



Best Practices in Instructional Design for Web-based Training

July 5, 2011

Table of Contents

Introduction.....	3
1.0 Best Practices in Instructional Design for Web-based Training	4
1.1 Designing Instruction	4
1.1.1 Steps.....	5
1.1.2 Objectives	5
1.1.3 Levels of Interactivity.....	9
1.1.4 Instructional Strategies	10
1.1.5 Practices.....	12
1.1.6 Instructional Media.....	12
1.2 Recommended Course Structure.....	16
1.2.1 Modules	16
1.2.2 Lessons	16
1.2.3 Scenarios.....	18
1.2.4 Detailed Content Outline	18
1.2.5 Course Design Plan	18
1.2.6 Recommendations for Completing a Web-based Training Storyboard.....	19
1.2.7 The Header Section	19
1.2.8 The Footer Section.....	21
1.2.9 Display	22
1.2.10 File Names	23
1.3 Best Practices for Screen Design	25
1.3.1 Recommendations for Text Language.....	25
1.3.2 Recommendations for Audio-Selection.....	26
1.3.3 Recommendations for Audio-Development.....	26
1.3.4 Recommendations for Visual Elements	26

1.3.5 Recommendations for Graphics/Photos	30
1.3.6 Recommendations for Video	31
1.3.7 Recommendations for Animation.....	31
1.4 Summative Learning Evaluation Strategy Using LearningLink	31
• Kirkpatrick Level 1 Evaluation.....	32
• Kirkpatrick Level 2 Evaluation.....	32
• Kirkpatrick Level 3 Evaluation.....	32
• Kirkpatrick Level 4 Evaluation.....	33
Appendix A: Glossary	34

Introduction

LearningLink is the Department of Labor's portal for the delivery of Web-based Training programs and the enterprise system of record for recording training completion.

LearningLink supports business and management processes by providing agencies, staff, and customers with single-site access for the management, delivery, and development of learning and knowledge. The purpose of this document is to 1) explain the analysis and design phases of the Analysis, Design, Develop, Implement, Evaluate Model (ADDIE) for the development of training programs, 2) provide a recommended course structure, 3) present best practices in screen design, and 4) explain the Kirkpatrick model of training evaluation and provide recommended evaluation strategies. Following these guidelines will ensure your training course/program is organized in a consistent manner that will help increase content retention, keep the audience engaged, and reinforce lessons learned.

1.0 Best Practices in Instructional Design for Web-based Training

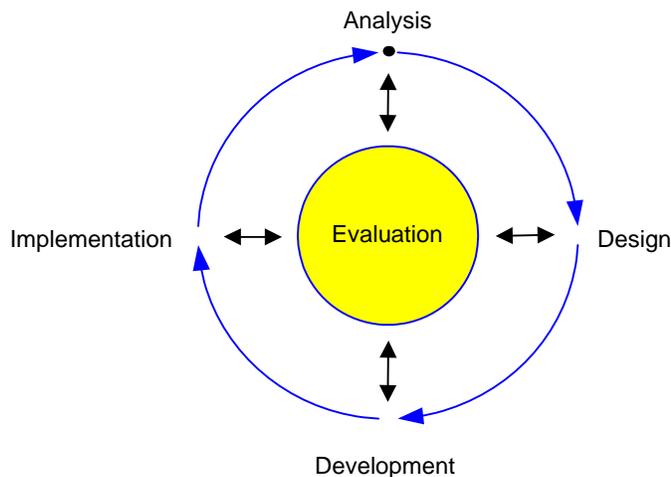
1.1 *Designing Instruction*

One of the most common models of Instructional Systems Design for Web-based Training is the ADDIE Model. This acronym stands for the 5 phases:

- **Analyze** the learner characteristics, task to be learned, etc.
- **Design** learning objectives, choose an instructional approach
- **Develop** instructional or training materials
- **Implement** and deliver or distribute the instructional materials
- **Evaluate** to make sure the materials achieved the desired goals

The figure below depicts this methodology's systematic approach to design and develop training programs. This methodology ensures that each program is instructionally sound and built with a structured approach to analyze, design, develop, implement, and evaluate a course throughout the entire development cycle. This section focuses on the Analysis and Design phase of the model.

Instructional Systems Design ADDIE Model



1.1.1 Steps

The first step in course design is to determine the instructional goal for the course. An in-depth analysis of the Learner's needs and abilities would then need to occur.

1.1.2 Objectives

Defining learning objectives is done early when designing Web-based Training and forms the basis upon which the rest of the course is built. An objective is a statement which specifies, in measurable terms, what a Learner will be able to accomplish as a result of the Web-based Training. It is a description of an acceptable level of performance Learners must exhibit at the end of a learning event.

All training program/course content for Agency-wide training launched via Learning Link must include:

1. Learning objective(s), i.e., clear statement(s) of instructional intent which answers the question, "What will the Learners be able to do/know when they finish the training program?"
2. Test and/or knowledge checks that are designed to evaluate the learner's mastery/understanding of the learning objective. Such tests/knowledge checks must be designed to ascertain whether the desired changes in knowledge, skills or behavior have occurred as a result of a learning experience.

The methodology and content of the training programs should directly support the training learning objectives. The instructional media should explain, demonstrate, and provide practice, where appropriate. The method of presentation, test and/or knowledge checks must be appropriate to the desired level of learning, as defined below:

1. Awareness - participant understands the content of material presented and recognizes correct application.
2. Learning - participant has learned the content and is able to apply it correctly.
3. Behavior change - participant implements/uses the training in their work. This measures the transfer that has occurred in Learner's behavior due to the training program.

R. Mager in his 1962 book on "Preparing Instructional Objectives" identifies four elements, (the ABCD method) to writing successful objectives:

A is the audience; the focus is on the Learner rather than the instructor.

B is the behavior or the action verb; the measurable performance outcome the Learner is able to demonstrate.

C is the conditions under which the performance will take place.

D is the degree of minimum achievement or acceptable performance criteria.

It is a best practice to develop a learning objective that:

- Asks what (knowledge, skills and attitudes changes) you want the Learner to acquire and demonstrate through participation in the course.
- Describes the expected Learner's performance or outcomes in measurable terms using action verbs.
- Specifies conditions under which the performance will take place.
- Describes the minimum acceptable standard of performance (in terms of quantity, quantity or completeness, or accuracy).

The Assessment (Knowledge Check questions) are written next, based on the objectives determined in the course.

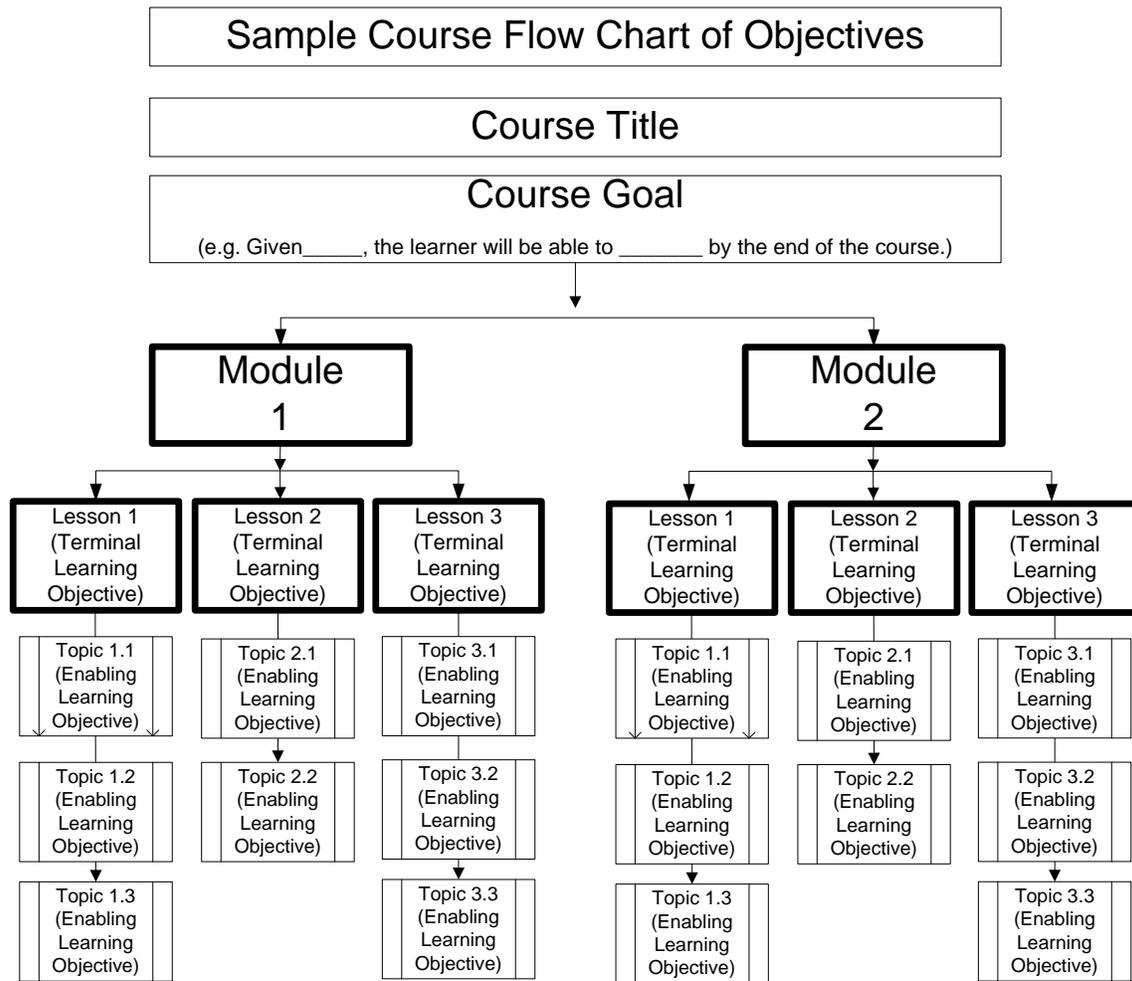
The learning taxonomy is best illustrated as follows:

- Course
- Module (grouping of lessons)
- Lessons (Terminal Learning Objectives)
- Topics (Enabling Learning Objectives)

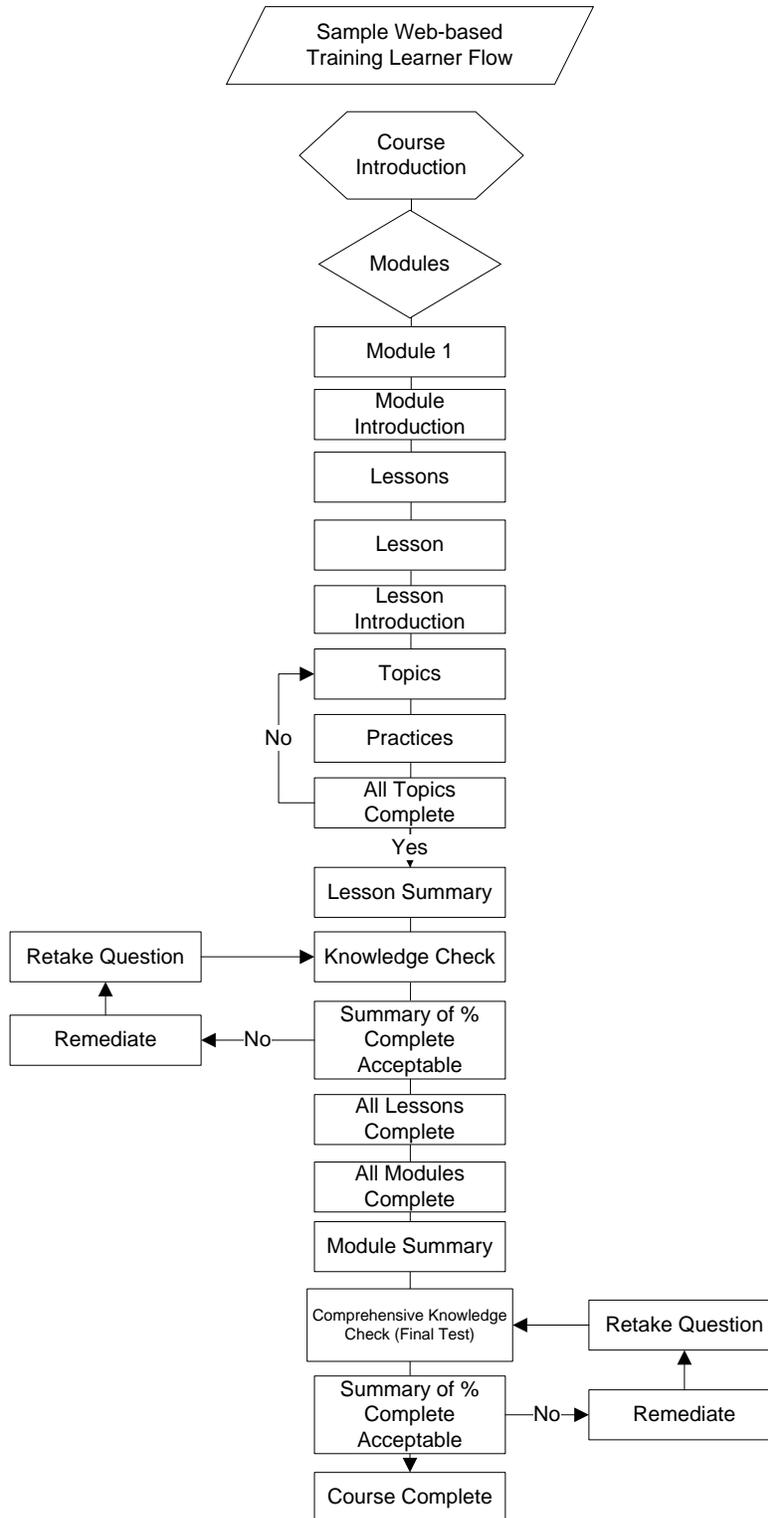
Terminal Learning Objectives (TLOs) are the objectives for LESSONS and are a statement of the course developer's expectations of the Learner's performance at the end of a specific module. The Terminal Learning Objective is written from the perspective of what the Learner will do and consists of three parts: Condition, Task, and Standard.

Enabling Learning Objectives (ELOs) are the objectives of the TOPICS and are concise statements of the course developer's expectations of the Learner's performance and are steps in accomplishing the Terminal Learning Objective. Enabling Learning Objectives are written from the perspective of the Learner and state the tasks to be accomplished for each main objective, the Terminal Learning Objective.

The flowchart below shows how the objectives sequence:



The flowchart below indicates how a Learner could progress through the Web-based Training course:



1.1.3 Levels of Interactivity

There are four suggested instructional levels of interactivity for Web-based Training products. The table below defines each level:

Levels of Interactivity	
Level	Description
Level I—Passive	The Learner acts solely as a receiver of information. The Learner is required to read the text on the screen or view graphics such as illustrations, charts, and graphics and use the navigational buttons to progress forward through the program or move back. Examples of this type of Web-based Training product are pop-ups, and hyperlinks to Web sites, materials, and other information interspersed between the text and graphic presentations.
Level II—Limited Interaction	The Learner makes simple responses to instructional cues. The Web-based Training product includes learning activities listed in Level I as well as multiple choice, drop-down lists, and labeling. An example would be a Web-based Training product that includes these types of test items at the end of a unit of instruction to test the Learner's retention of the information.
Level III—Complex Participation	The Learner makes a variety of responses using varied techniques in response to instructional cues. The responses would include those listed for a Level II –Limited Interaction as well as text entry boxes and manipulation of graphic objects to test assessment of the information presented. An example of this type of Web-based Training product would be desktop software training that requires the Learner to perform as if the Learner was actually using the program.
Level IV—Real-Time Participation	The Learner is directly involved in a life-like set of complex cues and responses. This involves engaging the Learner in a simulation that mirrors the work situation with stimuli-and-response coordinated to the actual environment. An example of this type of Web-based Training product would use artificial intelligence similar to computer games and flight simulators.

It is recommended that the Learner is engaged in learning and plays an active role such as listed in Levels II, III, and IV.

1.1.4 Instructional Strategies

Interactivity is a measure of Learner involvement required for the instructional activity. Interactivity strategies are selected based on the following learning criteria:

- Type of learning (e.g., knowledge, skill, and attitude)
- Level of learning (e.g., fact, rule, procedure, or discrimination learning)

The type and level of learning affects the instructional strategy, lesson assessment strategy, level of interactivity, and performance measurement. The level of interactivity should match the level of learning associated with each learning objective. The required level of interactivity then determines the appropriate category of Web-based Training presentation.

It is an educational best practice to incorporate interactivity into Web-based Training programs. Interactive elements should be used to support the learning objectives. The table below provides some guidelines for interactivity.

Recommendations for Interactivity	
Guideline Description	Rationale
Engage the Learner	<p>Write vivid and descriptive passages. Whenever possible, information should use lively language, striking statements, and fascinating facts.</p> <p>Speak directly to the Learner.</p> <p>Use the active voice to keep the instruction concise, dynamic, and more personal.</p> <p>Use second person, active voice for objectives, introductions, and summaries.</p> <p>Use imperative voice (“you” understood) for directions, procedures, and guidelines. Use a professional but conversational tone but avoid being overly dramatic or humorous.</p>



<p>Address the “What’s in it for me?”(WIIFM) factor.</p>	<p>Explain the relevance of the information by answering the Learner’s question, “What's in it for me?” (WIIFM). Specifically, the message should be designed to:</p> <p>Inform the Learner about the importance of the information.</p> <p>Explain the immediate and long-term benefits of learning the content.</p> <p>Communicate the potential consequences of not learning the information.</p>
<p>Provide opportunities for interaction at least every three or five screens. However, mandatory interaction with the computer should not be superficial.</p>	<p>Without interaction, the program is just a fancy electronic page-turner.</p> <p>However, if an action required is unnecessary, the Learner could be distracted by it and become frustrated. Learners prefer not to have unnecessary interactions.</p>
<p>Group the content into small segments and build in questions (with feedback), periodic reviews, and summaries for each segment.</p>	<p>Grouping content into smaller units and providing opportunities for interaction (e.g., questions) within each information segment allows learners to interact with the program more frequently providing motivation and increasing attention.</p>
<p>Ask as many relevant questions as possible without interrupting the continuity of the instructional flow.</p>	<p>Provide immediate feedback to learners regarding their own performance.</p> <p>Sustain Learner attention by keeping them mentally active in the learning process.</p>
<p>Ask questions at the application level rather than at the memory level.</p>	<p>Application questions (questions relating to the on-the-job experience) enhance attention and comprehension and facilitate transfer of learning.</p>

<p>Use rhetorical questions (questions that do not require Learners to provide an answer) to get Learners to think ahead about the content or to stimulate their curiosity.</p>	<p>A rhetorical question invites Learners to mentally interact with the content. Used as a transition aid, it can direct attention to what is coming up next. It can be used as a natural transition between frames.</p>
<p>Consider designs where the Learner is not presented with information in a linear format, but can discover information through active exploration in the program.</p>	<p>Develop activities which are creative and use in-depth understanding. This adds variety, challenges Learners, and maintains their interest.</p>

1.1.5 Practices

Practices throughout each lesson are recommended. Instructionally, they provide a reinforcement of the learning and a way for the Learner to apply the skills, knowledge, or attitude from the content that was recently learned.

Distance Learning course developers are encouraged to produce creative exercises using all appropriate media (e.g., audio and graphic identification).

Recommendations for developing practices:

- Practices support the Terminal Learning Objective (Lesson).
- Practices occur approximately after three to five screens.
- Creative exercises or scenarios could be created using the variety of media which LearningLink allows (e.g., audio, graphic identification, video, Flash).
- Practice exercises should be intuitive.
- Provide feedback when a practice item is complete.

1.1.6 Instructional Media

Each type of instructional media is unique. Requirements for effective Web-based Training can be quite different from the requirements for effective paper-based instruction, classroom training, or other Distance Learning training.

The instructional strategy defines how a desired level of learning is achieved through text and graphics. The table below describes approaches for text, graphics, and animation.

Instructional Strategies	
Strategy	Definition
3-D Animation	A complex 3-D animation attempts to depict a process. Complex animations require more resources than simple animations. Example: Virtual Reality, character animations, avatars.
2-D Animation	A simple animation is similar to a complex animation, but generally shorter in length and easier to produce than a complex animation (i.e., 2-D animations).
Animated Line Art	Animated line art may be used to illustrate a simple process or flow, such as how a piece of equipment functions.
2/3-D Illustration	Illustrations are usually static images, but many include simple interactions such as hot spots with links to pop-up boxes of information.
Photo	Original photographs that are used “as is” with little to no editing. They may also be manipulated and edited for either static or animated visuals.
Digital Video	Digital video refers to use of video clips that have copyright permission.
Static Graphic	Static graphic refers to a static visual element. Photographs and original artwork are both used in this way. In some cases, text is treated as a graphic, a visual image rather than words.
Graphic Build	A graphic build is a series of graphics shown in sequence or as overlays.
Label	A label is text that is included as part of a graphic or animation. The label does not require action by the Learner to be displayed.
Pop-Up Text	Pop-up text appears in the graphic area of the screen from a Learner cue given such as clicking on an item or moving the mouse over an item.

Text Build	A text build is a series of text items shown in sequence. Text builds add text until the instruction is complete.
-------------------	---

The table below explains the Presentation Categories 1-4 which can be used to develop Web-based Training.

Categories of Web-based Training Presentations	
Category	Description
Category 1— Low Grade Presentation	This is the lowest (baseline) category of Web-based Training development. It is a knowledge or familiarization lesson, provided in a linear format (one idea after another). Category 1 is used to introduce an idea or concept. The Learner has little or no control over the sequence and timed events of the lesson material. This category can include simple developed graphics and/or clip art icons, video or audio clips.
Category 2— Medium Grade Presentation	This category involves the recall of more information than a Category 1 presentation and provides the Learner with more control over the lesson scenario through screen icons and other peripherals, such as light pens or touch screens. Typically Category 2 is used for non-complex operations and maintenance lessons. Simple emulations or simulations are presented to the Learner. As an example, the Learner is requested to rotate switches, turn dials, make adjustments, or identify and replace a faulted component as part of a procedure. This category can also include simple graphics and/or clip art, and video and audio clips.

<p>Category 3— High Simulation Presentation</p>	<p>This category involves the recall of more complex information than categories 1 and 2 and allows the Learner an increased level of control over the lesson scenario through peripherals (e.g., light pen, touch screen, track ball, mouse). Video, graphics, or combinations of both are presented to simulate the operation of a system, subsystem, or equipment to the Learner. The lesson scenario training material typically is complex and involves more frequent use of peripherals to affect a transfer of learning. Operation and maintenance procedures are normally practiced with Category 3 scenarios and Learners might be required to alternate between multiple screens to keep pace with the lesson material. Simulations are an integral part of this presentation. This category can also include complex developed graphics and/or clip art, and video and audio clips.</p>
<p>Category 4— Real-Time Simulation Presentation</p>	<p>This Web-based Training category involves in-depth recall of a larger amount of information than Categories 1, 2, and 3 and provides the Learner with an increased level of control over the lesson. Every possible subtask is analyzed and presented with full, on-screen interaction, similar to the approach used in aircraft simulator technology. The lesson material is extremely complex and involves more frequent use of peripherals (e.g., light pen, touch screen, track ball, mouse) to affect the transfer of learning. This category normally supports certification, recertification, or qualification requirements.</p> <p>Complicated operation and maintenance procedures are normally practiced with Category 4 and such practice involves all of the elements of Categories 1, 2, and 3 presentations in addition to the following:</p> <p>High degree of interactivity</p> <p>Extensive branching (four or more levels)</p> <p>Levels of sophistication—short of artificial intelligence</p>

Section 508 of the Rehabilitation Act of 1973 (29 U.S.C. 794d) provides information regarding access to and use of Federal executive agencies' electronic and information technology (EIT) by individuals with disabilities. Detailed information on Section 508 can be found at http://social.labornet.dol.gov/wiki/index.php/Section_508.

1.2 Recommended Course Structure

It is recommended that courses be organized according to the following structure:

- Course Introduction
- Module
- Lesson
- Topic

Content screens appear within each of the topic menu items. Learners should be prompted to proceed through a course in a certain sequence (e.g., It is recommended that learners complete each topic in the order displayed on the topic menu). Other groups of screens, such as Glossary, Email and Help can be accessed as the Learner needs them.

1.2.1 Modules

The use of modules is recommended due to use of reporting in LearningLink. A module consists of a group of lessons. Learners generally are not expected to complete an entire module in a single sitting. The primary principle in determining module composition is the most logical grouping of lessons.

Recommended Module Structure:

- **Module Introduction** – The Module Introduction could consist of two screens: The first screen provides a brief overview of the module and a brief description of what the Learner will learn and the second screen lists the module objectives.
- **Module Menu** – The Module Menu provides a list of options including the Module Lesson, Module Summary, and Comprehensive Knowledge Check.
- **Lessons** – Lessons contain topics that correspond to the learning objectives.
- **Module Summary** – The module conclusion provides a summary of the module and a transition to the following module.

1.2.2 Lessons

Lessons correspond to Terminal Learning Objectives and consist of a group of topics. Each topic equates to one Enabling Learning Objective. Lesson size is dependent on the logical grouping of topics (Enabling Learning Objectives) and the time required to complete a lesson. It is recommended that learners finish a lesson in a single sitting. The recommended maximum time for lesson completion (seat time) is approximately 45 minutes. To accommodate this time constraint, the “chunking” or grouping of Enabling

Learning Objectives can be flexible. For example, one, two, or three topics (Enabling Learning Objectives) can be taught in a single lesson. The idea is to order lessons logically while keeping lessons within a 45-minute time frame.

Recommended Lesson Structure:

- **Lesson Introduction Screens** – The Lesson Introduction screen could consist of two screens: The main lesson screen provides the lesson title and the lesson purpose. The second screen lists the objectives for the lesson. The objectives should include only the task statement for the objectives.
- **Content and Practice Screens** – The main objective of each lesson is to present content and practice. Content flow should follow the objectives and instructional strategies.

It is recommended that Learners complete lessons in the order in which they are presented, review the Lesson Summary, and complete the Lesson Knowledge Check.

- **Lesson Summary Screens** – The Lesson Summary screen provides a summary of the lesson topics and a transition to the following lesson. This screen could have a Resource button that provides access to FAQ's, web links, and Forums.
- **Lesson Knowledge Check** – Each lesson could conclude with a Lesson Knowledge Check. Instructionally, there should be a minimum of one knowledge check question/task for every Enabling Learning Objective.

Remediation could be provided for the questions that Learners have answered incorrectly. These screens review question-specific content to assist Learners with answering a question correctly.

At the end of the course, when all lessons and or modules have been finished successfully, the Learner could complete:

- **Course Comprehensive Knowledge Check (or Final Test)** – The Comprehensive Knowledge Check could contain a sampling of questions from the Lesson Knowledge Check or new, related questions. It is recommended that there is at least one knowledge check question for each Enabling Learning Objective.

Remediation could be provided for the questions that Learners answered incorrectly. These screens review question specific content to assist Learners with answering a question correctly.

- **Course Conclusion Screen** – This optional screen would congratulate the learner for successfully completing the course and could also be designed to print a certificate of completion.

1.2.3 Scenarios

Scenarios incorporate authentic situations and possible events into interactive courseware. Scenarios can consist of case studies, stories, examples, or real-life situations that have occurred. The learner could respond to “What would you do in this situation?” which helps in transferring the knowledge of the content just learned to an on-the-job example. Instructionally, it is good practice to include scenarios in Web-based courses whenever appropriate.

1.2.4 Detailed Content Outline

Distance Learning course developers usually create a Detailed Content Outline (DCO) in collaboration with Subject Matter Experts to organize and “chunk” course content to best meet the course goal. Generally, a detailed outline can be created within a five – day period. Some courses may take longer – this is dependent upon the amount of content. The detailed outline contains very specific content information. Often, the amount of content contained in the detailed outline exceeds that which will be contained in the course. The purpose of the detailed outline is to provide Web-based Training Instructional Designers all of the content information, broken down into Modules, Lessons, and Topics to design a course. The detailed outline determines the scope of the course.

1.2.5 Course Design Plan

The Course Design Plan finalizes the learning objectives and detailed outline for a Web-based Training course. The Course Design Plan assists with determining how a course will be developed and details the instructional elements of a course, specifically the structure, objectives, and instructional strategies.

The Course Design Plan includes the following elements:

- Introduction (project overview, target audience, and purpose).
- Course Structure (description, course outline, course flow chart, estimated number of screens, and contact time).
- Course Design Strategy (overall approach to course, scenarios, and plan for supplemental materials).
- Course Practice and assessment (Knowledge Check) strategies.

- Design Strategy for each module, lesson (Terminal Learning Objectives), topic (Enabling Learning Objectives), descriptions, instructional strategies, assessment strategies, references, and content outline).

This document acts as a blueprint for the development team and is best developed as a hard copy and in electronic format.

1.2.6 Recommendations for Completing a Web-based Training Storyboard

A storyboard differs from the Course Design Plan in that it visually describes media content placed on every screen in the course. A storyboard displays the content and detail to the flow and interactivity of each screen. It describes in detail all images, animation, movie segments, sound, text, and navigational paths.

Storyboards are based on the Course Design Plan specifications and the Detailed Content Outline. Storyboard templates provide Distance Learning course developers a framework in which they are able to build the course content.

The following are recommendations to create consistency of documents.

1.2.7 The Header Section

Date:

The date the storyboard is created or changed. Remember that each time the Date changes, the Version # and Storyboard Reviewer fields should be updated accordingly.

Storyboard File Name:

The storyboard file name includes the course number (3-digits), module number (2-digits), and lesson number (2-digits), with each separated by an underscore (_). The storyboard file name is a shorthand reference to the storyboard and should not be confused with the screen name. The screen name is comprised of the following 12-digits: course number, module number, lesson number, topic number, and screen number.

Version #:

The first version number for a storyboard file is 1.0. The version number must be updated to reflect any storyboard modifications (e.g., 1.2, 1.3, etc.). After Subject Matter Expert comments have been incorporated, the storyboard should then receive the designation of Version 2.0. Remember that each time the Version # changes, the Date and Storyboard Reviewer fields should be updated accordingly.

Storyboard Writer:

This field includes the name of the persons responsible for writing the storyboards.

Storyboard Reviewer:

This field contains the name of the person reviewing the storyboards. Remember that each time the Storyboard Reviewer makes changes, the Date and Version # fields should be updated accordingly.

Date Comments Received:

This field contains the date on which the reviewer received the storyboards.

Course and Course #:

These fields include the complete course name in the first space and the corresponding course number in the adjacent space. If the course name needs to be abbreviated, ensure that it is easily identifiable. The course number could be a 3-digit number.

Module and Module #:

These fields include the complete module name in the first space and the corresponding module number in the adjacent space. If the module name needs to be abbreviated, ensure that it is easily identifiable. The module number could be a 2-digit number.

Lesson and Lesson #:

These fields include the lesson segment name in the first space and the corresponding lesson number in the adjacent space. If the lesson name needs to be abbreviated, ensure that it is easily identifiable. The lesson number could be a 2-digit number.

Topic and Topic #:

These fields include the complete topic name in the first space and the corresponding topic number in the adjacent space. If the topic name needs to be abbreviated, ensure that it is easily identifiable. The topic number could be a 2-digit number. If there is no topic assigned to a specific storyboard, leave the topic name blank, and assign it the number 00.

Screen and Screen #:

These fields include the screen name that is based on the screen type, for example, Module Menu, Lesson Menu, Practice Screen, or Content Screen. This is not to be confused with the 12-digit number that is the unique identifier for the screen.

The screen number could be a 3-digit number starting with 010. The numbering could continue in increments of 10. Any screens inserted during the editing process could be numbered so as not to disrupt the existing order of the screens (e.g., 0.1, 0.2, 0.3). If an abundance of extra screens are required adjust the subsequent screen numbers accordingly.

1.2.8 The Footer Section

Programmer Notes:

This field includes any information the programmer needs to accurately program the storyboard. This information may pertain to the placement and movement of text on the screen as well as hyperlinks and any interactions that the plug-ins and additional software may facilitate.

Pop-up Text:

The pop-up text field provides the definition for the hyperlinked term(s) upon which the Learners' click. The terms should appear at the beginning of the first sentence of the definition.

Back:

This field contains the 3-digit number of the screen to which the Learner will move when the Back (<) button is selected. Remember that if any screens are inserted during the editing process, the screen numbers in this section must be adjusted accordingly.

Forward:

This field contains the 3-digit number of the screen to which the Learner will move when the Forward (>) button is selected. This should include the logical progression if the Learner does not select any hyperlinks. Remember that if any screens are inserted during the editing process, the screen numbers in this section must be adjusted accordingly.

Correct Feedback Pop-Up Text (for practice exercises):

This field contains the actual text (as it should be viewed on a screen) that will accompany practice items that are answered correctly. Learners will be informed they answered the question correctly followed by a restatement of the question and the corresponding correct answer.

If correct Branch to (for Knowledge Checks only):

This field includes the 3-digit screen number for the next knowledge check (this field only pertains to the lesson knowledge check and comprehensive knowledge check). Remember that if any screens are inserted during the editing process, the screen numbers in this section must be adjusted accordingly.

Incorrect Feedback Pop-Up Text (Practice only):

This field includes the actual text (as it should be viewed on a screen) that will accompany practice items that are answered incorrectly. Learners will be informed they answered the question incorrectly followed by the correct response and a restatement of the question and correct answer.

If incorrect Branch to (Knowledge Check only):

This field includes the 3-digit screen number of the screens that will be shown during remediation (this field pertains to the lesson knowledge check and comprehensive knowledge check). Remember that if any screens are inserted during the editing process, the screen numbers in this section must be adjusted accordingly.

1.2.9 Display

The display section is located between the header and footer sections in the storyboard template. The topics provided below describe how to complete the display section.

Lesson Title/Topic Title:

These fields include the title of the lesson and the title of each topic as they appear on the screen.

Page numbers (# of #)

This field contains two numbers that indicate where the learner is in each topic and the number of screens remaining in that given topic.

Screen title:

This field contains the title of the screen as it will appear on the screen.

Screen text:

This field contains the actual text as it is to appear on the screen. When using the portrait template the text is on the right. When using the landscape template the text is on the bottom.

Graphic description:

This field contains a description of the graphic, picture, or illustration. The description can include a reference of where to find the image, graphic file names, and directions on animation, and labels that will appear with the graphic. When using the portrait template the graphic is on the left. When using the landscape template the graphic is on the top.

Explain all graphics and animations in sufficient detail for reviewers to recognize the item and to make decisions about appropriateness. When using the portrait template the graphic is on the left. When using the landscape template the graphic is on the top.

Also include any audio/video requirements in this section. If there is an audio (narration) requirement, provide the script, if there is a video requirement; provide the appropriate detail description and/or the source file.

Terms of Use Statement:

Describe the terms of use for the content. It is a best practice to include a footer within the content player window or interface of Web-based content, which is visible on every screen, and describes the terms of use for the content. Some suggestions include the following:

Public	This content is freely available for public use.
Proprietary	This content is proprietary. For usage guidelines, please contact the content owner.

Confidential This content is confidential. Please protect the contents of this course.

User Instructions:

This field contains screen specific prompt text directing the learner what to do next.

1.2.10 File Names

For maximum compatibility, files should use only lower-case letters, numbers.

The underscore (“_”) should be used to separate words. No blank spaces (“ ”) should ever be used in a file name.

It is recommended that files be named during the storyboard stage. File names are required for efficient course archival, updates, and revisions and must be accurate when the final Web-based Training has been completed. The files corresponding to the screens will be named based on a unique 12-digit number that identifies the screen’s precise location in the course sequence. This number is called the screen name. It is made up of a 3-digit course identifier, a 2-digit module number, a 2-digit lesson number, a 2-digit topic number, and a 3-digit screen number. Every file name could contain the two digits of the module number.

Audio, video, graphic, and animation files associated with a particular screen will be named using the screen name, followed by a letter indicating the sequence in which that audio, video, graphic, or animation file occurs in the screen. The following example illustrates a sample file-naming convention for all audio, video, graphic, and animation files.

301_02_04_07_010_a

- 301 represents the course identifier
- 02 represents the module number
- 04 represents the lesson number
- 07 represents the topic number
- 010 represents the screen number
- a represents a specific graphic file

Graphic files for a screen are lettered in “sequential order.” The first graphic receives an “a”, the second “a” “b”, etc. When two files are to be shown simultaneously (for example, an animation with accompanying audio), assign two contiguous letters to them (e.g., aa, ab, ac, ad, etc.).

Name only the files launched by the authoring program, not the individual items used to create the files. For example, do not provide names for each frame in an animation or for a series of source files used to create a particular graphic. Include only the files the program will access. Files that are used repeatedly during the program can use a text designation, for example, 301_print, where “301” represents the course number and “Print” represents the Print button used numerous times throughout the course. The text designation must be used consistently. Recurring files must be stored in a single folder, not in lesson folder.

1.3 Best Practices for Screen Design

The following are recommendations for developing screens:

- Place graphics to the left and text to the right of the screen (portrait) or place graphics so they appear at the top and the text at the bottom (landscape) of the screen.
- Present information in a top down, left to right instructional format.
- Provide Learners with the necessary information in the fewest possible steps and in the shortest time possible.
- Avoid “timed” effects. If one or more events are to happen on a screen, the learner should initiate the event when prompted to do so by the courseware.
- Address one concept, procedure, or item of instruction per screen. Screens should also maintain a consistent writing style chosen for the target audience.
- Use color consistently in text and graphics.
- Choose colors in a Web-based Training course to represent a clear and consistent meaning. Two distinct colors should not be used for the same purpose. Use color consistently for cueing learners to additional information.
- Colors must be compliant with Section 508 of the Americans with Disabilities Act.
- Avoid stereotyping by race, gender, or ethnicity when using visual elements, text, and audio.
- Use existing sources of content or media when available. Ensure appropriate copyright permissions have been obtained.

1.3.1 Recommendations for Text Language

The following are recommendations for text language:

- Use active voice, 2nd person (for objectives, introductions, and lesson summaries), and conversational tone when appropriate.
- Keep language simple, concise, and consistent.
- Do not use hyphenation to break words except for compound words.
- Avoid jargon and slang.
- Maintain parallel construction and noun-pronoun agreement.

1.3.2 Recommendations for Audio-Selection

The following are recommendations for selecting audio:

- Incorporate audio into lessons where it is critical to the mastery of the learning objectives.
- Narration is used to support the explanation of complex or key material. Use narration when the message is short, simple, requires immediate Learner response, or when the visual channel is overloaded.
- Narration and text should complement, not compete with, each other. To achieve this recommendation, the audio narration will often be somewhat different than the onscreen text.

1.3.3 Recommendations for Audio-Development

The following are recommendations for developing audio:

- Create a separate script to correspond to each changing element within the screen. For example, if the audio is to be synced with the appearance of three bullets, then create three separate audio scripts. Label the scripts and the event to explain the relationship.
- Avoid long pauses in visuals waiting for extended narration to finish.
- Make clear the transition from one concept to another.
- State in the storyboard the actual words to be recorded. If additional space is necessary, add a page.
- Keep language simple, active, and direct. Use short sentences. Avoid acronyms, technical jargon, and unfamiliar terms. Define any terms used.
- Express all numbers as digits.
- If each letter is to be read in an acronym, format the acronym to reflect this (D-O-L). If an acronym should be read as a word then spell it out phonetically.

1.3.4 Recommendations for Visual Elements

Visual elements should relate directly to the content.

The following are recommendations for visual elements:

- Provide recurring information in consistent locations.
- Maintain a constant perspective in a series of visuals. If a change of perspective is necessary, cue the Learners to the change.
- Include logos with express written consent.



- Avoid cluttering the screen with too many visual elements.
- Re-use graphics to reinforce basic concepts.
- Use the following ratio for screen elements:
 - 10% should consist of complex animations (VR, 3-D animations)
 - 30% should consist of simple animations (2-D animations)
 - 60% photo/illustrations with possible rollovers and pop-ups



Recommended Functions of Visual Media		
Function	A visual used to:	Example(s)
Motivational	Add interest or aesthetic appeal, or illustrate/demonstrate a compelling “What’s In It For Me” (WIFFM).	“Splash” screen slide show for a course on improvised explosive devices that depicts Marines successfully disarming an IED in an IRAQI street crowded with civilians
Representational	Depict objects in a realistic fashion or concretely visualize textual information.	<ul style="list-style-type: none">• Outline of a human being with detailed skeletal system superimposed• Screen capture of a software screen• Avatar of a commanding officer in a military planning exercise
Mnemonic	Provide retrieval cues for factual information.	Picture of a stamped letter in a shopping cart to recall the Spanish word “carta” (letter)
Organizational	Show structure and relationships among content, including a sense of time and direction.	<ul style="list-style-type: none">• Concept map showing the relationship between various MRI results and cancer diagnoses



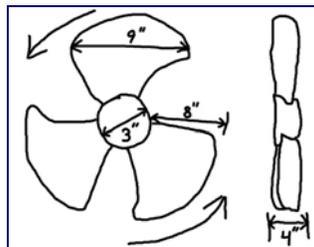
		<ul style="list-style-type: none">• Graph animating the change in air pollution over time• Arrows indicating a flow of information
Transformational	Show changes in objects over time and space.	<ul style="list-style-type: none">• An animation of the water cycle• A video showing an amphibious landing
Interpretive	Illustrate a theory, principle, or cause-and-effect relationship.	<ul style="list-style-type: none">• Animation of molecular movement• Schematic diagram of equipment

It is recommended to use graphics to illustrate a concept, versus portraying an exact “real-world” object or scene. Provide artists with appropriate contact information for the Subject Matter Expert (SME).

Provide accurate and detailed information for all images. For example, if a graphic is supposed to illustrate fan blades and how they work, describe them as accurately as possible. Provide a simple diagram or line drawing of the graphic. The information could be provided to accurately represent fan blades:

- Type of fan (squirrel cage fan, paddle fan, etc.)
- Direction of rotation (clockwise vs. counter-clockwise)
- Number of blades
- Diameter of fan hub
- Length/width/depth of fan blade

Example: “Static image of a 3-bladed ventilation fan. See illustration below for dimensions:”



- Indicate in the graphic description if an object should to be drawn to scale.
- Specify “illustration” if a graphic must be an illustration (i.e. not a photograph).

1.3.5 Recommendations for Graphics/Photos

Graphics include clip art, drawings, charts, and tables.

The following are recommendations for developing graphics and photos:

- Avoid using too many visual cues or too many colors at once.
- Ensure adequate contrast between text and background colors.

- Ensure that key details are easily identified.

1.3.6 Recommendations for Video

The following are recommendations for selecting video:

- Use short video clips to reinforce, clarify, or emphasize a specific behavior or learning objective.
- Use appropriate video techniques (e.g. talking head, show and tell, interview, panel discussion, simulation, or dramatization) for the content presented.
- Use video if the content requires motion to clearly depict the point.

1.3.7 Recommendations for Animation

The following are recommendations for animation:

- Use special effects only when absolutely required for emphasis. Avoid using special effects which take attention away from learning.
- Animations require Learner interaction to be viewed, for example, clicking on an item, button or text to play an animation or video clip.

1.4 Summative Learning Evaluation Strategy Using LearningLink

The Kirkpatrick model of training evaluation was developed by Donald Kirkpatrick, Professor Emeritus of the University of Wisconsin in North America and a past president of the American Society for Training and Development (ASTD).

The four levels are:

- Level 1 – Reaction
- Level 2 – Knowledge
- Level 3 – Transfer
- Level 4 – Results

Below is a description of the four Kirkpatrick evaluation levels. DOL recommends an evaluation strategy that includes Levels 2 and 3.

- *Kirkpatrick Level 1 Evaluation*

Kirkpatrick Level 1 assessments evaluate the Learner's reaction to training courses. These assessments are typically conducted as a survey questionnaire immediately following the conclusion of the training. They include questions that probe for the Learner's perception of the training's relevance to the course objectives, ease of navigation, and the usability of the training in the workplace.

- *Kirkpatrick Level 2 Evaluation*

Kirkpatrick Level 2 assessments evaluate the knowledge a Learner has gained by participating in the training.

The following types of learning assessments can be used in the development of Web-based Training to evaluate comprehension of the materials presented in the course.

Practice Questions – are questions, embedded within the context of the lesson, which reinforce learning by providing an opportunity to practice applying the knowledge or skill presented in the lesson. (Practice is a self-assessment and learning reinforcement strategy. Typically, scores from practice exercises are not recorded or used in Level 2 evaluation.) This type of assessment is usually integrated within the course content and created in the course's authoring tool.

Lesson or Module Knowledge Checks – are a cluster of questions following a lesson or module, that quiz the Learner on the objectives presented in the lesson or module. Scores from lesson or module knowledge checks can be recorded by LearningLink only when the lesson or module is created as an independent SCO.

Pre/Post Test – are evaluations that measure the change in knowledge a Learner achieves through participating in training.

- *Kirkpatrick Level 3 Evaluation*

Kirkpatrick's Level 3 evaluation measures the transfer of training to the workplace, as behavior change or application and practice of the skills and knowledge presented in the training. Level 3 evaluations are usually conducted as surveys and interviews with the Learner, the Learner's manager, and others in a position to directly observe behavior change or the application of knowledge and skills in the workplace.

Typically Level 3 evaluation is conducted 6 weeks to 6 months (or longer) after completing a course. The evaluation may be designed as a one-time event, or as recurring evaluations at increasing intervals.

- *Kirkpatrick Level 4 Evaluation*

Kirkpatrick's Level 4 evaluation measures the result of training from a business perspective. Considering the difficulty in obtaining appropriate business data and the difficulty of isolating the impact of training as a unique variable, Level 4 evaluation is rarely completed.

Appendix A: Glossary

Term	Definition
Courseware	Courseware refers to the WBT and all supplemental materials. It includes the necessary auxiliary materials and any special applications, programs, or other software necessary to present instruction.
Distance Learning	Distance Learning is structured learning that takes place without the physical presence of the instructor.
Flowchart	A flowchart is a deliverable that provides a high level view of the content. It includes a table of contents and a diagram that illustrates the logical sequence of the interactive interface.
Interactivity	A process by which the computer presents instruction and responds individually to each student's input.
Levels of Interactivity	<ul style="list-style-type: none"> • Level I Passive - the student acts solely as a receiver of information. • Level II Limited Interaction - the student makes simple responses to instructional cues. • Level III Complex Participation - the student makes a variety of responses using varied techniques in response to instructional cues. • Level IV Real-Time Participation - the student is directly involved in a life-like set of complex cues and responses.
Plug-In	Free industry software used to alter, enhance, or extend the functionality of a parent application program. A plug-in must be from a well-established market niche so it will be supportable through the life of the WBT courseware.
Seat Time	An instructional hour of WBT consists of one hour of student contact time in the training program.
Storyboard	A deliverable that visually describes media content placed in every screen in the course. Storyboards display the content and detail to the flow and interactivity of each screen. They describe in detail all images, animation, movie segments, sound, text, and navigational paths.
Web-Based Course	A WBT distance learning course students can complete via a web-based server.



LearningLink

DOL - Connecting Learning and Career Development

Term	Definition
Web-based Training (WBT)	A group of predominantly interactive, training and training support products delivered over the Worldwide Web. WBT products include instructional software and software management tools used in support of instructional programs.