in figure 22 teaches interviewing skills in the context of a criminal investigation. The player must interview a witness to extract clues necessary to identify a bank robber. Because this game is mostly text, even learners connected by a slow modem can use it. Yet, most find it engaging and fun. Like a simulation, learners can try different approaches in a safe, nonjudgmental environment.

Figure 22. Adventure game in e-learning.

To see this example go to:
http://www.designingwbt.com/html/exampleActivityLearningGameCrimescene.htm
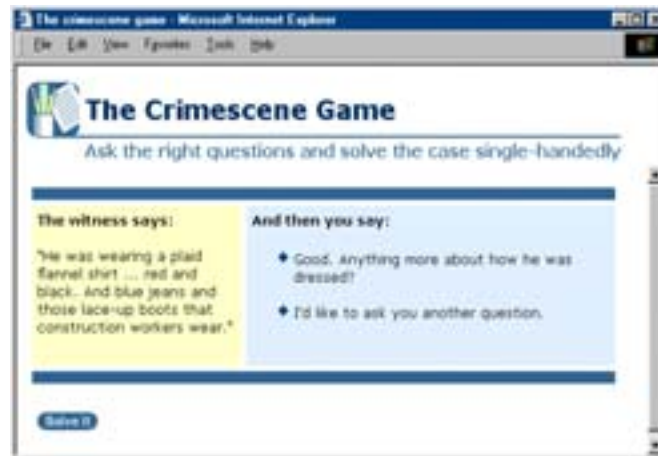
Scavenger Hunts

Scavenger hunt activities challenge learners to find their own sources of reliable and timely information on the local network or on the Internet. Learners are given a series of questions, which they must answer correctly and then provide the URL where the answer was found. The scavenger hunt activity shown in figure 23 asks questions about diamonds in Colorado.

Figure 23. Scavenger hunt for information sources.

To see this example go to:
http://www.designingwbt.com/html/exampleActivityScavengerHunt.htm

ONLINE INFORMATION

Aside from the activities and other instructional components already mentioned, many complete e-learning solutions include information resources as well. Increasingly, training requires connecting people with the information sources they will need back on the job after training. Here are some informational components often included in e-learning solutions.

Online Libraries

In a way, the entire Web is like a library--without the Dewey Decimal System. It contains trillions of pages of information, but finding the tidbit of information you need can be a daunting and time-consuming process.

You can create a useful resource for your learners by "pre-finding" pertinent and timely information and creating a course library. Start with a simple jump page. As it grows, put a menu page in front of it. If it increases beyond a few hundred resources, consider using a database to hold the individual records. Figure 24 shows an example of what a simple online library might look like.

Figure 24. Online library of information sources.

Libraries can link to online tutorials, documents, job-aids, Websites, databases, and computer applications. They can include materials that learners can view directly as well as ones they can download and use later.

Databases

Databases are collections of structured information--that is, information about which the same things are known. There are databases of support issues, patent information, product information, project reports, and the like. And most important, databases are searchable.

As you design your course offerings you should investigate whether there are databases of relevant information you can use to supplement your instructional materials. Figure 25 shows the search page and results from a database of nutrition information. If you were designing a course about dietary issues, a database like this would save you from having to provide this information some other way.

Figure 25. Web-accessible database.

To see this example go to:
http://www.designingwbt.com/html/exampleBeyondSimulationsDietgame.htm

E-books

An e-book, or electronic book, is a digital book that you can read on a computer screen. Some e-books can also be read on an electronic device such as a Palm Pilot, Pocket PC, or other handheld computer. E-books require viewing software such as the free Microsoft Reader or the free Adobe Acrobat eBook Reader. E-books prepared for one brand of viewing software, however, cannot be read by the other.

The value of e-books is that they are available immediately to any computer connected to the Internet--no shipping, no waiting, and no dog-eared pages. The downside is that they currently cost about 10 percent more than their paper siblings. Convenience has its price.

Using one of the e-book formats may be a very good way to publish your own class materials. Readers can bookmark, highlight, and take notes in e-books. Plus, content placed in the e-book format is more secure from unauthorized viewing and printing.

Online Galleries

A gallery is an organized collection of exhibits gathered in one place, such as the paintings of Currier and Ives or the sculptures of Rodin, labeled with relevant facts. An online gallery is much the same except that the objects are displayed in a linked set of Webpages rather than a brick-and-mortar building. And, online galleries are searchable. Learners can specify certain criteria, and the requested exhibits come to them, rather than the other way around.

Use galleries to collect concrete instances of objects from a field being studied, to make available the artifacts of an ongoing project, or even to document and display all the products a company has produced throughout its history. Figure 26 shows an example of an online mineral gallery that might be appropriate for geology students.

Figure 26. Online gallery.

To see this example go to:
http://www.designingwbt.com/html/exampleBeyondMuseum.htm

Help Files

If your company produces software or computer peripherals, it most likely churns out help files to support users of those products. Help files are small, concise sources of reference and procedural information. If the topic you are teaching relates to software or computer components or peripherals, consider whether you can link to portions of the online help from your training. Conversely, perhaps the documentation folks would be pleased to link to some of your training material from their product tutorials.

Product help files may also be useful in your course support strategy. Why write instructions for components like chat or media players when you can link to either the help files installed on the learner's computers or the product's support site on the Internet?

Figure 27 shows the online help desk for a course. Some entries link to local information. However, the one selected, "Logging Into the Forum," brings up the help file for the discussion forum software used in the course.

Figure 27. E-learning help desk linked to external help files.

To see this example go to:
 http://www.designingwbt.com/html/exampleHurdlesHelpDesk.htm

Guided Tours

A guided tour demonstrates an interactive computer system, such as an application, a Website, or even an e-learning course. At each stop on the tour,

important features are pointed out. In some guided tours when the tourist advances to the next stop, the application advances to the screen discussed at that stop in the tour. In others, the tourist is instructed how to navigate to the next stop.

Guided tours provide users with an overview before turning them loose to grapple with the details. Guided tours are also useful when you just want to acquaint users with a product rather than give them in-depth training.

Figure 28 shows a tour for a knowledge management system that introduces users to all the major areas of the system.

Figure 28. Online guided tour.

ONLINE ADVISERS

Telecommunications and network media allow learners and human advisers to interact frequently and in depth, even though they may be far apart. Such one-on-one assistance is yet another component of e-learning solutions. Two forms have established themselves: online coaching and telementoring. Though the terms are used somewhat interchangeably, they do represent different degrees of personal involvement.

Telementors

The term *telementoring* refers to traditional mentoring activities performed using email, videoconferencing, and other collaborative technologies. Mentors provide learners with a more knowledgeable and perhaps more mature partner from whom they can learn "things not written in books or taught in classes."

There are no precise rules for how the partners interact. The mentoring relationship is personal and will evolve into what best accomplishes the mutual goals of the partners. Mentoring relationships tend to be long term and focus on career development.

Online Coaches

Online coaching has a more short-term, project-specific goal. In online coaching, the contact between adviser and learner is more precisely defined. It is usually limited to a specific subject, such as the solution of a particular problem or completion of a specific project. The online coach serves as a technical or business consultant rather than an adviser or confidante on personal matters and overall career growth.

JOB AIDS

Job aids provide help to someone performing a job right when and where they need it. Job aids range from recipe cards to expert systems. They are not usually considered training, but they can reduce the need for training and in some cases replace it all together. They play a secondary, but important, role in complete e-learning solutions. Here is a brief review the most common types of job aids.

Checklists

Checklists are reminders of questions to ask, information to gather, and symptoms to check. They can prevent lapses in memory and discourage jumping to conclusions. They can also make clear the need for formal training. Figure 29 shows an example of a checklist that helps people evaluate their listening skills. Notice that the checklist links to e-learning on the subject.

Figure 29. Online checklist.

To see an example of a checklist go to:
http://www.designingwbt.com/html/exampleBeyondJobAidsChecklist.htm

Calculators

On-screen calculators remove math as a barrier to performing complex calculations and eliminate the need to memorize formulas. They can often replace long complex numerical tables. Figure 30 shows a calculator used to compute heat flow through solid materials. The user selects the item to be calculated, fills in the other data, and then clicks "Calculate."

Figure 30. Online calculator.

To see this example go to:
http://www.designingwbt.com/html/exampleBeyondJobAidsCalculator.htm
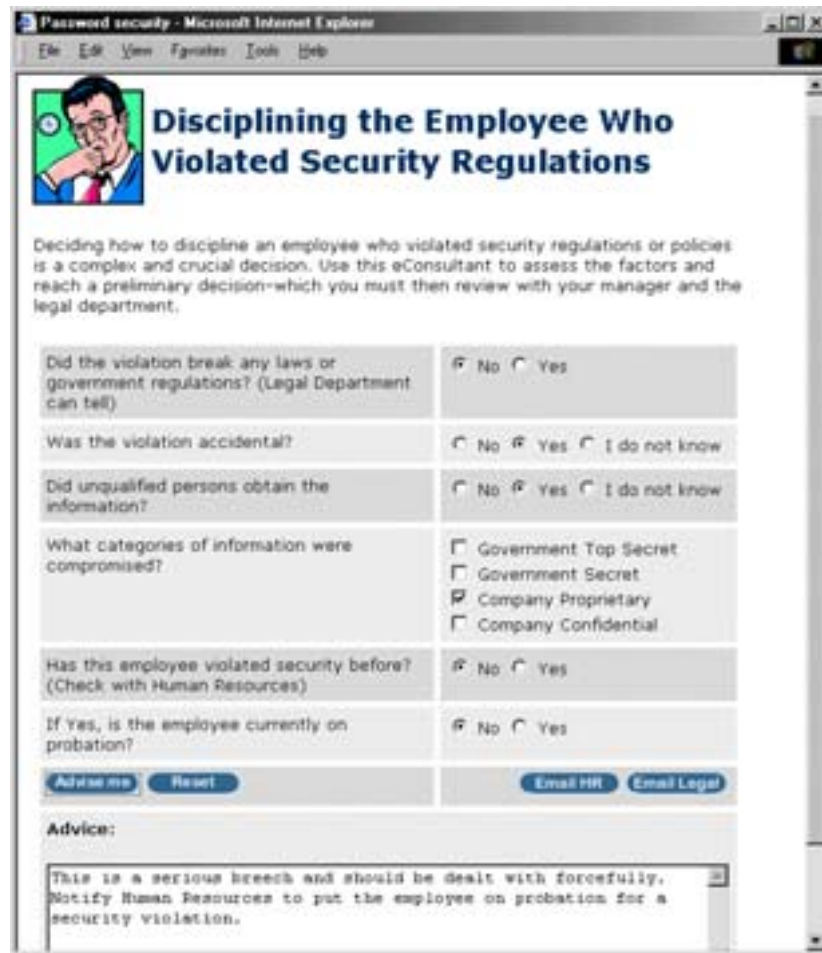
E-Consultants

An e-consultant is a Web-based form that interviews a user about a particular problem. When the user clicks a "Submit" or "Advise me" button, the programming in the form analyzes the user's responses and presents its recommendations. Think of e-consultants as soft skills calculators. Use them when a situation has a lot of conditions, irregularities, and exceptions.

Figure 31 shows an e-consultant that helps managers decide how to deal with employees who have violated security regulations.

Figure 31. E-consultant dispenses reasoned, expert advice.

To see this example go to:
http://www.designingwbt.com/html/exampleBeyondJobAidsConsultant.htm

Glossaries

A glossary defines terms and guides readers in their use. Glossaries can include pronunciation, links to related terms, and illustrations. Glossaries are useful where specialists and nonspecialists must work together, where people of different specialties must collaborate on a project, or where correct use of terminology is crucial for success. Glossaries are especially important in self-directed learning where learners, pursuing their own path through material, encounter terms that are defined in modules the learner skipped.

Figure 32 shows an example of a glossary containing terms from the telecommunications industry. Users can look up words either by drilling down through the index or by typing the term in the search box and clicking an icon with a picture of a magnifying glass.

Figure 32. Online glossary.
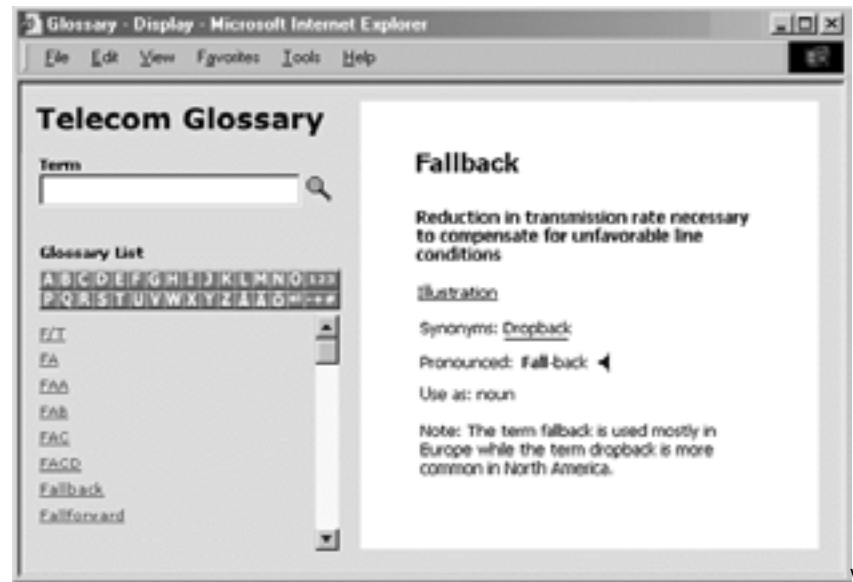
INVISIBLE COMPONENTS

The components discussed in this white paper are only the visible tip of the iceberg. Beneath these components with which the learner interacts in order to learn lies a complex structure of people and technology necessary to create, operate, and support these visible components.

Among these components are the people who propose, champion, design, develop, deploy, and conduct e-learning. In addition to internal staff, e-learning may involve external organizations, such as portals selling access to e-learning courses and Application Service Providers (ASPs) who host and develop courses as well as offer course-management services and collaboration tools. Also involved may be system integrators, course developers, and consultants.

Along with people, e-learning requires an extensive technological infrastructure. Fundamental to this infrastructure is the network linking the desktop computers, workstations, servers, laptop computers, and handheld devices on which e-learning is taken and on which it is authored and hosted. Software, likewise, is needed to author, host, and access e-learning. Prominent within the software infrastructure will be administrative packages such as learning management systems and virtual classroom systems.

Interconnecting all these components are the business and developmental processes that underlie the planning, selling, developing, deploying, and evaluating of e-learning projects.

To learn more about these invisible components, take a look at William Horton's book, Leading E-Learning.

CONVENTIONAL MEDIA TOO

So far, this white paper has concentrated on online components you could incorporate into your training strategy. Here are some flesh-and-blood and brick-and-mortar components you might consider as well. Most, if not all, effective solutions include some of these established forms.

- Conventional classroom training
    - Lecture courses
    - Workshops
    - Seminars
- Face-to-face consultations
    - Briefings
    - Presentations
    - Meetings
    - Walk-throughs
- Telephone-support help desks
- Message transport
    - Company mail
    - Postal service
    - Package service
    - Courier
- Other electronic media
    - Video tapes
    - Audio tapes
- Paper documents
    - Training manuals
    - Books (from venders and third-parties)
    - Tutorials
    - Reference manuals
    - Specifications and reports
    - Quick-reference cards

- Telephone
  - o Conference calls
  - o Voice mail

YOUR TURN

Even if you are just considering e-learning you probably have in place many of the components of e-learning solutions. For the components of e-learning listed in Worksheet 1 identify which you are already using.

Worksheet 1: Components of e-learning solutions

Category	Component	Using now?	How are you using this component now?
Online presentations	Page sequences		
	Animations		
	Video segments		
Online readings	Web-ready materials		
	Linked Web materials		
	Network search queries		
Web meetings	Live online presentations		
	Online briefings		
	Online seminars		
Conferencing activities	Chat and instant messaging		
	White boards		
	Screen sharing		
	Videoconferencing		

Discussions with others	E-mail exchanges		
	Discussion forums		
Test questions	Types:		
Practice activities	Simulations		
	Role playing		
	Voting		
	Storytelling		
	Learning puzzles		
	Adventure games		
	Scavenger hunts		
Online information	Libraries		
	Databases		
	E-books		
	Online galleries		
	Help files		
	Guided tours		
Online advisors	Telementors		
	Online coaches		
Job aids	Checklists		

	Calculators		
	E-consultants		
Conventional media	List:		