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NHI Web-based Training Standards and Style Guide Version 1.0



NHI WBT Standards and Style Guide, v1.0

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1 Introduction

1.1 Background

The National Highway Institute (NHI) Web-based Training Standards and Style Guide provides the standards to be followed when developing Web-based Training (WBT) for the National Highway Institute.

1.2 Document Content

This Guide focuses on:

Section	Description
1.0 Introduction	Provides basic background information regarding this document and its intended use, and introduces the basic terms and concepts used in NHI courseware development.
2.0 Process	Provides an explanation of the activities and deliverables within each phase of the ADDIE process.
3.0 Instructional Design Standards*	Provides guidance on the instructional quality that NHI expects for the courseware and defines instructional standards.
4.0 Adobe Presenter	Provides guidance on the functional and development standards that grant a consistent look and feel to the NHI courseware.
Appendices	Provides additional information and document templates referenced in this document.

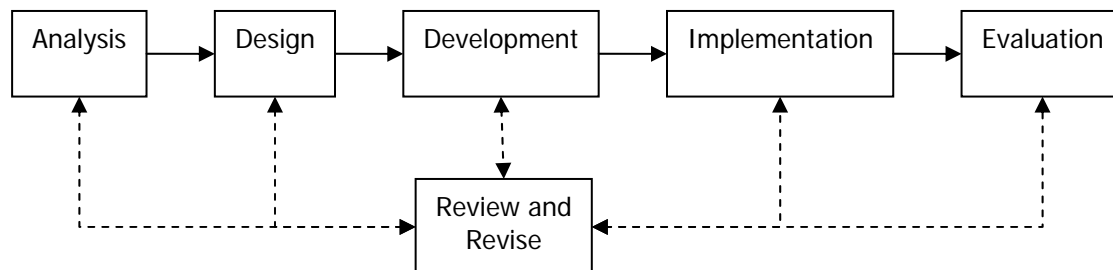
*For clarification of these standards or for permission to deviate from NHI standards, contact NHI at (703) 235-0500.

1.3 Process Overview

WBT courseware will be developed using the Instructional Systems Design (ISD) process, sometimes known as the ADDIE process. Phases of this process include:

1. Analysis
2. Design
3. Development
4. Implementation
5. Evaluation

The flow chart below illustrates the NHI WBT content development process.



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1.4 Development Team

It is NHI’s expectation that a fully-qualified instructional systems designer (ISD) will be responsible for the development of analysis and design phase deliverables. In the appropriate phases of the project, NHI expects the ISD to work with a multi-disciplinary team that includes:

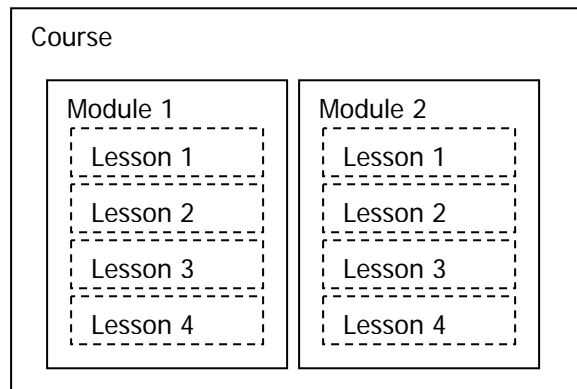
- Subject Matter Expert(s)
- NHI ISDs
- Content Reviewer(s) (also Subject Matter Experts) to include a designated “Lead Reviewer”
- Graphic Artist(s)
- Quality Assurance Specialist(s)
- Web Developer(s)/Programmer(s) *
- Audio/Video Producer(s) **

* Adobe Presenter does not require the use of a Web programmer/developer. However, a Flash programmer/developer may be needed to develop complex custom interactions and animations.

** An audio/video producer may be needed when professional audio narration or video is planned.

1.5 Taxonomy

NHI courseware is developed using the following taxonomy:



All courses will include modules; lessons are optional. For purposes of the Sharable Content Object Reusability Model (SCORM), a sharable content object (SCO) is defined at the module level.

Course learning outcomes are equivalent to course learning objectives.

1.6 Deliverables

The following should be specified as deliverables in contracts for custom e-Learning courseware development:

Phase	Deliverable(s)
Planning	Work Plan (tasks, resources, start/end dates, dependencies)
Analysis	High-level Design Plan (HDP) (approach, scope, outcomes)
Design	<ul style="list-style-type: none"> • Detailed-level Design Plan (DDP) (instructional strategies, media) • Prototype Storyboards and Published Prototype (1 Lesson or designated Module portion)
Development	<ul style="list-style-type: none"> • Storyboards consisting of detailed PowerPoint Slides including audio scripts and media elements

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	<ul style="list-style-type: none">• Beta PowerPoint files (.ppt and .ppc files for each module, end-of-course exam answer key)• Pilot-ready PowerPoint files (.ppt and .ppc)
Implementation	<ul style="list-style-type: none">• Final PowerPoint files (.ppt and .ppc)• Final Media Source Files
Evaluation*	Test Items as submitted in Beta and Final PowerPoint files (.ppt and .ppc)

**NHI will provide a URL for the standard NHI Level 1 course evaluation form for insertion in the Assessment Report Screen*

Samples of each of these deliverables will be provided upon request.

FHWA shall hold ownership of the final courseware, including the PowerPoint files and all final and raw audio, video, Flash (.FLA) and graphic files. The final deliverable files shall be provided to NHI on CD-ROM, with the final courseware on one CD-ROM and the raw files on additional CD-ROMs. Refer to the Statement of Work for specific direction on number of CDs and delivery instructions.

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2 Process

2.1 Analysis Phase

Sound instructional design practice requires designers/developers to analyze the business driver(s), target audience needs, content, budget, schedule, and delivery options as part of the Analysis Phase of a WBT development project.

Figure 2.1 – 1 depicts the analysis phase within the ADDIE Process.

Figure 2.1 - 1

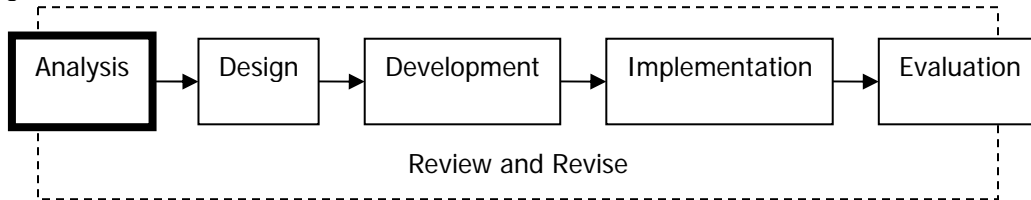
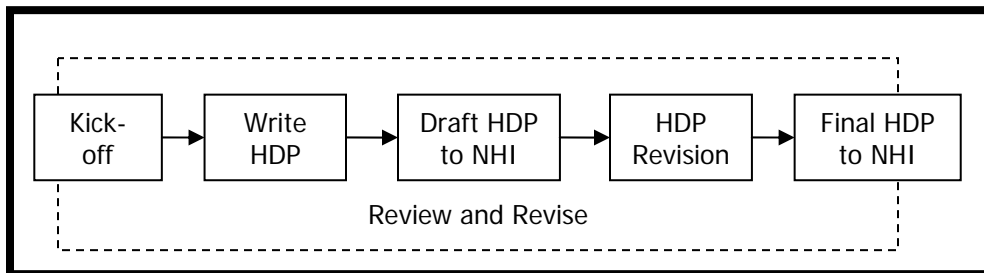


Figure 2.1 - 2 depicts primary tasks and deliverables within the Analysis phase, with review and revision occurring throughout the phase.

Figure 2.1 - 2



2.1.1 High-level Design Plan (HDP)

The HDP contains the findings and recommendations as a result of the analysis phase. This high-level document ensures the course is instructionally sound (defined as job relevant, task based, problem centered, interactive, engaging and well organized).

The HDP template contains the following sections:

- Introduction and Background
- Statement of Business Need
- Target Audience Characteristics
- Course Goal(s)
- Course Learning Outcomes (Terminal Learning Objectives, required; Enabling Objectives, optional)
- Overarching Instructional Approach (e.g., theme, metaphor)
- Delivery Method(s)
- Course Structure (diagrams of modules that show chunking and sequence of instruction)
- Use of media (animation, audio, video), if recommended
- Level of Interactivity
- Estimated Course Duration, by module
- Evaluation Strategy (high-level)

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Designers/Developers must use the NHI-provided HDP template. The MS Word 2000 template contains boilerplate text and provides all the sections that must be completed. Specific instructions are included in the template.

2.1.2 HDP Approval Criteria

A draft version of the HDP will be submitted to NHI. The NHI team and others designated by the Training Program Manager will review and provide comments. Developer/Designers are required to address the comments, providing details on what was changed and/or the reason(s) why the comment was not incorporated. Iterative versions of the document are considered draft, until all issues are resolved to NHI's satisfaction – then the document can be submitted as final.

2.2 Design Phase

Once the initial analysis is complete and approved, the design of the content can begin. The detailed-level design plan expands on the areas outlined in the high-level plan to build the basic course structure. The information in this report establishes the baseline for the project design and development.

Figure 2.2 – 1 depicts the Design phase within the ADDIE Process.

Figure 2.1 - 2

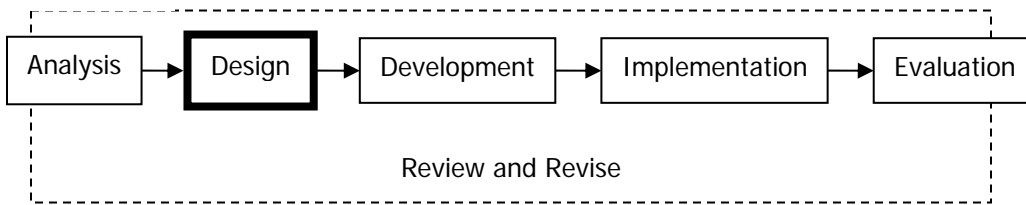
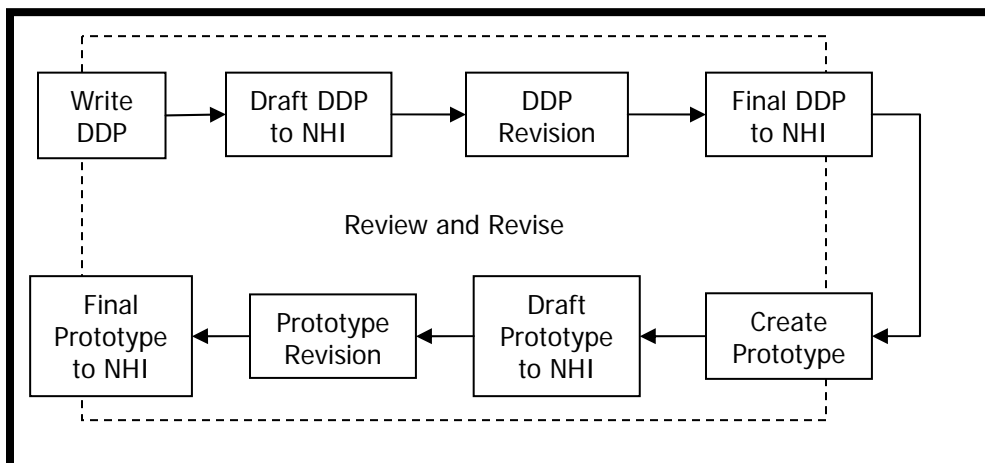


Figure 2.2 - 2 depicts primary tasks and deliverables within the Design phase, with review and revision occurring throughout the phase.

Figure 2.2 - 2



2.2.1 Detailed-level Design Plan (DDP)

NHI requires designers/developers to develop a DDP. This detailed plan provides the details on how the content will map to the objectives and how the content will be presented, practiced and tested. Using

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the content outline and the content identified in the HDP, projected timelines for tasks and milestones are also developed. These tasks and milestones are based on procedures for design, testing, implementation, and evaluation for online course development.

The DDP template contains the following sections:

- Introduction and Background
- Course Level Details
- Module Level Details
- Lesson Level Details (if lessons are used)
- Content and exercises mapped to each course learning outcome (in bulleted or outline format)
- Graphics designated to enhance content
- Estimated Duration, by course, module and lesson (if applicable)
- Proposed use of narration, if applicable
- Specific use of additional audio and/or video, if recommended
- Level 2 evaluation and remediation strategy, including number and type of test items and feedback/remediation standards
- Identification of prototype content

2.2.2 DDP Approval Criteria

A draft version of the DDP will be submitted to NHI. The NHI team and others designated by the Training Program Manager will review and provide comments. Developer/Designers are required to address the comments, providing details on what was changed, and/or the reason(s) why the comment as not incorporated. Iterative versions of the document are considered draft, until all issues are resolved to NHI's satisfaction – then the document can be submitted as final.

Preliminary work on PowerPoint storyboards for the prototype may begin prior to the final approval of the DDP. However, the initial draft DDP must precede any work on the storyboards.

2.2.3 Prototype

The prototype provides a functional sample of the content designed and developed in accordance with the WBT standards and instructional strategies identified in the DDP. Changes required to the WBT standards and instructional strategies are identified and approved by NHI early in the design phase. Global changes at the prototype phase are considerably less time-and cost-intensive than later in the design or development process.

Developers/Designers will designate a specific lesson as the prototype, which should approximately be twenty screens. Rationale for this selection as the prototype may include the following:

- Content for this section is among the most stable or best-documented in the material.
- All functionality to be included in the project is included in this subsection.
- This content is the foundation for other content in the project, and its development will facilitate the development of other content.

The prototype must be delivered to NHI on a CD-ROM as .ppt and .ppc files, if audio is used. The purpose of the prototype is to illustrate:

- Creativity
- Level of interactivity
- Opportunities for practice
- Writing style
- Understanding of adult learning principles
- Adherence to standards
- Accuracy of content

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- Treatment of content

2.2.4 Prototype Approval Criteria

The draft version of the Prototype will be reviewed by the NHI team and others designated by the Training Program Manager. This may be done as a group review via Web conference or individually. If reviewed individually, reviewers will provide written comments on a supplied comment form. If reviewed via a Web conference, the Developer/Design team is responsible for capturing all comments. All comments must be addressed, providing details on what was changed, and/or the reason(s) why the comments are not incorporated. Iterative versions of the prototype are considered draft, until all issues are resolved to NHI's satisfaction – then the prototype can be submitted as a final .ppt file.

NOTE: Refer to the Product Review Process for additional guidance

2.3 Development Phase

NHI defines a storyboard set as a set of PowerPoint slides for a single module, due to the relatively short length of the modules. Delivery, review and revision cycles will occur on a module-by-module basis.

Figure 2.3 – 1 depicts the Development phase within the ADDIE Process.

Figure 2.3 - 1

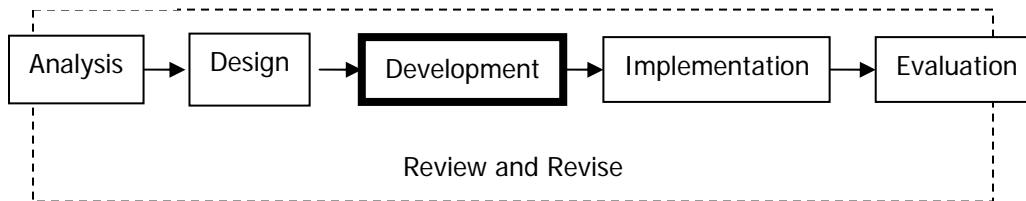
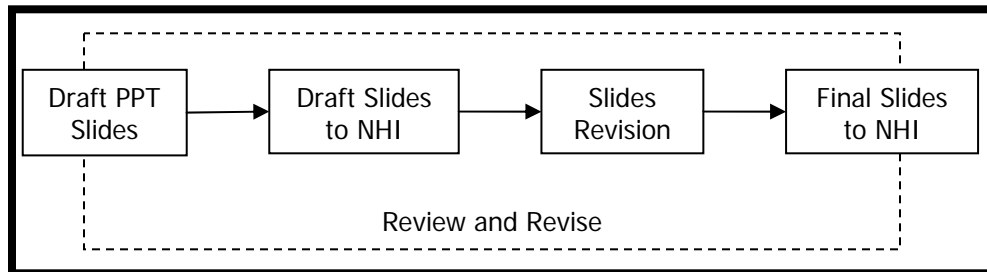


Figure 2.3 - 2 depicts primary tasks and deliverables within the Development phase, with review and revision occurring throughout the phase. One module is one review set. The development process should be repeated for each module in the course and the end-of-course exam.

Figure 2.3 - 2



2.3.1 Draft PowerPoint Slide Presentation

The designer/developer will create draft PowerPoint storyboard slides for each module that include:

- On-screen text
- Visuals (e.g., royalty-free photos, diagrams, descriptions of planned Flash animations)
- Narration script in the Notes section
- MS Word script for professionally-narrated audio, if any, that is in addition to the narration, sorted by actors/voices)
- Script for new video, if any

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- End-of-course exam answer key

Each draft module should be delivered as a separate .ppt file and, if audio is used, a corresponding .ppc file. The designer/developer will submit for review and comment:

- Draft PowerPoint files (i.e., .ppt and .ppc files)
- Any ancillary files (e.g., text-heavy documents)
- Rough cut (scratch) audio – if provided

The designer/developer will submit an end-of-course exam as a separate .ppt file and all relevant supporting files. The designer/developer will also submit a traceability document that supports the end-of-course exam as a Level 2 evaluation. The traceability document will allow NHI to quickly and easily determine validity of the Level 2 instrument, as well as facilitate later updates of content. It will identify, by objective, the:

- Assessment item that effectively tests learner mastery of an objective
- Location in the courseware of supporting content

Use the following file naming conventions for draft deliverables:

Draft Deliverable	Naming Convention
Each module .ppt file	Course Number_ModuleTitle_Draft_MonthYear EX: NHI-123456_Module1OverviewofErosionControl_Draft_0906.ppt
Each module .ppc file	Auto-generated audio file by Adobe Presenter
Ancillary Files	Course Number_ModuleTitle_DocTitle_Draft_MonthYear EX: NHI-123456_Module1OverviewofErosionControl_VideoScript_Draft_0906.doc
Audio .wav file	Course Number_ModuleTitle_Draft_MonthYear EX: NHI-123456_Module1OverviewofErosionControl_Draft_0906.wav
End-of-course exam .ppt file	Course Number_Test_MonthYear EX: NHI-123456_Test_0906.ppt
End-of-course answer key .doc file	CourseNumber_AnswerKey_MonthYear EX: NHI-123456_AnswerKey_0906.doc

NOTE: The module title should be consistently abbreviated in the file name.

2.3.2 Storyboard Approval Criteria

The draft version of the Storyboards will be reviewed by the NHI team and others designated by the Training Program Manager. The reviewers will provide written comments on a supplied comment form. Developer/Designers are required to address the comments, providing details on what was changed, and/or the reason(s) why the comment as not incorporated. Iterative versions of the storyboards are considered draft, until all issues are resolved to NHI's satisfaction – then the storyboards can be submitted as a final .ppt file and will be used to create the pilot-ready version of all course materials.

NOTE: Refer to the Product Review Process for additional guidance

2.4 Implementation Phase

NHI will coordinate and conduct an online pilot of the WBT with representative members of the target audience. A minimum of 10 participants is required.

Figure 2.4 – 1 depicts the Implementation phase within the ADDIE Process.

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Figure 2.4 - 1

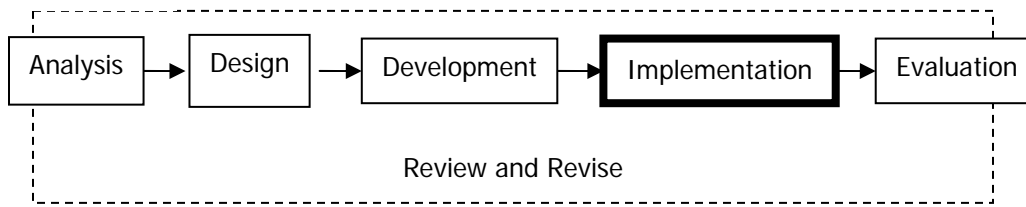
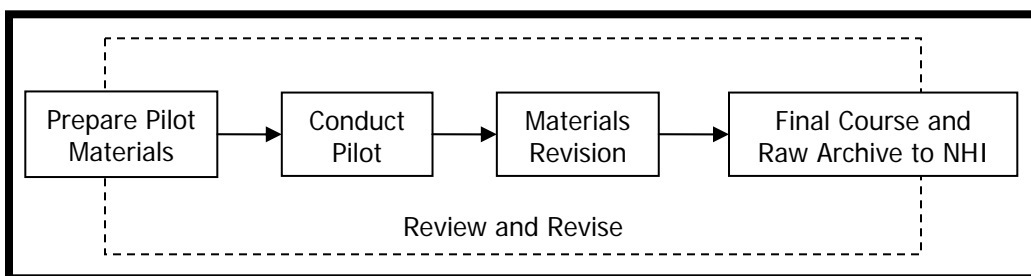


Figure 2.4 - 2 depicts primary tasks and deliverables within the Implementation phase, with review and revision occurring throughout the phase. The course, including the end-of-course exam, is used for the pilot test. Upon completion of the implementation phase, the course is ready for wide-spread deployment.

Figure 2.4 - 2



2.4.1 Pilot-Ready Materials

The following final products are required for pilot:

- PowerPoint files (.ppt and .ppc) for each module
- PowerPoint files (.ppt and .ppc) for end-of-course exam
- Script (included in the Notes section within PowerPoint)
- Embedded link to the Level 1 online course evaluation

Use the following file naming conventions for pilot deliverables:

Pilot Deliverable	Naming Convention
Each module .ppt file	Course Number_Module_Title_Pilot_MonthYearmm/yy EX: NHI-123456_Module1Overviewo ErosionControl_Pilot_0906.ppt
End-of-course exam .ppt file	Course Number_Module Title_Test_Pilot_MonthYear EX: NHI- 123456_Module1_OverviewofErosionControl_Test_Pilot_0906.ppt
Ancillary Files	Course Number_Module Title_DocTitle_Draft_MonthYear EX: NHI-123456_Module 1 Overview of Erosion Control_VideoScript_Draft_0906.doc
Script (if using professional talent)	Course Number_Script_Pilot_MonthYear EX: NHI-123456_Script_Pilot_0906.doc
Level 1 online course evaluation URL embedded in .ppt file	URL provided to vendor by NHI

The designer/developer should plan to participate in the pilot by reviewing all Level 1 and Level 2 data collected. Whenever possible, the designer/developer should facilitate a follow-on Web conference to

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capture additional feedback from the test users. NHI will coordinate the sessions while the designer/developer will facilitate the pilot feedback session. The designer/developer will submit feedback to NHI using the Comment Form template within two days of the conclusion of the pilot. NHI will review the feedback and decide which feedback to implement and which to set aside. NHI will provide the designer/developer with a Comment Form of expected changes.

2.4.2 Post-Pilot Updates

The designer/developer will create a set of final course materials that reflect the documented and agreed upon changes resulting from the pilot.

Use the following file naming conventions the final deliverables:

Final Deliverable	Naming Convention
Each module .ppt file	Coursenumber_moduleX_Final_MonthYear EX: NHI-123456_module1_Final_0906.ppt
Each end-of-course exam .ppt file	Coursenumber_moduleX_Test_Final_MonthYear EX: NHI-123456_Test_Final_0906.ppt
All supporting files (.swf)	Coursenumber_moduleX_screenxx_xx EX: NHI-123456_module1_01_04.swf
All original supporting files	Coursenumber_moduleX_screenxx_xx EX: NHI-123456_Module1_01_04.wav

2.5 Evaluation Phase

NHI evaluates both the courseware that was developed as well as the development process itself. Upon completion of the courseware evaluation, the designer/development team discusses Lessons Learned over the life of the project.

Figure 2.5 – 1 depicts the Evaluation phase within the ADDIE Process.

Figure 2.5 - 1

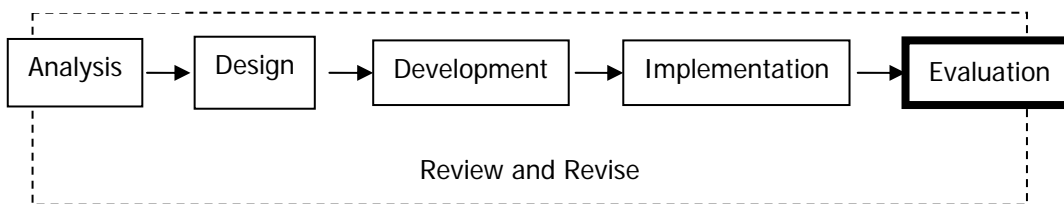
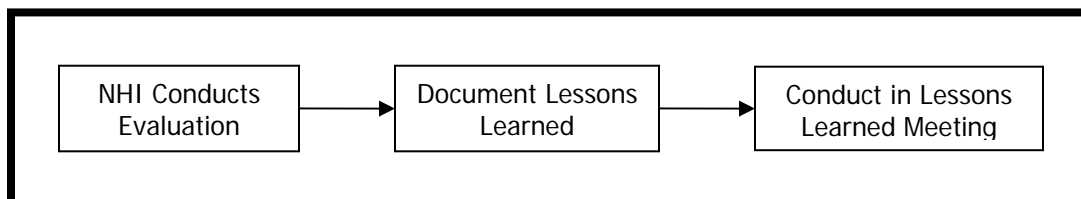


Figure 2.5 - 2 depicts primary tasks and deliverables within the Evaluation phase. NHI evaluates the course for efficacy; NHI and the design/development team document lessons learned. Upon completion of the Evaluation phase, the project is considered complete.

Figure 2.5 - 2



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2.5.1 Course Evaluation

NHI uses Kirkpatrick's Levels of Evaluation model to determine efficacy of training. NHI selected Kirkpatrick's model due to its versatility for evaluating multiple modes of training consistently, and its standing as an industry best practice.

NHI will manage the collection and analysis of Level 1 and Level 2 data. NHI uses a standardized, online Level 1 assessment. The designer/developer will develop the Level 2 evaluation during the Development phase, with the rest of the course. NHI will use the traceability document to assist in courseware evaluation.

Level	Requirement
Level 1	<ul style="list-style-type: none">• The learner accesses the NHI standard WBT course evaluation via a URL.• Learners are directed to the Level 1 Course Evaluation link on the report screen of the end-of-course exam.
Level 2	<ul style="list-style-type: none">• In order to comply with IACET standards for continuing education credits (CEUs), NHI courseware must include an assessment of the learners' mastery of the course learning outcomes. All terminal learning objectives must be tested. The threshold for mastery is 70% for the end-of-course exam.• Learners may take the test only once. If they do not pass the test, they must retake the course.• The traceability of the Level 2 evaluation must be documented prior to the completion of the course development.
Level 3	<ul style="list-style-type: none">• Not required by policy.• NHI welcomes discussion of performance evaluation at level 3.
Level 4	<ul style="list-style-type: none">• Not required by policy.• NHI welcomes discussion of performance evaluation at level 4.

2.5.2 Process Evaluation

The designer/developer will coordinate and facilitate a one-hour Lessons Learned meeting within two weeks of completion of delivery of the final product. The meeting may be held virtually. The designer/developer will document lessons learned and submit a brief (i.e., approximately six pages) Lessons Learned document in MS Word covering things done well and areas for improvement for:

- Development Process – general comments
- Communication (internal and external)
- Technical issues
- Management

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3 Instructional Design Standards

3.1 General Standards

Use the following general standards:

- Design modules that are approximately 30 minutes in duration (25-35 minutes); exceptions to this standard must be approved by the NHI Training Team (Training Program Manager and/or NHI Instructional Designer). The duration is measured by the amount of time it takes an average learner to read through all the presented material, access provided options, and listen to all included audio.
- Maintain module and lesson consistency by:
 - Developing module and lesson welcome screens that illustrate the relevance of the content to the learner
 - Including estimated module and lesson completion times in a consistent location and manner
 - Ending each lesson with a summary that recaps the content and ties it to the learning outcomes
 - Using tone and voice within the writing and audio
- State learning outcomes clearly and succinctly at the course and module levels
- Allow learner to navigate and determine order of modules or lessons
- Begin each module and lesson with something compelling that will create a desire to learn
- Create the shortest module and lesson titles needed to convey meaning
- Ensure coherent flow between screens by including transitions
- Address one concept, procedure or item of instruction on each page
- Include a resource feature, when applicable, for:
 - Sited documents
 - A bibliography
 - Relevant Web resources
 - Similar items
- Include a glossary
- Provide verbatim audio script text in the Notes section, if audio is used
- Modify the standard Help file if course unique instructions are required
- Provide learners with information in the fewest steps and shortest time possible
- Use royalty-free graphics and photographs to add visual interest
- Use custom illustrations and interactions to teach complex concepts
- Model diversity by avoiding stereotypes of race, gender or ethnicity
- Develop course-level assessments that test every terminal learning objective
- Employ adult learning principles to keep learners motivated
- Employ instructional strategies that take into consideration different learning styles

3.2 Screen Layout

All screen layout standards are already incorporated into the templates. Media standards are used to maintain style consistency within the following areas:

3.2.1 Screen Design

- Establish a specific location for the presentation of instructions and prompts
- Provide recurring information in consistent locations
- Use white space to separate blocks of text

3.2.2 Text Layout

- Present information in a top down, left to right instructional format
- Layout content so a screen reader will read the text and alt tags in the correct order.
- Design text layout in short segments or phrases
- Break up blocks of text to make it easier for the learner to scan the content

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- Use bullets, numbered lists, tables and charts to break up lengthy sentences
- Line up text under the first letter in any bulleted list, if the bulleted text wraps to a second line
- Do not indent paragraphs
- Left justify text

3.2.3 Text

- Use consistent color for text and graphics throughout a course
- Font size and color:
 - **Course Title** - Trebuchet **18**-point - RGB color: 0, 61, 125
 - **Module Title** - Trebuchet **12**-point - RGB color: 0, 61, 125
 - **Lesson Title** - Trebuchet **12**-point **Bold** - RGB color: 0, 61, 125
 - **Screen Title** - Trebuchet **12**-point **Bold** - RGB color: 0, 61, 125
 - **Instruction text** - Trebuchet **12**-point - RGB color: 0, 61, 125
 - **Feedback text** - Trebuchet **12**-point - RGB color: 0, 61, 125

Use of other font type, size or color must be approved by the NHI Training Team

- Underline hyperlinks **only**; use hyperlinks for glossary words
- Use bold font sparingly to emphasize a word or phrase.
- Do not use all capital letters or underlining to emphasize words or phrases
- Use standard Web conventions for hyperlinks (not yet selected, currently being selected, already been accessed)
- Do not use blinking text or repetitive animation

3.3 Interactivity

Interactivity should be used throughout the courses to engage the learner and allow him or her to practice applying the information whenever possible. Use of interactivity is strongly encouraged. The level of interactivity is documented in the High-Level Design Plan. NHI uses the following definitions to describe the degree of interactivity:

Level of Interactivity	Description
Level I – Passive	The learner acts solely as a receiver of information. The learner progresses linearly through course reading text from the screen, viewing video or listening to audio. Results in approximately 80 screens per hour of screen time.
Level II – Limited Interaction	The learner makes simple responses to instructional cues. The responses may include answering multiple choice or true/false questions. Results in approximately 60 screens per hour of screen time. Example: Embedded “Knowledge Checks”
Level III – Complex Participation	The learner makes a variety of responses using varied techniques in response to instructional cues. Results in approximately 45 screens per hour of screen time. Example: Building a model/diagram from available parts.

The degree of interactivity in any e-Learning product is based upon relative importance of the content, budget, timeline, shelf life, and audience size. Learners should interact with the courseware consistent with the defined level of interactivity designated for the course. It may be appropriate to design modules within the same course for different levels of interactivity (e.g., foundational principles along with complex, branched case studies for application of those principles; the foundational module might be developed at Level I, whereas the application module might be developed at Level III).

- Use interactive instructional strategies (e.g., an “Explore It” interaction where the learner selects several text labels, graphical elements, or photographs for further information)
- Include a wide variety of interaction types to keep the learner engaged throughout the course
- Adhere to the standard set of learner prompts for each screen and interaction type

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3.3.1 Embedded Practice

Use Knowledge Checks as embedded practices. Embedded practice provides opportunities for reinforcement after each concept or skill is presented. Practice exercises are evaluated, but the scores are not sent to the learning management system. Other points to consider include:

- Provide the context for the practice activity by relating it to a concept or job skill in introductory text
- Ensure practice opportunities are directly linked to learning outcomes (i.e., terminal and/or enabling learning objectives)
- Use the standard NHI Knowledge Check screen for embedded practice exercises
- List up to eight (8) possible answer choices for multiple choice questions
 - Format answer choices as:
 - a) Answer option
 - b) Answer option
 - c) Answer option
 - Use radio buttons when there is one correct answer and the standard prompt: "Select the correct answer. Then select the Submit button."
 - Use check boxes when there are multiple correct answers and use the standard prompt: "Select all answers that apply, and then select the Submit button."

3.3.2 Learner Feedback and Remediation for Embedded Practice

Each Knowledge Check should allow for two tries except for true/false, which allow only one try for a correct answer. Provide the correct answer along with reinforcing feedback when the learner answers correctly. Provide the learner with a "hint" if the learner answers incorrectly on the first try and encourage the learner to try again. Provide the learner with corrective feedback to help enable learning if the learner answers incorrectly the second time. Feedback always starts with either "Correct" or "Incorrect", followed by the corrective or reinforcing feedback.

3.3.3 Bookmarking

Adobe Presenter automatically bookmarks the location a learner is at every 10 pages and/ or every time an embedded practice is completed. Should a learner exit a course without completing the module, Adobe Presenter "bookmarks" the page the learner was on. This allows a learner to return to the same location and complete the course.

3.3.4 Course Completion Requirements

Adobe Presenter requires every lesson and/or module end with a scored item. A learner must "submit" at the end in order for the lesson/module to record as complete in LMS tracking. This is accomplished by using one of the following:

- Use a Knowledge Check to provide the summary page for the lesson/module, including one unscored question at the end such as: "Do you understand all of the content covered in this section?" The "No" response would provide feedback telling the learner to go back over the lesson/module for review. The "Yes" response would congratulate the learner and inform them they have successfully completed the lesson/module.
- Provide a scored test at the end of the lesson/module

After successfully completing a course, learners will be able to download a course certificate (there is no requirement to take the end-of-course exam in order to download a certificate). NHI will provide a URL to the developer to include in the last course screen. The URL is a link to the downloadable Adobe Acrobat course certificate file.

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WBT Development Standards

3.4 Quality Control (QC) and Quality Assurance (QA)

NHI requires development teams to complete QC and QA reviews on all deliverables (draft and final) prior to submission to NHI. Testing is required on the prototype and final versions. QC, QA, and testing artifacts should be provided to NHI upon request.

In general, the development team should ensure:

- Teaching and testing strategies comply with the standards provided in the NHI WBT Style Guide
- Text complies with the standards provided in the NHI WBT Style Guide
- Media complies with the standards provided in the NHI WBT Style Guide
- Alpha tests are conducted on all supported operating systems and browsers
- LMS integration testing is completed
- Thorough quality assurance testing is conducted on published versions of Alpha, Beta, and Final courseware

The NHI review is neither a QC nor QA review. The role of NHI is to review for **content** accuracy. Development teams must ensure compliance with the NHI WBT guide, SCORM, and Section 508.

3.5 Development Tools

All WBT developed for NHI **must** use Adobe Presenter 6, a PowerPoint to Flash conversion tool. Developers will need to purchase a developer's license for Adobe Presenter 6. Before starting the development phase, the contractor must obtain the latest version of the NHI WBT Template to use in conjunction with this style guide.

Other tools for use should be non-proprietary, and include:

- Adobe Flash (version 7.0 or later)
- JavaScript
- Adobe Photoshop
- Adobe Premiere

Other development tools require NHI approval.

3.6 Graphical User Interface

The graphical user interface (GUI) is standard and included in the templates. Developers may request permission to make additions or changes to the GUI; a rationale must be provided in writing to the NHI point of contact for the course, and must be approved.

3.6.1 Menu

The course menu is provided on the FHWA Adobe Training server. Modules are listed in numerical order.

- Module level:
 - Create the shortest module titles needed to convey meaning
 - Use descriptive headings, e.g.: **Module 1 Overview of Erosion Control**
 - Titles limited to 45 characters, including spaces
- The module menu is provided within in .ppt file. Lesson Titles appears in the left-hand frame of the WBT template as a set of links to lesson introductory screens within a module
 - Create the shortest lesson titles needed to convey meaning

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- Use Descriptive headings, e.g., **Lesson 2: Planning Erosion Control Measures**
- Titles limited to 45 characters, including spaces

3.6.2 Navigation

The use of consistent navigation standards will add to learner satisfaction and retention. The following standards apply to all web-based courseware:

- Intuitive, learner- controlled navigational
- Include the following navigational links:
 - Continue link only on first screen of each module
 - Back and continue links on module screens
 - Back button only on last screen of each module
- For explore-it interactions (multiple selectable items on a base screen), use the back button to return to the base slide from each sub-slide; back button location does not change
- Provide clear instructions or cues for all required learner activities. Use boilerplate text where provided.
- Navigational elements will provide one click access to learners and should include the following:
 - **Resources:** Direct learners to course-level ancillary items (additional reading, source documents, policy documents)
 - **Help:** Direct learners to navigational guidance. NHI provides standard Help content available at <http://fhwa.acrobat.com/wbthelp>. This URL has been coded into the NHI WBT template
 - **Glossary:** Direct learners to a course-level list of terms and definitions. The glossary may be delivered as a Flash paper document or as a self-contained Presenter module.

NOTE: Other navigational buttons may be added, as appropriate. However, the location of navigational buttons is specified in the standard NHI GUI. The buttons (e.g., Submit, Play, and Replay) should be consistent within each course

- Mouse cursor changes and rollover highlights must be consistent within a course
- Learners must be able to control all navigation to accommodate all users. Buttons will have text description labels (alt tags) as part of the template
- Navigation buttons must display in the same position on every page
- Modules and lessons can be completed in any order, unless the instructional design requires sequential accomplishment (if this is required, provide instructions to the learners)
- Use breadcrumbs to help learners quickly identify their location in a course
- Course titles are limited to 60 characters, including spaces
- Module titles are limited to 45 characters, including spaces
- Lesson titles are limited to 45 characters, including spaces
- Screen titles are limited to 45 characters, including spaces
- Use the following screen title standards (these will show in the sidebar and used for navigation):
 - Module X Objectives 1, 2, 3, etc.
 - Module X Review
 - Lesson X Objectives
 - Lesson X Review
 - Module X Quiz Introduction
 - Module X Quiz Results
 - Course Exam Introduction
 - Course Exam Results

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3.7 Media Standards

Media standards provide a consistent look and feel to courses, as well as offering assurance that the media will function as intended on the training platform.

3.7.1 Graphics

- Use the NHI-provided color palette (provided at project onset) as part of the NHI WBT templates
- Use colors that accommodate learners who are color blind
- Establish and maintain a convention for the use of color(s) to denote meaning, however, so not use color as an instructional cue
- Maintain a constant perspective in a series of visuals
- Do not include contractor or other corporate logos in the courseware
- Avoid graphics that may become outdated in a short time
- If using clipart, verify it is royalty free or obtain written permission for use
- Do not use cartoon characters
- All text within the graphic must be readable. If the graphic needs to be scaled down, then there should be a “select to enlarge” feature
- Be consistent with all graphics (with the use of borders, effects and quality)
- Do not use drop shadows
- Make sure there is no advertising in the photo (e.g., car model name, billboard signs, license plates)
- Deliver raw files to NHI as compressed, processed files and .PSD with layers preserved

3.7.2 Animation

- Allow user to control the animation to include: start, stop, and replay
- Avoid timed effects (If one or more events are to launch on a page, the learner should trigger the event. Events should not be timed to launch.)
- Do not use blinking graphics or text
- Use special effects when required for emphasis or transition
- Do not use any special effects that detract from learning or as the main element of learning.
- Use animation to display concepts that are difficult to describe with narration and/or text
- Raw files built in flash delivered to NHI as .fla.

3.7.3 Audio

- Use audio judiciously (e.g., to demonstrate interpersonal skills, to demonstrate sounds heard on the job, to engage the learner – such as providing a talking coach)
- Include verbatim text of any audio in the Notes section of each Power Point slide
- Ensure audio volume levels are consistent throughout the course
- Use one audio talent to narrate all modules within the same course. If role-playing, multiple voice talent may be used, but roles must be consistent.
- Use sound effects only when they help to convey the content – but they cannot be used to provide the only means for learning
- NHI standards for audio edits
 - Place 1.5 seconds of silence at the beginning of every slide
 - Place 1.5 seconds of silence at the end of every slide
- If audio is recorded outside of the Adobe Presenter tool:
 - Raw audio files delivered to NHI as .WAV or MP3
 - Recommended audio editing tool is Adobe Premiere, but others are acceptable as long as the final product is .wav

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3.7.4 Video

- Use video to reinforce, clarify or emphasize a specific behavior or performance objective that cannot be effectively taught using graphics, stills, photographs or animation
- Videos must be captioned to comply with accessibility requirements
- Do not use continuous video clips (more than 15-20 seconds in length) because of file size
- Use appropriate video (e.g., talking head, show and tell, interview, panel discussion, simulation or dramatization)
- Avoid techniques such as zooming, panning, transitional wipes, dissolves and fast motion subjects due to buffering problems which tend to hinder streaming media performance
- Raw files delivered to NHI as compressed digital files – .FLV or .AVI
- Recommended audio editing tool is Adobe Premiere, but others are acceptable as long as the final product is .fla

3.8 Platform Standards

All courseware should be designed for use on the minimum platform configurations to reach the widest possible audience. Because NHI does not have control over all courseware consumers' training platforms; however, NHI assumes that learner workstations meet the following minimum requirements.

3.8.1 Hardware

Design courseware to perform on the standard hardware configuration in use at the time of development.

Minimum configuration includes the following:

- Operating system: Windows 2000
- Minimum processor speed: 328 MHz
- Standard screen resolution: 800 x 600
- Color depth: 16 bit

3.8.2 Browser Specification

Design courseware for optimal viewing using the standard FHWA configuration browser.

- Internet Explorer 6.0
- Flash Player 7.0 or higher

3.8.3 Hosting

All NHI WBT courseware resides on the FHWA online training server (<http://fhwa.acrobat.com>).

3.9 Writing Standards

Adherence to an established writing style provides continuity and consistency within a course and across the curriculum.

3.9.1 General Writing Guidelines

- Use active voice, second person (you), present tense, and conversational tone when appropriate
- Keep language simple, concise and consistent
- Do not use hyphens to break words
- Avoid jargon and slang
- Use examples that are universally understood
- Avoid references that learners with English as a second language would have difficulty understanding
- Avoid the use of contractions (unless the course is consistently conversational in style)

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- Avoid language and examples that will reduce the shelf life of the courseware, such as dates and references to current events
- Do not use all capital letters. Learners have more difficulty reading text that is all capitalized than text that uses mixed-case letters
- Italic should only be used for titles of published works and words that are appropriated from other languages and have not become standard English (e.g., *détente*)
- Use “select” in learner prompts (“click” or “click on” are not compliant with Section 508)

3.9.2 Acronyms and Abbreviations

- Write out the full name of the entity, followed by its acronym in parentheses for first time use on a page.
- Acronyms do not include spaces or periods
- Abbreviations should be used when using titles before and after names (e.g., Mr., Mrs., PhD)
- Use abbreviations when the acronym for a corporation, institution or country is more familiar than the full name (e.g., USA, IBM, FBI, FedEx)
- Use abbreviations for mathematical measurements (e.g., lb., kg.)
- Include acronyms in the glossary

3.9.3 Punctuation

- Use one space after periods and colons
- Do not use serial commas immediately preceding “and” or “or” (a serial comma is the last comma in a series of items)
- Use a hyphen to connect words in a sequence (e.g., 2003-2004, pp. 28-72)
- Do not use hyphens to separate syllables within a word
- Do not use hyphens to connect two related parts of a sentence
- Place all punctuation inside the quotation marks
- Establish and adhere to a standard symbol for first and second level bullets
- Do not use an Em Dash
- Use an En Dash to connect related parts of a sentence (e.g., NHI expects the vendor to ensure – through thorough quality testing – compliance to this Guide, SCORM, AICC, and Section 508.)
- Use a space before and after an En Dash (as shown in example above)
- Do not use a “/” – it is read as “slash” by screen readers

3.9.4 Bullets

- Maintain parallel construction in a bullet list (e.g., start all bulleted items with a verb)
- Use no more than two levels in a bulleted or numbered list
- Use numbered bullets where sequence is important (e.g., the five sequential steps of the ADDIE model); use symbols for bullets when order is not important
- Use a colon at the end of the introductory sentence (i.e., stem of before bullet list)
- Capitalize the first word in each bulleted phrase or sentence
- Do not place a period at the end of learning outcomes, even when stated in a complete sentence
- Begin phrases (bulleted items that are not complete sentences) with caps and end without punctuation
- Do not use “and” or “or” in bulleted sequences
- Do not use a comma after each bulleted item
- Do not put a period at the end of the last bullet in a list of bulleted items
- Do not use a bullet (number or symbol) when there is only one item; there must be at least two items to make a bullet list

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3.9.5 Numbers

- Use figures to express the numbers 10 and above, as well as all numbers representing mathematical functions or quantities, dates, ages, time, money and numbers as part of a series
- Spell out the numbers nine and below unless they represent precise measurement (e.g., 8.2578) or are part of a complex mathematical formula
- Spell out any number that begins a sentence, title or heading

3.9.6 Date and Time

- Write out the date in full (e.g., July 4, 1776)
- Use a colon to separate hours and minutes (e.g., 9:00 a.m.)
- Include Time Zone (EST, CST, MST, PST), if applicable

3.9.7 Capitalization

- In headlines, capitalize all words except definite/indefinite articles, prepositions and conjunctions that are shorter than four letters.
- When using bullets, capitalize the first word contained in each bullet
- Capitalize the word "State" whenever referring to one of the 50 States
- Capitalize the word "Federal" as in Federal Government
- Do not capitalize the word "federally"

3.9.8 Emphasis

- Avoid excessive use of bolding (it can be distracting and should be reserved for headings)
- Do not use italics for emphasis (they are hard to read on screen and are used specifically for citations)
- Do not underline (underlined text can be confused with a hyperlink)
- Do not use quotation marks for emphasis
- Use headings and subheadings to draw attention to specific concepts

3.10 508 Considerations

This section provides information relevant to Section 508. All NHI technology-based training products must be in compliance with these standards.

The following statement summarizes Section 508, Part 1194.21 regarding software applications and operating systems:

Most of the specifications for software pertain to usability for people with vision impairments. For example, on provision requires alternative keyboard navigation, which is essential for people with vision impairments who cannot rely on pointing devices, such as a mouse. Other provisions address animated displays, color, and contrast settings, flash rate, and electronic forms, among others.

NHI follows standards published by the Access Board (<http://www.access-board.gov/sec508/guide/index.htm>). All courseware developed must be in adherence with the Access Board standards. When requested, the development team must document proof of accessibility.

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There is no designated NHI-standard assistive technology. Courseware should be developed for functionality using assistive technology agreed to be the project development team.

3.10.1 508 Compliance Standards

Courses must be accessible to persons with disabilities in accordance with section 508 of the Rehabilitation Act Amendments of 1998. Proposals should address how the course would meet the requirements of this Act.

The Contractor will coordinate with the Contracting Officers Technical Representative (COTR) for overall technical direction. The COTR will convene designated U.S. Department of Transportation (USDOT) staff to serve as technical experts, and assist in the review and approval of course materials. Technical experts will represent USDOT, as appropriate.

The Final Rule, Electronic and Information Technology Accessibility Standards, published in the Federal Register on December 21, 2000, provides guidance on how a Contractor can meet these requirements (see, 36 CFR Part 1194 [Docket no. 2000-01] RIN 3014-AA25). There are also a number of readily available resources on the Rehabilitation Act including several web sites. See, for example, www.section508.gov and www.access-board.gov. Additionally, a number of organizations provide technical information on making websites accessible for the disabled. Such organizations include but are certainly not limited to:

- The Web Consortium (www.w3.org)
- The HTML Writers Guild (www.hwg.org)
- The Rochester Institute of Technology's Equal Access to Software and Information website (www.rit.edu/~easi/)
- The University of Wisconsin-Madison's Trace Research and Development Center (www.trace.wisc.edu)

See also:

Janet L. Balas. Online Resources for Adaptive Information Technologies, Computers in Libraries (June 1, 1999).

Marilyn J. Cohodas. Does Barrier-Free Compute?, Governing Magazine (April, 2000).

The requirements for Web-based applications as described in § 1194.22 the December 21, 2000 Final Rule, e.g.:

- (a) A text equivalent for every non-text element shall be provided (e.g., via "alt", "longdesc", or in element content).
- (b) Equivalent alternatives for any multimedia presentation shall be synchronized with the presentation.
- (c) Web pages shall be designed so that all information conveyed with color is also available without color, for example from context or markup.
- (d) Documents shall be organized so they are readable without requiring an associated style sheet.
- (e) Redundant text links shall be provided for each active region of a server-side image map.
- (f) Client-side image maps shall be provided instead of server-side image maps except where the regions cannot be defined with an available geometric shape.
- (g) Row and column headers shall be identified for data tables.
- (h) Markup shall be used to associate data cells and header cells for data tables that have two or more logical levels of row or column headers.
- (i) Frames shall be titled with text that facilitates frame identification and navigation.
- (j) Pages shall be designed to avoid causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz.

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- (k) A text-only page, with equivalent information or functionality, shall be provided to make a Web site comply with the provisions of this part, when compliance cannot be accomplished in any other way. The content of the text-only page shall be updated whenever the primary page changes.
- (l) When pages utilize scripting languages to display content, or to create interface elements, the information provided by the script shall be identified with functional text that can be read by assistive technology.
- (m) When a Web page requires that an applet, plug-in or other application be present on the client system to interpret page content, the page must provide a link to a plug-in or applet that complies with § 1194.21 (a) through (1).
- (n) Whenever electronic forms are to be completed online, the forms shall allow people using assistive technology to access the information, field elements, and functionality required for completion and submission of the form, including all directions and cues.
- (o) A method shall be provided that permits users to skip repetitive navigation links.
- (p) When a timed response is required, the user shall be alerted and given sufficient time to indicate more time is required.

Note to § 1194.22: 1. The Board interprets paragraphs (a) through (k) of this section as consistent with the following priority 1 Checkpoints of the Web Content Accessibility Guidelines 1.0 (WCAG 1.0) (May 5, 1999) published by the Web Accessibility Initiative of the World Wide Web Consortium:

Section 1194.22 Paragraph	WCAG 1.0 Checkpoint
(a)	1.1
(b)	1.4
(c)	2.1
(d)	6.1
(e)	1.2
(f)	9.1
(g)	5.1
(h)	5.2
(i)	12.1
(j)	7.1
(k)	11.4

2. Paragraphs (l), (m), (n), (o), and (p) of this section are different from WCAG 1.0. Web pages that conform to WCAG 1.0, level A (i.e., all priority 1 checkpoints) must also meet paragraphs (l), (m), (n), (o), and (p) of this section to comply with this section. WCAG 1.0 is available at: <http://www.w3.org/TR/1999/WAI-WEBCONTENT-19990505>

3.11 LMS Integration

LMS integration is handled internally for all NHI courses. The development team has no tasks associated with integration other than to assist in integration testing, if requested by NHI.

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4 Adobe Presenter

4.1 Templates

The purpose of the templates is to provide learners with a consistent look and feel with all online NHI courses they may take. The templates have established standard settings. There are two WBT templates:

- WBT module template
- WBT end-of-course evaluation template

4.2 Standardized Screen Types

In addition to standard PowerPoint templates, NHI standards include several standard screen types. Though the layout of each screen is not prescribed, the designer/developer will use the standards screens throughout an NHI course. Refer to the ***Standardized Text*** document for boilerplate text and text placement.

The available screen types are documented in the table below.

Screen Type	Description
Module Introduction	The module introduction page orients the learner to the module. Most importantly, it captures the learner's attention and creates a tension for learning. This page should provide the What's In It for Me? (WIIFM). The estimated contact time (module duration) is provided along with the Module learning outcomes.
Lesson Introduction	The lesson introduction page orients the learner to the lesson. Lesson learning outcomes are stated. NOTE: Lessons are optional. If the course does not contain lessons, do not use the lesson introduction template.
Content	The content screens provide the body of the instruction. Each screen should address an instructional concept, provide a transitional link between related concepts, provide a practical example or case study, or serve a similar instructional function.
Embedded Questions	The Adobe Presenter Quiz Manager provides six different types of question interaction: <ul style="list-style-type: none">• Short answer• Matching• Multiple Choice• Fill-in-the-blank• Rating Scale• True/False The questions can be modified to work as unscored quizzes (i.e., knowledge checks).
Lesson Summary	The lesson summary page wraps up the lesson. Lesson learning outcomes are paraphrased. This page also provides instruction on how to continue (e.g., select another lesson). If desired, one (the same) graphic may be used on every lesson summary page in a course. Refer to section 3.3.4 on course completion requirements NOTE: Lessons are optional. If the course does not contain lessons, do not use the lesson summary template.
Module Summary	The module summary page wraps up the module. Module learning

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Screen Type	Description
	outcomes are paraphrased. If the module contains lessons, the connectivity between the module's lessons is emphasized. This page also provides instruction on how to continue (e.g., select another module). If desired, one (the same) graphic may be used on every module summary page in a course. . Refer to section 3.3.4 on course completion requirements
End-of-Course Exam Introduction	The course exam introduction page orients the learner to the course assessment. Clear instructions on how to take the test are provided. The number of questions in the test is stated. The test scoring page is explained. The learner is informed that the threshold for mastery is 70% for the course test. This page also provides instruction on how to start the test.
End-of-Course Exam Questions	Similar to the embedded question templates, they include the six different types of question interaction: <ul style="list-style-type: none"> • Short answer • Matching • Multiple Choice • Fill-in-the-blank • Rating Scale • True/False
End-of-Course Exam Report	The course exam report page is the course "scorecard" for the learner. The learner's score on the course is provided as a percentage. The learner is informed, in text, if he or she passed the exam. The learner is also directed to the Level 1 course evaluation.

4.3 Adobe Presenter Settings

Most settings are established in the template. Use the following Step/Action tables to re-establish or double check settings to ensure a consistent user experience.

4.3.1 Theme Editor Settings

Theme settings may be edited as part of the publication process. The developer may opt to edit theme settings after selecting *Publish* in the Adobe Presenter menu.

Step	Action
1	Open the Theme Editor window by selecting Adobe Presenter → Theme Editor .
2	Select NHI Template 1 from the Theme Name dropdown menu. NOTE: If you do not have the NHI Template 1 option, select Save As from beside the Theme Name dropdown. In the Save as ... window, enter NHI Template 1 , then select OK .
3	Set the following in the General Options : <ul style="list-style-type: none"> • Select the Outline Pane Checkbox • Deselect the Thumbnail Pane Checkbox • Select the Notes Pane Checkbox • Select the Search Pane Checkbox • Select Outline from the Default Pane on Startup dropdown menu • Select Right from the Location of Layout dropdown menu • Select Full Screen from the Default Mode on Startup dropdown menu
4	Deselect all options in the Present Options.
5	Select Text Labels → Notes Tab Text and change the Custom Text to Narration . Select OK .
6	Select Change Theme Colors → Theme Color . In the Color window, enter the following:

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	<ul style="list-style-type: none"> • Hue: 140 • Sat: 240 • Lum: 48 • Red: 0 • Green: 51 • Blue: 102 <p>Select OK.</p> <p>Select Glow Color from the Theme Colors window. In the Color window, enter the following:</p> <ul style="list-style-type: none"> • Hue: 108 • Sat: 25 • Lum: 195 • Red: 202 • Green: 212 • Blue: 209 <p>Select OK.</p> <p>Select Font Color from the Theme Colors window, and then select White in the Color window. Select OK.</p> <p>Select Background Color from the Theme Colors window. In the Color window, enter the following:</p> <ul style="list-style-type: none"> • Hue: 75 • Sat: 8 • Lum: 110 • Red: 114 • Green: 121 • Blue: 113 <p>Select OK.</p> <p>Select OK on the Theme Colors window.</p>
7	Select OK on the Theme Editor window to save all your settings.

4.3.2 Knowledge Check Settings

Knowledge Checks and the end-of-course exam are both created using the Quiz Manager. Knowledge Checks should be created as ONE question per quiz, or ONE Knowledge Check per quiz. The end-of-course exam should be created as one quiz with multiple questions.

4.3.2.1 Quiz Manager Settings for Knowledge Checks

Use the following step/action chart to set up a Knowledge Check. Note that you must set up a quiz before you can enter the questions.

Step	Action
1	Open the Quiz Manager window by selecting Adobe Presenter → Quiz Manager .
2	In the Quiz Manager window, select the Reporting tab, and deselect Enable reporting for this presentation .
3	In the Quiz Manager window, select the Default Labels tab, and set: <ul style="list-style-type: none"> • In the Default question button labels section: <ul style="list-style-type: none"> ○ Submit button text: Submit

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Step	Action
	<ul style="list-style-type: none"> • In the Default question feedback section: <ul style="list-style-type: none"> ○ Select Correct message, and enter Correct. {Add reinforcing feedback on slide} Click anywhere to continue. ○ Select Incorrect message, and enter Incorrect. {Add corrective feedback on slide} Click anywhere to continue. ○ Select Retry message, and enter Incorrect. {Add hint feedback on slide} Click anywhere to try again. ○ Select Incomplete message, and enter You have provided an incomplete answer. Click anywhere to try again. <p>NOTE: All custom feedback must be completed on the PowerPoint slide, NOT in the Quiz Manager. The text in the {brackets} should be replaced with the intended additional feedback.</p>
4	In the Quiz Manager window, select the Quizzes tab.
5	Select Add New Quiz to open the New Quiz window.
6	Select the Quiz Settings tab.
7	In the Name field, enter Lesson {#} Knowledge Check {#} .
	NOTE: Replace {x} with the appropriate sequential numbers.
8	From the Required dropdown, select Required – the user must take the quiz to continue
9	In the Settings section: <ul style="list-style-type: none"> • Select Allow backward movement • Select Allow user to review quiz • Deselect Show score at end of quiz • Select Show questions in outline
10	Select Question Review Messages ... , and set: <ul style="list-style-type: none"> • Correct: You answered this question correctly. {Add reinforcing feedback on slide} • Incomplete: You did not answer this question completely. • Incorrect: Incorrect. The correct answer is: {Add correct answer and feedback on slide} <p>Select OK to close the Question Review Messages... window.</p>
11	Select Pass/Fail Options tab and: <ul style="list-style-type: none"> • In the Pass/Fail options section, set 0% or more of total score to pass • In the If passing grade section, select Go to next slide from the Action dropdown • In the If failing grade section: <ul style="list-style-type: none"> ○ Set Allow user to 2 ○ Select Go to next slide from the Action dropdown.
12	Select OK to close the New Quiz window

4.3.2.2 Question Settings for Knowledge Checks

After you have set up the quiz, you can create the question(s) for the quiz. Remember that for the embedded Knowledge Checks, there is one question per quiz; for the end-of-course exam, there is one quiz for the exam, with multiple questions in the quiz.

Use the step/action chart to set up the quiz questions.

Step	Action
1	In the Quiz Manager window, select the quiz to which you are adding a question, then select Add New Question to open the Question Types window.
2	Select the type of question indicated in the storyboards, then select Create Graded

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Step	Action
	<p>Question.</p> <p>NOTE: The type of question used in this example is Multiple Choice. The inputs are similar for other types of questions, unless noted.</p>
3	<p>In the {Type} Question window, the Question section is similar for all questions types. Set the following:</p> <ul style="list-style-type: none"> • Name field: Learning Outcome {x} <p>NOTE: Indicate which Learning Outcome/Objective the question addresses.</p> <ul style="list-style-type: none"> • Question field: Enter the actual question along with the boilerplate instructions for the type of question. • Points field: 0
4	From the Type dropdown, select either single response or multiple response, based on the storyboard.
5	From the Numbering dropdown, select the lower case characters (a, b, c, . . .)
6	In the Answers section, select Add , then enter or copy/paste the text for the answer options. Select the correct answer(s).
7	<p>Select the Options tab, and set the following:</p> <ul style="list-style-type: none"> • In the Type section: <ul style="list-style-type: none"> ○ Select Graded – there are right and wrong answers from the ○ Select Show clear button • In the If correct answer section: <ul style="list-style-type: none"> ○ Select Go to next slide from the Action dropdown ○ Select Show correct message • In the If wrong answer section: <ul style="list-style-type: none"> ○ Enter 2 in the Allow user field NOTE: Set to 1 for True/False or Yes/No questions. ○ Select Go to next slide from the Action dropdown ○ Select Show error message ○ Select Show retry message ○ Select Show incomplete message
8	Select the Reporting tab and deselect Report answers
9	In the {Type} Question window, select OK .
10	In the Quiz Manager window, select OK .
11	Repeat for each knowledge check.

4.3.3 Learner Assessment Settings

The end-of-course exam is also created using the Quiz Manager. The end-of-course exam should be created as one quiz with multiple questions in a separate PowerPoint file.

4.3.3.1 Quiz Manager Settings for End-of-Course Exam

Use the following step/action chart to set up an end-of-course exam. You must set up a quiz before you can enter the questions.

Step	Action
1	Open the Quiz Manager window by selecting Adobe Presenter → Quiz Manager .
2	<p>In the Quiz Manager window, select the Reporting tab, then select Enable reporting for this presentation. Set the following:</p> <ul style="list-style-type: none"> • Learning Management System: Adobe Presenter

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Step	Action
	<ul style="list-style-type: none"> • Report Pass or Fail: Report status as defined by report data • Choose report data: Report to Adobe Presenter • Report score to LMS as: Score • Reporting level: Only report the score <p>Select OK</p>
3	<p>In the Quiz Manager window, select the Default Labels tab, and set:</p> <ul style="list-style-type: none"> • In the Default question button labels section: <ul style="list-style-type: none"> ○ Submit button text: Submit ○ Clear button text: Clear • In the Default question feedback section: <ul style="list-style-type: none"> ○ Deselect Correct message. ○ Deselect Incorrect message. ○ Deselect Retry message. ○ Select Incomplete message, and enter: You must answer the question before continuing.
4	In the Quiz Manager window, select the Quizzes tab.
5	Select Add New Quiz to open the New Quiz window.
6	Select the Quiz Settings tab.
7	In the Name field, enter {Course Name} .
8	From the Required dropdown, select Answer all – the user must answer every question to continue
9	<p>In the Settings section:</p> <ul style="list-style-type: none"> • Deselect Allow backward movement • Deselect Allow user to review quiz • Select Show score at end of quiz • Deselect Show questions in outline
10	<p>Select Pass/Fail Options tab and:</p> <ul style="list-style-type: none"> • In the Pass/Fail options section, set 70% or more of total score to pass • In the If passing grade section, select Go to next slide from the Action dropdown • In the If failing grade section: <ul style="list-style-type: none"> ○ Set Allow user to 1 attempts ○ Select Go to next slide form the Action dropdown
11	Select OK to close the New Quiz window

4.3.3.2 Question Settings for End-of-Course Exams

After you have set up the quiz, you can create the questions. For the end-of-course exam, there is one quiz for the exam, with multiple questions in the quiz.

Use the step/action chart to set up the quiz questions.

Step	Action
1	In the Quiz Manager window, select the quiz to which you are adding a question, then select Add New Question to open the Question Types window.
2	<p>Select the type of question indicated in the storyboards, then select Create Graded Question.</p> <p>NOTE: The type of question used in this example is Multiple Choice. The inputs are similar for other types of questions, unless noted.</p>
3	<p>In the {Type} Question window, the Question section is similar for all questions types. Set the following:</p> <ul style="list-style-type: none"> • Name field: Learning Outcome {x}

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Step	Action
	<p>NOTE: Indicate which Learning Outcome/Objective the question addresses.</p> <ul style="list-style-type: none"> • Question field: Enter the actual question along with the boilerplate instructions for the type of question. • Points field: Enter the number of points for the question. <p>NOTE: The total number of points for an end of course exam should be 100. Distribute points as evenly as possible through all questions on the exam, but only include 1 question per learning outcome.</p>
4	From the Type dropdown, select either single response or multiple responses, based on the storyboard.
5	From the Numbering dropdown, select the lower case characters (a, b, c, . . .)
6	In the Answers section, select Add , then enter or copy/paste the text for the answer options. Select the correct answer(s).
7	<p>Select the Options tab, and set the following:</p> <ul style="list-style-type: none"> • In the Type section: <ul style="list-style-type: none"> ○ Select Graded – there are right and wrong answers from the ○ Deselect Show clear button • In the If correct answer section: <ul style="list-style-type: none"> ○ Select Go to next slide from the Action dropdown ○ Deselect Show correct message • In the If wrong answer section: <ul style="list-style-type: none"> ○ Enter 1 in the Allow user field ○ NOTE: Set to 1 for all question types in the end-of-course exam. ○ Select Go to next slide from the Action dropdown ○ Deselect Show error message ○ Select Show incomplete message
8	<p>Select the Reporting tab and select Report answers, then:</p> <ul style="list-style-type: none"> • Select the {Course Name} from the Name dropdown. • Do not change the Interaction ID.
9	In the {Type} Question window, select OK .
10	In the Quiz Manager window, select OK .

4.3.4 Question Formatting on PowerPoint slides

After a Quiz is created in the Adobe Presenter Quiz Manager, the text will not use the same size font or color as the master slide so the font and color must be altered manually.*

Step	Action
1	<ul style="list-style-type: none"> • Add the Question to the slide in a separate text box • Set font to Trebuchet 14 pt Bold • Align to top-left of grid • Set color to BLUE • Set RGB color 0, 61, 125 on the CUSTOM tab in the colors dialog box
2	<ul style="list-style-type: none"> • Set answer font to Trebuchet 12 pt • Set RGB color 0, 61, 125 on the CUSTOM tab in the colors dialog box
3	<p>Format answers.</p> <ul style="list-style-type: none"> • Manually adjust the default text box size to match the grid • Select all answers by holding the SHIFT key and clicking each text box. • Select Format > Object • On the TEXT BOX tab, un-check "<i>word wrap text in auto-shape</i>". This will cause the text to continue off the page • Select the spot after the last word that fits within the grid and select the ENTER key while holding

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	SHIFT. Complete for every line of text
4	Format response boxes <ul style="list-style-type: none">• Manually adjust the font and color of the response boxes• Set font to Trebuchet 16 pt and RGB color 0, 61, 125• Set box fill color to RGB 208, 221, 234 or the same color as the sub-navigation bar• Left justify the feedback text• Arrange the boxes so no answers are covered
5	Format Submit and Clear buttons <ul style="list-style-type: none">• Set font to Trebuchet 14 pt and white color• Set box fill color to RGB 0, 61, 125• Place boxes in the lower-right corner of the screen

*To avoid this extra step, create a separate master slide for quizzes to accommodate the different font sizes and colors.

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5 Appendix

Appendix A: Acronym List

The following acronyms have been used in this document.

Acronym	Definition
ADDIE	Analysis, Design, Development, Implementation, Evaluation
DDP	Detail-level Design Plan
FHWA	Federal Highway Administration
GUI	Graphical User Interface
HDP	High-level Design Plan
ISD	Instructional Systems Design; Instructional Systems Designer
NHI	National Highway Institute
QA	Quality Assurance
QC	Quality Control
SCO	Sharable Content Object
SCORM	Sharable Content Object Reusability Model
W3C	World Wide Web Consortium
WBT	Web-based Training