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Appendix C

Web Conference Training Standards Guide

NATIONAL HIGHWAY INSTITUTE

U.S. Department of Transportation
Federal Highway Administration

Table of Contents

Introduction

Background

The National Highway Institute (NHI) Web Conference Training Standards Guide provides the standards to be followed when developing Web Conference Training (WCT) for the National Highway Institute.

Document Content

This Guide focuses on:

Section	Description
Introduction	Provides basic background information regarding this document and its intended use, and introduces the basic terms and concepts used in NHI courseware development.
Process	Provides an explanation of the activities and deliverables within each phase of the ADDIE process.
Instructional Design Standards*	Provides guidance on the instructional quality that NHI expects for the courseware and defines instructional standards.
Participant and Facilitator Preparation	Provides information on the resources available to participants and Facilitators that will help them prepare for WCT.
Appendix	Provides additional information.

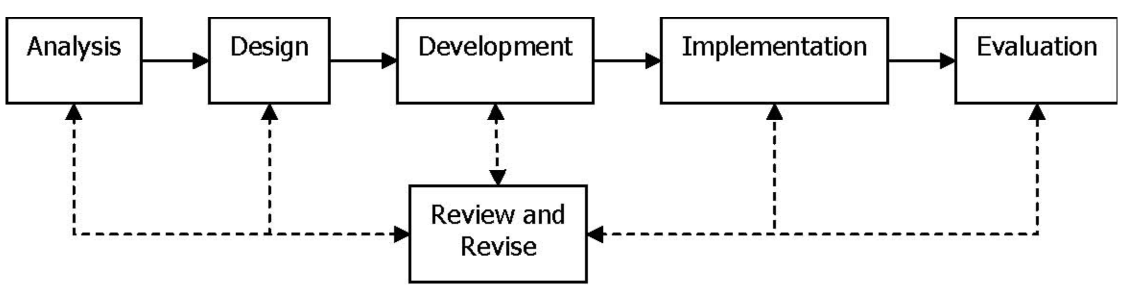
*For clarification of these standards or for permission to deviate from NHI standards, contact your assigned COTR at (703)235-0500.

Process Overview

WCT 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 WCT content development process.



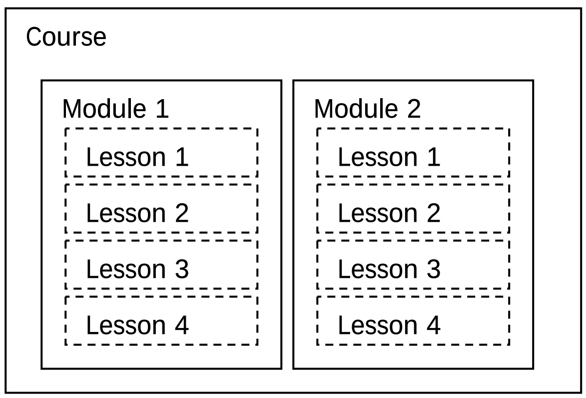
Development Team

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 ISD's
- Content Reviewer(s) (also Subject Matter Experts)
- Graphic Artist(s)
- Audio/Video Producer(s)-if required by project
- Quality Assurance Specialist(s)

Taxonomy

NHI WCT 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.

Deliverables

The following should be specified as deliverables in contracts for WCT courseware development:

Phase	Deliverable(s)
Planning	Statement of Work/Work Plan (tasks, resources, start/end dates, dependencies
Analysis	High-level Design Plan (HDP) (approach, scope, delivery method, outcomes)

Design	• Detailed-level Design Plan (DDP) (structure, instructional strategies, media, duration) • Prototype WCT (approx 20 slides)
Development	• Draft PowerPoint slides • Draft End-of-course assessment file • Draft Facilitator Guide • Draft Participant Workbook • Draft ancillary learning resources • Draft end-of course assessment Answer Key
Implementation	• Pilot-ready WCT (uploaded to the Web conferencing system) • Final WCT in PowerPoint, Final Facilitator Guide in MS Word, final Participant Workbook in MS Word, ancillary learning resources and multimedia source files)
Evaluation*	• Final Test Items submitted as Draft, Pilot, and Final PowerPoint slides • Pilot Report

**NHI will direct learners to an online NHI Level 1 course evaluation form. Not a deliverable.*

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

NHI shall hold ownership of the final WCT, including the underlying source code, including all audio, video and graphic files. Interim and final deliverables shall be posted to the meeting room. The final deliverable files shall be provided to NHI on CD-ROM.

Process

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 WCT development project.

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

Figure 2.1 - 1

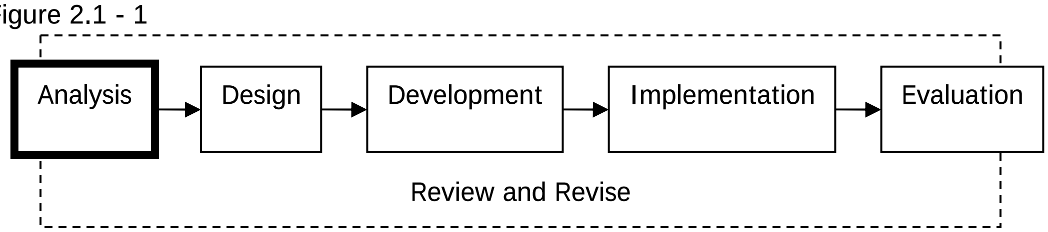
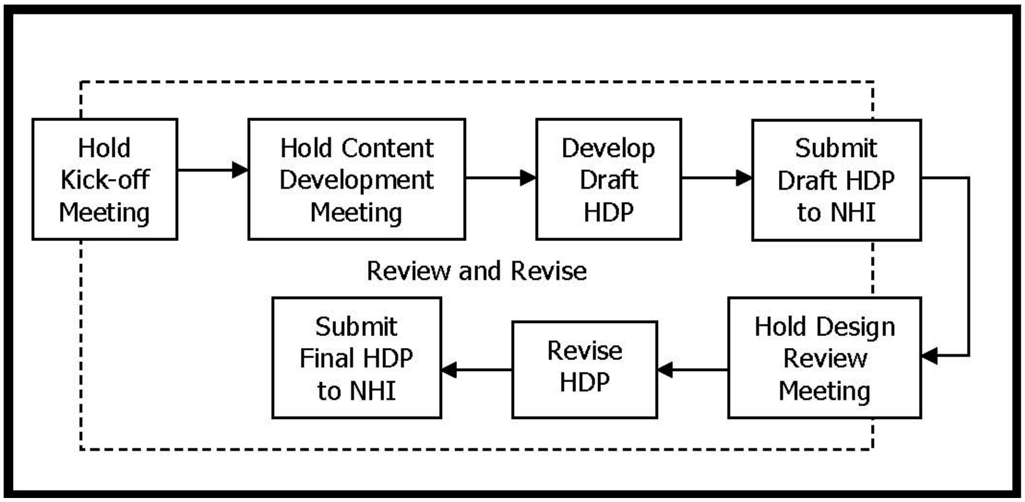


Figure 2.1 - 2 depicts primary tasks and deliverables within the Analysis phase, with review and revision occurring throughout the phase.

Figure 2.1 - 2



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, interactive, engaging and well-organized).

The HDP template contains the following information:

- Introduction and background
- Statement of business need
- Target audience characteristics
- Course goal(s)
- Course pre-requisites, if any
- Course learning outcomes (terminal objectives and enabling objectives)
- Overarching instructional approach (e.g., them, metaphor)
- Course structure (diagrams of modules, showing 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)

HDP Approval Criteria

The HDP should be submitted to NHI in an MS Word file. The designer/developer should plan to meet with NHI (either in a face-to-face or in a Web meeting) to discuss and finalize the proposed training design, including content treatment and delivery method(s). All mutually agreed-upon changes resulting from the design review meeting will be incorporated into a Final HDP.

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 established the baseline for the project design and development.

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

Figure 2.2 - 1

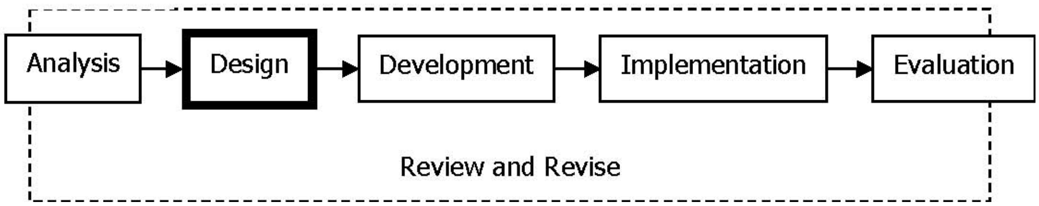
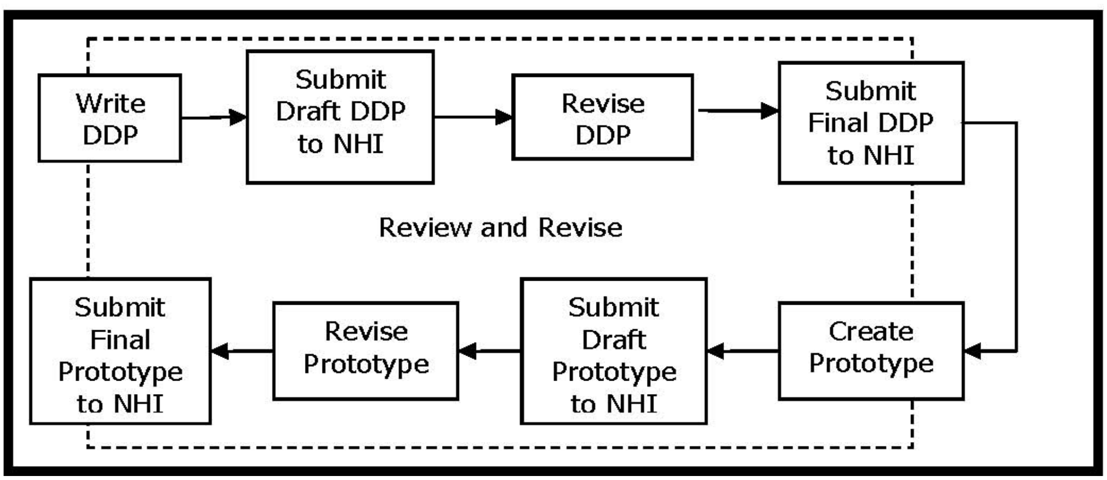


Figure 2.2 - 2 depicts primary tasks and deliverables within the Design phase, with review and revision occurring throughout the phase.

Figure 2.2 - 2



Detailed-level Design Plan (DDP)

NHI requires designers/developers to develop a DDP. The purpose of the DDP is to indicate to NHI how the content will map to the objectives and how the content will be presented, practiced and tested. Using the content outline and the content in the HIP, projected timelines for tasks and milestones are also developed.

The DDP template contains the following information:

- 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)
- Instruction treatment of content
- Graphical treatment of content
- Specific use of audio and/or video if recommended
- Description of any pre-work and homework assignments
- Course duration, by module (revised estimate)
- Evaluation methodology
- Identification of prototype content

DDP Approval Criteria

The draft DDP should be submitted to NHI in an MS Word file. All NHI feedback to the draft DDP will be incorporated into a Final DDP.

Prototype

Also as part of the Design Phase, NHI requires a short (approximately 20 slides) prototype in PowerPoint. The purpose of the PowerPoint prototype is to illustrate:

- Learner-directed approach
- Creativity
- Accuracy of content
- Writing style
- Adherence to standards
- Use of blended elements (e.g., asynchronous WBT elements)

Prototype Approval Criteria

Ideally, the prototype would be delivered in the Web conferencing tool and presented during a synchronous Web meeting. If this is not possible, NHI will review a PowerPoint file. A feedback session will be facilitated to obtain NHI feedback, which will then be incorporated into a Final Prototype, delivered to NHI as a .ppt file.

Development Phase

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

Figure 2.3 - 1

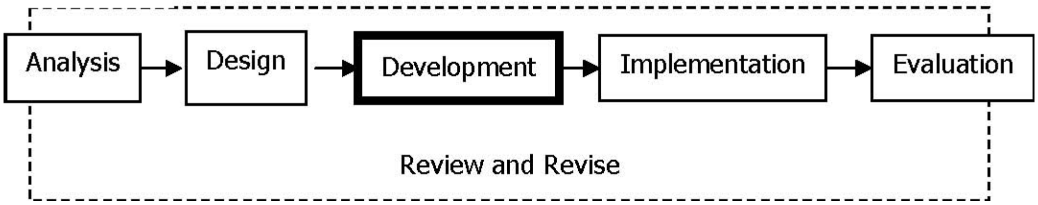
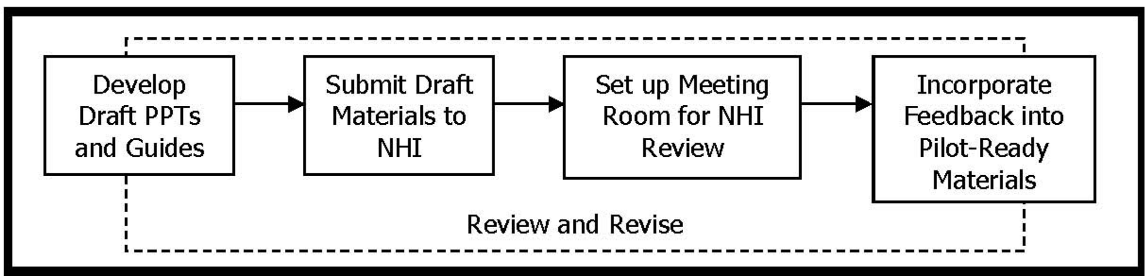


Figure 2.3 - 2 depicts primary tasks and deliverables within the Development phase, with review and revision occurring throughout the phase. One module is one review set. The development process should be repeated for each module in the course and the end-of-course exam.

Figure 2.3 - 2



Draft PowerPoint Slide Presentation

The designer/developer will create a set of draft PowerPoint slides that references the Web conference tool (e.g., Acrobat Connect Professional pod types and content of the proposed pods). The slides will be developed in accordance with the NHI-approved final DDP, using the standard NHI WCT PowerPoint template.

Draft Guides

The designer/developer will create a draft Facilitator Guide (FG) and Draft Participant Workbook (PW) using the NHI-provided templates. In the Notes page of each slide, the designer/developer will provide the Facilitator's script (verbatim). In the Facilitator Guide, the designer/developer will provide:

- Interaction types
- Facilitator cues
- Participant cues
- Any other notes to the Facilitator (e.g., additional resources, sources of content)

Each draft guide should be delivered as a separate MS Word file. If there is an end-of-course exam, it should be developed using the standard NHI End-of-course assessment PowerPoint template and delivered as a .ppt file. The end-of-course assessment key should be delivered as a separate MS Word file.

The designer/developer will submit the draft PowerPoint files, draft MS Word Facilitator Guide and draft MS Word Participant Workbook to NHI for review and comment. The designer/developer will set up the Acrobat connect Professional meeting room for NHI to review the draft materials.

The following file naming conventions are to be used for the draft deliverables:
The title of the module should be abbreviated in the file name.

Draft Deliverable	Naming Convention
Each module .ppt file	Course Number_Module Title_Draft_MonthYear
Course exam .ppt file	Course Number_Title_Exam_Draft_MonthYear
Each ancillary file	Course Number_Module Title_Prework_Draft_MonthYear
Facilitator Guide	Course Number_Title_FG_Draft_MonthYear
Participant Workbook	Course Number_Title_PW_Draft_MonthYear

NHI will provide written, consolidated feedback, which the designer/developer will incorporate into the materials to create the pilot-ready version of all course materials.

Implementation Phase

NHI will coordinate and conduct a pilot of the WCT with representative members of the target audience.

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

Figure 2.4 - 1

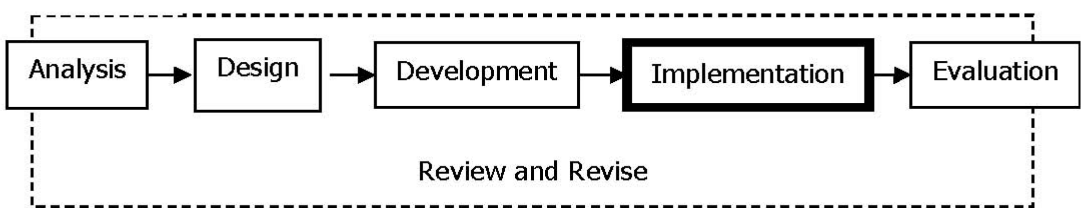
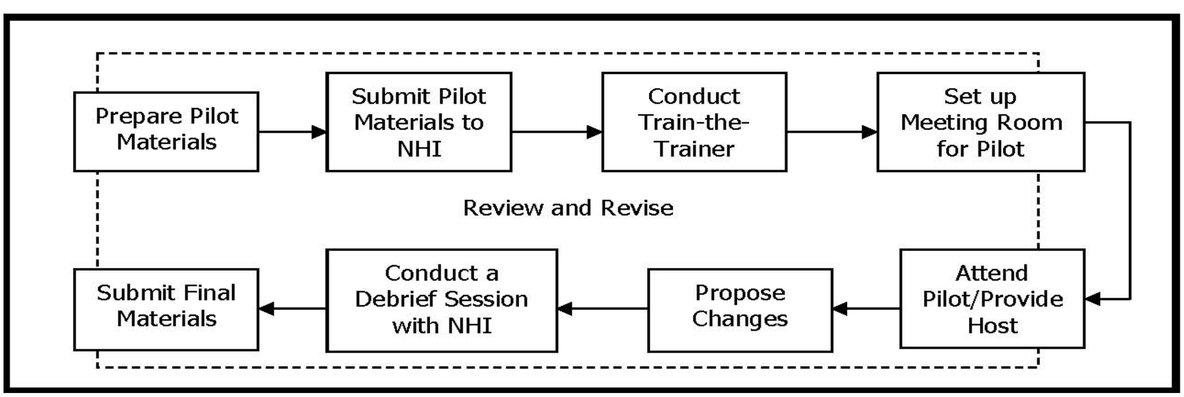


Figure 2.4 - 2 depicts primary tasks and deliverables within the Implementation phase, with review and revision occurring throughout the phase. The course, including the end-of-course exam, is used for the pilot test. Upon completion of the implementation phase, the course is ready for widespread delivery.

Figure 2.4 - 2



Pilot-ready Materials

The designer/developer will create:

- Pilot-ready Facilitator Guide, using NHI-provided template, that includes embedded PowerPoint slides with Facilitator script, preparation steps and instructional activity
- Pilot-ready Participant Workbook, using NHI provided template
- Any ancillary material as recommended in the Detailed Design Plan

The following file naming conventions are to be used for the pilot-ready deliverables:

Pilot Deliverable	Naming Convention
Each module .ppt file	Course Number_Module Title_Pilot_MonthYear
Course exam .ppt file	Course Number_Title_Exam_Pilot_MonthYear
Each ancillary file	Course Number_Module Title_Prework_Pilot_MonthYear
Facilitator Guide	Course Number_Title_FG_Pilot_MonthYear
Participant Workbook	Course Number_Title_PW_Pilot_MonthYear

The designer/developer will conduct a Train-the-Trainer session for the course Facilitator. The designer/developer should set up the Acrobat Connect Professional meeting room and attend the pilot. The designer/developer will propose changes to the course based on a review and analysis of levels 1 and 2 feedback, and facilitate a debrief session with NHI. NHI will review the feedback and decide which feedback to implement and which to set aside.

Post-Pilot Updates

The designer/developer will create a set of final course materials that include all mutually agreed-upon changes resulting from the pilot. The designer/developer will create a final set-up of the Acrobat Connect Professional meeting room and post final deliverables to the room. The designer/developer will provide NHI three CD-ROMS with each CD containing all final deliverables, including source media files.

The following file naming conventions are to be used for the final deliverables:

Final Deliverable	Naming Convention
Each module .ppt file	Course Number_Module Title_Final_MonthYear
Course exam .ppt file	Course Number_Title_Exam_Final_MonthYear
Each ancillary file	Course Number_Module Title_Prework_Final_MonthYear
Facilitator Guide	Course Number_Title_FG_Final_MonthYear
Participant Workbook	Course Number_Title_PW_Final_MonthYear

Evaluation Phase

NHI evaluates both the course ware that was developed as well as the development process itself. Upon completion of the courseware evaluation, the design/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 – 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 - 1

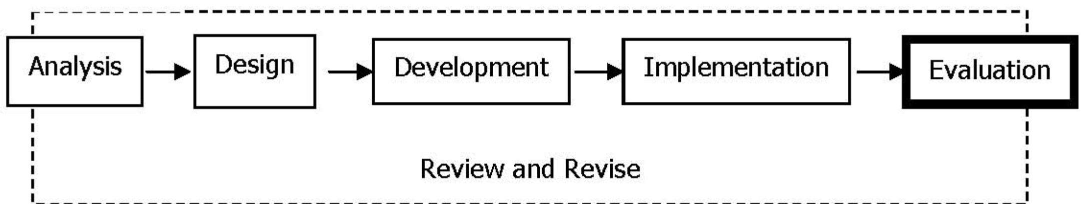
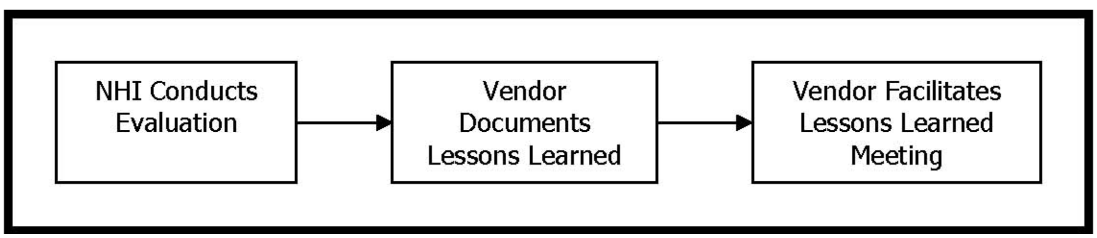


Figure 2.5 - 2



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 evaluation multiple modes of training consistently and its standing as an industry best practice.

NHI will manage the collection and analysis of Level 1 (learner reactions) and Level 2 (learner knowledge and skill acquisition) data.

Level	Requirement
Level 1	• During the development process, NHI establishes a URL that learners use to access an online Level 1 evaluation form. It is the responsibility of the vendor to acquire the URL from NHI • Prior to the end of a WCT synchronous session, the Facilitator opens a Web pod that includes a link to the online NHI WCT Level 1 Evaluation. Learners complete the online course evaluation during the actual synchronous session (this encourages submission of evaluations) • If there is no end-of-course exam, a link to the online NHI WCT Level 1 Evaluation should be placed in a Web pod. Time should be built into the course for participants to complete this evaluation before the end of the synchronous session
Level	**Requirement**
Level 2	• 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 assessment • Most end-of-course assessments that re part of the WCT learning solution will be developed in Adobe Presenter • Learners may take the test only once. If they do not pass the test, they must retake the course • Scores reside in the FHWA online learning management system. Data is then sent to NHI's system of record, known as CMTS (central recordkeeping database) • The traceability of the Level 2 evaluation must be document prior to the completion of the course development
Level 3	• Not required by policy • NHI welcomes discussion of performance evaluation at level 3
Level 4	• Not required by policy • NHI welcomes discussion of performance evaluation at level 4.

Course Evaluation Based on Pilot Data. NHI will collect Level 1 and Level 2 evaluation data during the pilot. A report will be sent to the designer/developer for review, analysis and formulation of recommendations.

Process Evaluation

The designer/developer will coordinate and facilitate a one-hour Lessons Learned meeting within two weeks of project completion. The meeting may be held virtually. The designer/developer will document lessons learned and submit a brief Lessons Learned document in MS Word addressing what was done well and area needing improvement for:

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

Instructional Design Standards

General Standards

NHI believes that learners can direct their own learning experiences and that instructors facilitate the experience. Based upon this belief, NHI WCT courseware should be designed to minimize lecture (i.e., PowerPoint slide presentation bullet points, supplemented by lecture) and to maximize learner application of new ideas during online sessions. WCT designs should place knowledge-based content in offline pre-reading or homework assignments, provided as MS Word documents, web site links, or self-paced asynchronous online tutorials (created in Adobe Presenter). The focus of group-facilitated WCT sessions should be on clarification of concepts and application of new ideas and skills to real work situations. NHI WCT learners are expected to take an active role in their own learning, with guidance from a Facilitator.

When developing WCT, use the following general standards:

- Focus on job-relevant content that can be applied immediately on the job
- State course outcome(s), agenda and housekeeping issues at start of Module 1
- Design modules that are no more than 30 minutes in duration (approximately 25-35)
- State learning outcomes clearly and succinctly (at course and module levels)
- Provide estimated completion time on the module welcome slide
- Place instructions on how to interact with the Facilitator and/or other learners in the Notes Pod (use NHI-provided standard learner cues and corresponding graphics)
- Use custom illustrations to teach complex concepts
- Use royalty-free graphics and photographs to add visual interest
- Include a module summary slide; end each module with a summary slide that summarizes the content and ties it back to the relevant learning outcomes
- Provide a verbatim Facilitator script in the Facilitator Guide (see Facilitator Guide template); provide introductory statements, transitional statements, and summary statements as needed to ensure a coherent flow across pages
- Provide Facilitator cues (e.g., display a pod, open the whiteboard overlay toolset). See Facilitator guide template for formatting of Facilitator cues
- Develop non-graded practice exercises (quizzes) at the module level. Review questions and correct answers. Allow practice of eery terminal learning objective for that module
- Develop a graded, course-level assessment; test every terminal learning objective (create one separate PowerPoint file for every assessment)
- Place a link to the course certificate in a Web links pod (in the Housekeeping layout in the default meeting room)
- End the course-level assessment with a summary slide that reiterates the course goals and instructs learners to complete the Level 1 course evaluation (provide link to online Level 1 evaluation)

Interactivity

Levels of Interactivity

Interactivity should be used throughout the course to engage learners and allow them to practice applying the information whenever possible. The level of interactivity to be provided in the course ware is documented in the High-level Design Plan (HDP).

NHI uses the following definitions to describe the degree of interactivity that will be included in courseware:

NHI understands that decisions on the degree of interactivity in any e-Learning product are based upon relative importance of the content, budget, timeline, shelf life, and audience size. If lecture is used, NHI expects learners to interact with the Facilitator and/or each other every three-four slides (i.e., two-three minutes).

Note: It may be appropriate to design modules within the same course for different levels of interactivity (e.g., one module may focus on foundational principles and another module may use complex, branched case studies for application of those principles; the foundational module might be developed at a low level, whereas the application module might be

Level of Interactivity	Description	The learner may:	After completion, the learner will be able to:
Low	**Information** Web Conference relies primarily on lecture to convey information to participants.	View a PowerPoint presentation or demonstration as primary instructional method; respond to a poll; select status icons; ask questions via chat pod or telephone.	• Define • List • Recognize
Medium	**Knowledge** Web Conference is designed such that participants actively engage in the learning experience. Peer-to-peer knowledge sharing is highly encouraged. No more than half the Web conference relies on lecture.	View a PowerPoint presentation as just one instructional method; actively participate in discovery activities such as Web scavenger hunt, brainstorming/prioritizing, practice using software and scenario-based problem-solving. Paired or small group activities may be used.	• Describe • Explain • Identify • Interpret • Apply • Use
High	**Performance** Web Conference simulates real-world situations, to the greatest degree possible. Minimal lecture is used.	Take a virtual tour, work on a case study, edit a document, and participate in a role play. Small group assignments (conducted in multiple virtual break-out rooms) are often used.	• Analyze • Compare/Contrast Design • Formulate • Construct • Appraise • Evaluate

developed at a high level.

Use of Offline Assignments

Learners may be expected to read or view knowledge-based content (i.e., facts, concepts, and principles) on their own time, as preparation for an online WCT session or as a follow-up assignment. This design approach makes the best use of the actual online synchronous session because the Facilitator is not lecturing on material that could have been read by learners in advance. During a synchronous session, the Facilitator is able to challenge the learners to reflect upon what they have read and to apply it to their own unique job requirements. Learners can focus on why, where, when, and how to apply knowledge-based content.

Knowledge-based content can be presented to learners as a reading assignment (document or Web site) or as an asynchronous WBT (i.e., Adobe Presenter piece).

The learners will locate all course-related documents in the File Share pod. Items available to learners may include, but are not limited to, the following:

- Course welcome document (agenda, expectations, assignments, ground rules, policies, Facilitator contact info)
- Pre-work
- Homework
- Class roster
- PowerPoint files
- Participant Workbook

The Facilitator Guide must include the following:

- Preparation activities (modify the boilerplate in the template, as necessary)
- Sample Facilitator-to-learner e-mail (sent to learners 10 days prior to the session start date)
- List of items that are to be made available to learners prior to the start of the course

Use of Interactivity to Present Instruction and Enable Practice

- Include a wide variety of interaction types to keep learners engaged throughout the course, such as:
    - Polls (opinion, multiple choice and multiple/multiple choice)
    - Chat
    - Notetaking
    - Whiteboarding
    - Group discussion
    - Small group chats
    - Links to external resources
    - Demonstrations (e.g., of software applications)

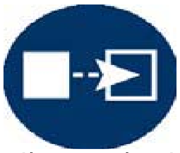
- Allow learners to do some of the presentation or some of the on-screen notetaking or whiteboarding
- Engage learners as frequently as possible through the use of interactive practice exercises (e.g., a polling {opinion} slide, multiple-choice question {using a variety of tools}, verbal question/answer, written question/answer)

Interaction Types

NHI encourages the use of a wide variety of interaction types, sprinkled throughout each module. A rule of thumb is that participants should interact with the Facilitator and /or each other (other than asking ad hoc questions) at the conclusion of each logical chunk of instruction (e.g., at the end of a topic or at the end of a learning objective). From a time perspective, participants should have a meaningful interaction every 3-4 slides or 3-5 minutes during a lecture-based segment of an online presentation.

To cue both the NHI Facilitator (e.g., to open a pre-developed polling question) and the participants, NHI has created a series of icons to represent interaction types. The icons, along with links to tutorials on how to use them, where available, are provided below:

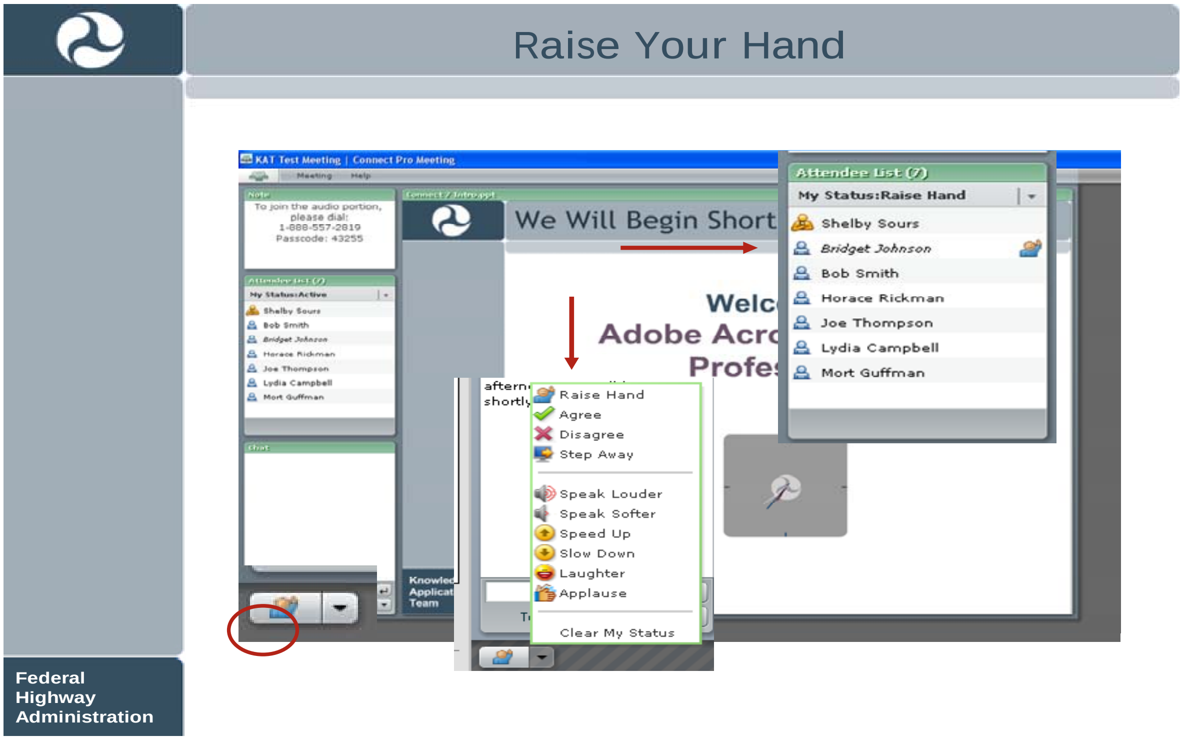
Feature	Purpose	The Facilitator can use the feature to....
 Phone Icon	Allows all attendees to communicate verbally during the course of the meeting.	• Facilitate introductions • Ask/answer verbal question(s) • Explain new ideas, concepts, methods • Encourage learners to answer each other's questions
 Status Icon	Allows all attendees to share their status by setting "emoticons" that signal the attendees without interrupting the flow of the course.	• Check for understanding or agreement • Survey participants • Solicit feedback on facilitation of meeting http://fhwa.acrobat.com/attendeelist
 Web Icon	Allows Facilitator to post specific sites and automatically link attendees to those sites for viewing or exploration.	• Share new content or resources • Instruct participants to search for information
 Chat Icon	Allows all users to communicate during the conference via text message. Messages can be sent to everyone or select attendees.	• Ask/answer open-ended question(s) • Post hyperlinks to Web sites • Provide further info to select attendees • Encourage attendees to share ideas with each other • E-mail contents of the pod https://admin.acrobat.com/chat
 Poll Icon	Allows Facilitator to ask questions of attendees and display results.	• Ask multiple choice questions with one, or more, correct answer(s) • Gather opinions (i.e., conduct a survey) • Prioritize a list of text items http://fhwa.acrobat.com/poll
 Share Icon	Allows Facilitator to share a document, an application or his/her computer screen (desktop, window or application).	• Demonstrate software • Share a view of your computer files • Allow another attendee to access his/her computer • Collaborate on a document • Navigate through a website http://fhwa.acrobat.com/viewshare

Feature	Purpose	The Facilitator can use the feature to….
 Whiteboard Icon	Allows Facilitator and attendees, with permission, to type or draw in order to create new content or edit existing content displayed on the screen.	•Edit illustrations, such as diagrams, charts, documents, maps, photographs • Record participant responses • Create visual examples http://fhwa.acrobat.com/whiteboard
 File Download Icon	Allows attendees to download documents from the meeting room to their computers.	• Share documents in formats that cannot be displayed in a Share pod (e.g., Word, .pdf, Excel, zip) • Post Participant Guide, pre- and post-assignments, agendas, and resource materials http://fhwa.acrobat.com/fileshare
 Note Icon	Allows Facilitator and attendees, with permission, to type and display new content.	• Capture discussion points • Provide a way for small groups to document their results • E-mail contents of the pod http://fhwa.acrobat.com/note

Developers have the option of crating a separate WBT that would allow participants to move through "knowledge checks". The WBT would be posted as a separate web link. However, this option should be used sparingly because of the increased download time required. Refer to the WBT Standards Guide, Embedded Practice and Knowledge Checks settings, for further information. The WBT Standards Guide can be found at:
http://www.nhi.fhwa.dot.gov/resources/wbt_developer.aspx

Status Icons in Attendee List Pod

The following status icons are available in the lower left corner of the web room. When the status icons are used by the Facilitator to get feedback from the participants (i.e., Facilitator asks participants to use this feature), the icons below should appear on the PowerPoint slide as answer choices. The meaning of the status icons may be changed, as needed. In this case, a text label must be added to the status icon to indicate its altered meaning. For example, the thumbs up status icon might mean, “I agree” and thumbs down status icon might mean “I disagree”



Learner Assessment (End-of-Course Exam)

If an asynchronous end-of-course exam is required, use Adobe Presenter Quiz Manager to create the exam as one quiz with multiple questions in a separate PowerPoint file. 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.

The End-of-Course Exam Template can be found at
http://www.nhi.fhwa.dot.gov/resources/wbt_developer.aspx

Step	Action
1	Open the **Quiz Manager** window by selecting **Adobe Presenter → Quiz Manager**.
2	In the **Quiz Manager** window, select the **Reporting** tab, then select **Enable reporting for this presentation.** Set the following: • **Learning Management System: Adobe Presenter** • **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** Select **OK**
3	In the **Quiz Manager** window, select the **Default Labels** tab, and set: • In the **Default question button labels** section: o Submit button text: **Submit** o Clear button text: **Clear** • In the **Default question feedback** section: o Deselect **Correct message.** o Deselect **Incorrect message.** o Deselect **Retry message.** o 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	In the Settings section: • Deselect **Allow backward movement** • Deselect **Allow user to review quiz** • Select **Show score at end of quiz** • Deselect **Show questions in outline**
10	Select **Pass/Fail Options** tab and: • 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: o Set **Allow user** to **1 attempts** o Select **Go to next slide** form the **Action** dropdown
	Select OK to close the **New Quiz** window

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	Select the type of question indicated in the storyboards, then select **Create Graded Question**. **NOTE**: The type of question used in this example is Multiple Choice. The inputs are similar for other types of questions, unless noted.
3	In the **{Type} Question** window, the **Question** section is similar for all questions types. Set the following: • **Name** field: Learning Outcome {x} • **NOTE:** Indicate which Learning Outcome/Objective the question addresses. • **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. **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.
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	Select the **Options** tab, and set the following: • In the Type section: o Select **Graded - there are right and wrong answers** from the o Deselect **Show clear button** • In the If correct answer section: o Select **Go to next slide** from the **Action** dropdown o Deselect **Show correct message** • In the If wrong answer section: o Enter **1** in the **Allow user** field **NOTE:** Set to **1** for all question types in the end-of- o course exam. o Select **Go to next slide** from the **Action** dropdown o Deselect **Show error message** o Select **Show incomplete message**
8	Select the **Reporting** tab and select **Report answers**, then: • 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**.

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	• 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	• Set answer font to **Trebuchet 12 pt** • Set **RGB color 0, 61, 125** on the CUSTOM tab in the colors dialog box
3	Format answers • 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 "word wrap text in auto-shape"'. 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 **SHIFT**. Complete for every line of text
4	Format response boxes • 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 colo**r 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 • 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.

Quality Assurance (QA)

This section describes NHI's expectations for quality assurance efforts performed by design/development teams.

It is NHI's expectation that the development team will conduct quality assurance testing on all deliverables prior to submission to NHI. Quality assurance is to be performed on all draft and final deliverables from each phase of the ADDIE process.

In particular, NHI expects the development team to:

- Ensure that all teaching and testing strategies comply with the standards provided in this Guide
- Ensure that all text complies with the standards provided in this Guide
- Ensure that all media complies with the standards provided in this Guide
- Conduct Alpha test prior to submitting Beta PowerPoint files for customer review
- Conduct thorough quality assurance testing on Draft, Pilot-ready, and Final versions

The role of NHI is to review for content accuracy. NHI expects the design/development team to ensure — through thorough quality testing — compliance with this Guide and Section 508.

Media Standards

This section defines the standard look and feel for NHI WCT courseware. These standards are used to maintain style consistency within the following areas:

- Slide Design
- Slide Text
- Graphics
- Slide Transitions
- Animation
- Audio
- Video

Slide Design

Use the following standards for general page design:

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

Slide Text

Use the following standards for text layout:

- Present information in a top down, left to right instructional format
- Limit the amount of text on screen
- Use short lines of 40-60 characters; maximum of 60 characters per line
- Design text layout in short segments or phrases
- Use bullets, numbered lists, tables and charts to break up textual content
- Line up text under the first letter in any bulleted list, if the bulleted text wraps to a second line
- Left justify text

Text

Use the following standards for text:

- Use consistent color for text and graphics throughout the course
- Use Trebuchet 32-point bold for course title
- Use Trebuchet 28-point for slide header text
- Use Trebuchet 26-point bold for subheadings (in the instructional area of a slide)
- Use Trebuchet 24-point for content text
- Use Trebuchet 24-point for first level bullets
- Use Trebuchet 22-point (or 20-point) for second level bullets
- Avoid the use of third-level bullets
- Use Trebuchet 16-point for participant instructions on a slide
- Break up blocks of text to make it easier for learners to scan the content
- Underline hyperlinks only
- Use standard Web conventions for hyperlinks (not yet selected, currently being selected, already accessed)
- Use bold font to emphasize words or phrases
- Avoid text orphans (one word on a line)

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

Graphics

Use the following standards for illustrations and photographs:

- Use an NHI-provided standard WCT color palette (provided at project onset)
- Establish and maintain a convention for the use of color(s) to denote meaning; do not use color as an instruction cue
- Maintain a constant perspective in a series of visuals
- Do not include contractor or corporate logos in the courseware
- Avoid graphics that may become outdated in a short time
- If using clipart, verify if 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, the capability to expand it must be provided so that all text is readable
- 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)
- Include Alt tags
- Deliver raw files to NHI as compressed, processed files and .PSD with layers preserved

Slide Transitions

Do not use slide transitions (e.g., dissolving, fading, or wiping). They are difficult for assistive technology for the visually impaired to manage.

Animation

Use the following standards for animation:

- Use special effects when required for emphasis or transition (Flash or PowerPoint animations)
- Do not use any special effects that detract from learning
- Use animation to display concepts that are difficult to describe in text
- Ensure that assistive technology for the blind can effectively manage animations
- Do not use blinking graphics or text
- Deliver raw file built in Flash to NHI as .fla.

Audio

Use the following standards:

- Use audio judiciously (e.g., to demonstrate interpersonal skills, to demonstrate sounds heard on the job, to engage learners — such as providing a talking coach)
- Provide verbatim text that matches audio script
- Ensure that audio volume levels are consistent throughout the course
- Use one audio talent to narrate the course. If role-laying, multiple voice talent may be used, but roles must be consistent
- Use sound effects only when they help to convey the content
- If audio is recorded outside of the Adobe Presenter tool:
    - Deliver raw audio files to NH as wav or MP3
    - Recommended audio editing tool is Adobe Premiere, but others are acceptable as long as the final product is .wav.

Video

Use the following standards to select video for courseware:

- Use video to reinforce, clarify or emphasize a specific behavior or performance objective that cannot be effectively taught using graphics, stills, photographs or animation
- 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)
- Because buffering problems tend to hinder streaming media performance, where possible, avoid traditional techniques such as zooming, panning, transitional wipes, dissolves, and fast motion subjects
- Video must be captioned to comply with accessibility requirements
- Deliver raw files to NHI as compressed digital files — .mpeg, .flv, .wav or .avi

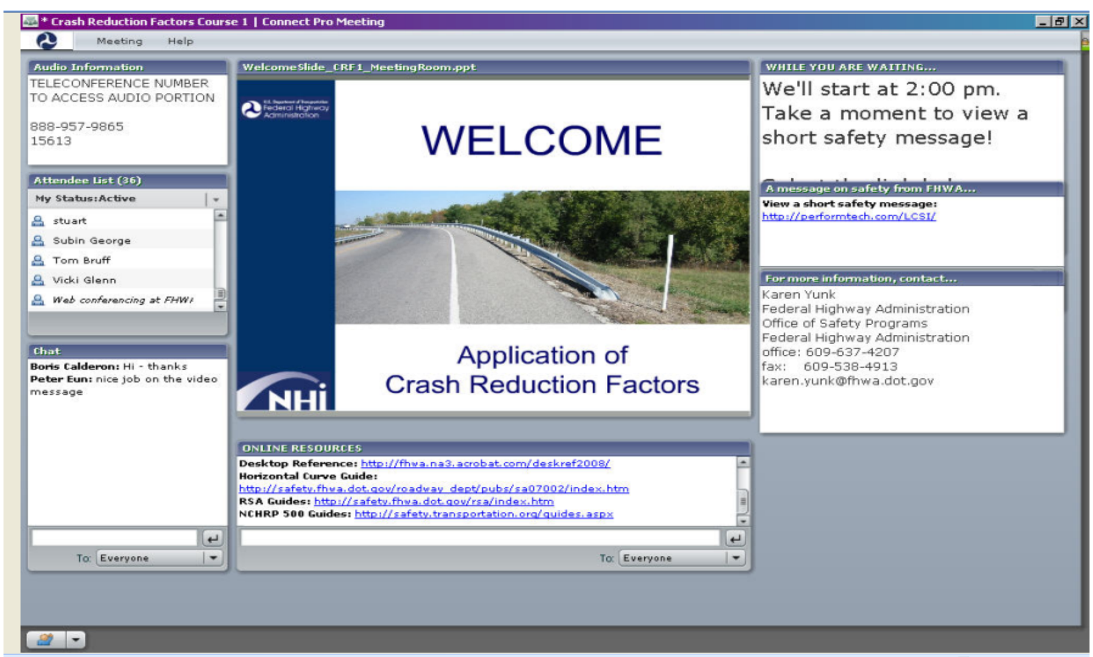
Best Practices for WCT Design

The following information provides examples and references to guide and assist in the design of WCT.

Splash Slide

The splash slide appears as the first slide of Module 1. The course splash slide lists the title of the course. This slide should be visually engaging; a content-relevant graphic should be used. The month/year of the date upon which the course is final (ready for implementation) should appear on the final PowerPoint slide deck. The NHI course number should appear as shown in the sample below. The color and size of fonts may change to accommodate the visual.

Splash Slide



Facilitator Introduction Slide

The Facilitator introduction slide provides a photograph of the Facilitator(s), as well as their title(s) and the name of the organization(s) for which the Facilitator(s) works. More than one Facilitator's information may be provided on the slide, as long as the slide does not become too busy. If necessary, more than one slide maybe used.

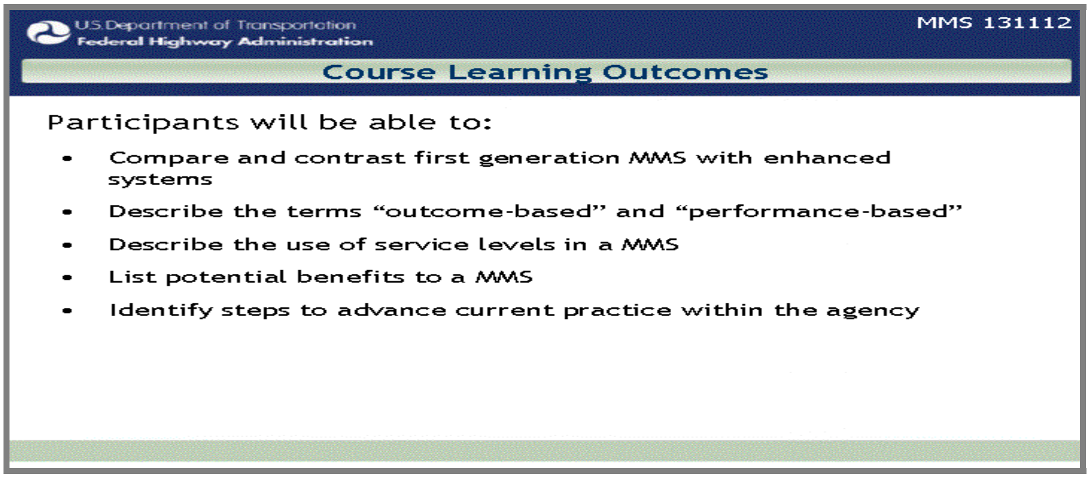
Facilitator Intro Slide

Learning Outcomes Slide

The learning outcomes slide lists the terminal learning outcomes (i.e., learning objectives). The corresponding script should provide embellishment on each outcome.

The module learning outcomes slide simply lists the learning objectives for the module. The corresponding script should paraphrase the objectives and explain how the Facilitator will be presenting content (overall instructional strategy of the module, eg., offline reading/online discussions, lecture followed by exercises, case study, game, storytelling, progressively-built diagram or process flow diagram).

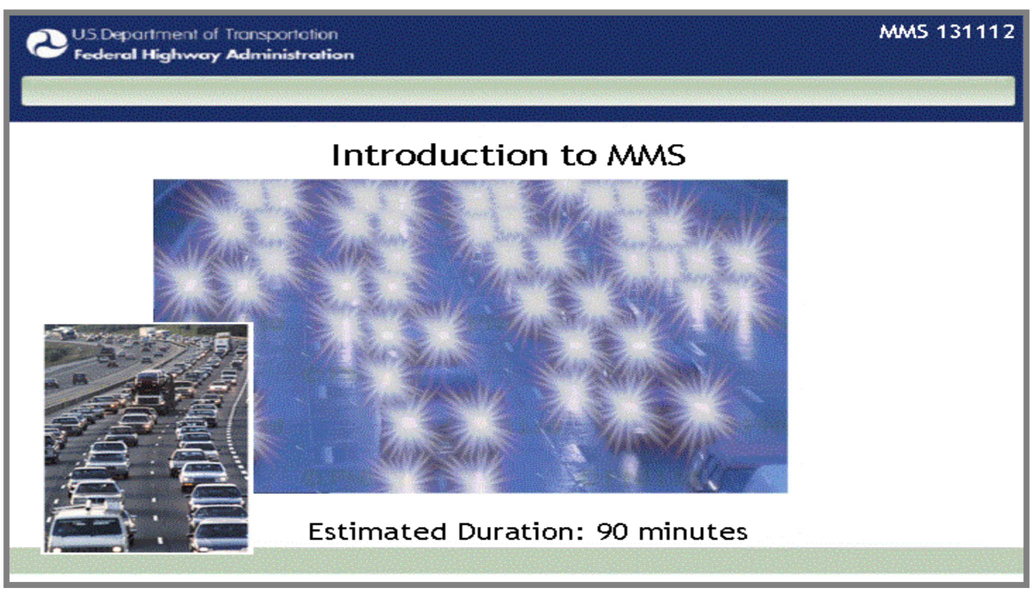
Learning Outcomes Slide



Transition Slide

A transition slide provides information — textual or graphical — that either seques into the next area of content or provides a teaser about the next area of content. It provides a cue to the learners that the discussion is switching to a new topic.

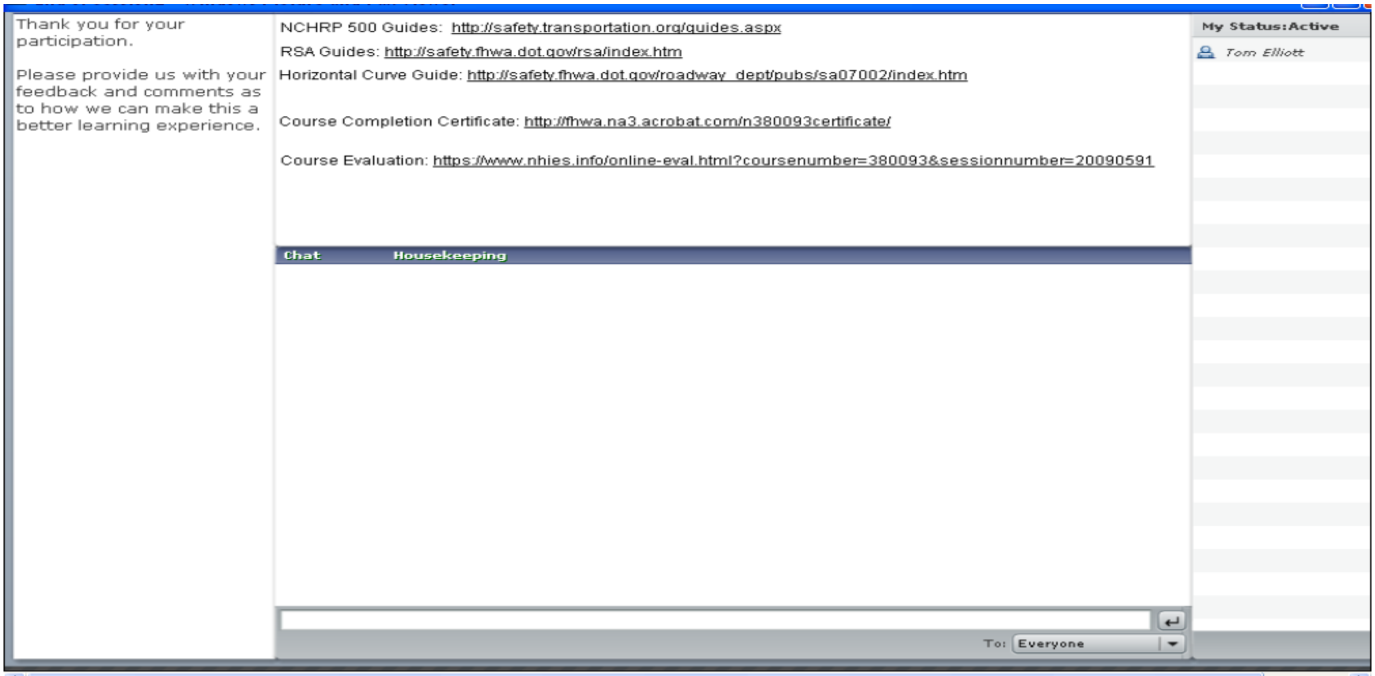
Transition Slide



Summary Slide

A summary slide neatly wraps up the information just learned by listing major topics addressed or providing a closing statement for that topic.

Summary Slide



Community of Practice

The Community of Practice (https://ksn.faa.gov/km/teams/lms/WBT/eLCOP) is an online meeting place provided by FHWA for the community that develops WBT and WCT for the highway transportation workforce. You can ask or respond to questions in the discussion forum, view resources such as instructional strategies for online learning in the reference section, view works in progress, and access a directory of individuals.

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.

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

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 (http://people.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.
(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

Participant and Facilitator Preparation

NHI equips WCT participants and Facilitators as follows:

Participants	Facilitators
Short synchronous tutorial on features of Acrobat Connect used during Web conferences (slide deck presented by the Facilitator at start of a session)	Toolkit for WCT Facilitators (available from NHI's web site http://www.nhi.fhwa.dot.gov/resources/wct_faciltator.aspx
Link to Adobe's web site (provided in the confirmation email) www.adobe.com	Online library of short "how to use Acrobat Connect Professional" tutorials http://fhwa.acrobat.com/wctutorials
	Instructor Development course for WCT Facilitators http://www.nhi.fhwa.dot.gov/rescources/wct_developer.aspx
	Link to Adobe's web site (provided in the confirmation email) www.adobe.com

A copy of all written documentation and training materials is available upon request.

Acronym List

The following acronyms have been used in this document.

Acronym	Definition
ADDIE	Analysis, Design, Development, Implementation, Evaluation
CEUs	Continuing Education Credits
CMTS	Central Recordkeeping Database
DDP	Detail-level Design Plan
FHWA	Federal Highway Administration
FG	Facilitator Guide
HDP	High-level Design Plan
IACET	International Association for Continued Education and Training
ISD	Instructional Systems Design; Instructional Systems Designer
NHI	National Highway Institute
PW	Participant Workbook
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
WCT	Web Conference Training