U.S. Department of Transportation
Federal Highway Administration

Office of Technical Services

national highway institute

NHI Web-Based Training Standards Guide

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Introduction

Purpose

The purpose of this document is to provide a high-level overview of the National Highway Institute (NHI) standards for web-based training (WBT) deliverables.

Any deviations from the standards in this document must be addressed and approved with the NHI Contracting Officer's Representative (COR) before performing work or delivering a product.

General WBT Development Guidance

The following are general standards for NHI WBT development:

- Provide interactive and creative training that adheres to the course learning outcomes. (Note that course assessments must be clearly tied to course learning outcomes.)
- Provide learners with information in the fewest steps and shortest time possible. (Duration is measured by the amount of time it takes an average learner to read through all the presented material, access provided options, answer knowledge checks, and listen to all included audio.)
- Convey content in plain and direct language using simple terms and active voice.
- Provide modules or lessons that are chunked logically and do not exceed 60 minutes per Shareable Content Object (SCO).
- Maintain module consistency in terms of formatting, layout, etc.
- Create a desire to learn by beginning each module with something compelling, such as opening screens that illustrate the relevance of the content to the learner with a thought-provoking question or anecdote.
- Include transitions to ensure coherent flow between screens.
- Correlate information on the screen to the slide title.
- Address one concept, procedure, or item of instruction on each screen.
- End each module with a summary that recaps the content and ties it to the learning outcomes.

Development Tools

Development tools must be commercial off-the-shelf (COTS) software and capable of creating WBT content that is Section 508-compliant, SCORM-compliant, HTML5-compatible, and can operate successfully on FHWA's Adobe Connect server.

Contractors must obtain their own development software licenses.

Section 508 Compliance

All final deliverables, as specified in the contract or task order (TO), must be Section 508-compliant. Refer to https://www.section508.gov/ for additional information.

Hosting Site

All NHI WBT courseware resides on the FHWA Adobe Connect server at the following URL: https://connectdot.connectsolutions.com.

NHI will grant developers access to a sandbox area on this Connect server for testing purposes.

Courseware Testing

The developer must ensure compliance with NHI standards, SCORM, and Section 508. To support compliance and confirm an acceptable product, NHI follows a testing process that requires the following:

- Testing on all supported operating systems and browsers
- LMS integration testing
- Quality control testing on published versions of the prototype and the complete Alpha, Beta, and Final courseware

Developers should refer to the contract or TO for any specific testing requirements or modifications to this process.

Additional Guidance

You should also consult the NHI Style and Standards Guide found on the **Developing an NHI Course** page of the NHI website:

https://www.nhi.fhwa.dot.gov/resources/intro_developing.aspx

Standards for NHI Web-Based Training

Graphical User Interface (GUI)

Note: Developers will have access to NHI samples and templates as a baseline. Contractors are encouraged to incorporate their own modifications, while holding to the basic standards and requirements specified in this document and in the project TO.

Media standards are used to maintain style consistency within the following areas:

Screen Design

- Establish a specific location for the presentation of instructions, completion times, and prompts.
- Provide recurring information in consistent locations.
- Use white space to separate blocks of text.
- Use varied layouts to present text and images in order to add visual interest.
- Create the shortest module titles needed to convey meaning.

Text Layout

- Present information in a top-down, left-to-right instructional format.
- Lay out content so a screen reader will read the text and the alt tags in the correct reading order.
- Select a layout for each slide and insert text or graphical elements into a placeholder on the layout.
- Design text layout in short segments or phrases.
- Break up blocks of text to make it easier for the learner to scan the content.
- Use bullets, numbered lists, tables, and charts, instead of lengthy sentences.

Navigation

Use consistent navigation standards to promote learner satisfaction and retention. The following standards apply to all Web-based courseware:

- Ensure intuitive, learner-controlled navigation.
- Add Back and Next buttons directly to each slide—not on the master slide.
- Ensure buttons have text description labels (alt text) that include the button text (e.g., “Back”)
- Display navigation buttons in the same position on every page.
- Ensure that mouse cursor changes and rollover highlights are consistent within a course.
- Add other navigational buttons, as appropriate. Make buttons, such as Submit and Clear, consistent within each course.
- Ensure that navigation elements provide reference access to learners. Examples include Resources, Help, and Glossary.
- Provide clear instructions or cues for all required learner activities.
- Allow modules to be completed in any order unless the instructional design requires sequential accomplishment. If sequential accomplishment is required, provide instructions to the learners.
- Describe internal links in the narration. For example: “For more information, please navigate to slide 38.” Otherwise, place linked slides directly after the slide that references it so that a user navigating with only the keyboard can access the information in a logical way.
- Describe any external links in the slide narration.
- Use external links sparingly so learners are not distracted from primary content.

Section 508 Considerations

- Meet all Section 508 requirements for eLearning.
- Access the most current government guidance at https://www.section508.gov.

Font

Follow NHI general standards for readability as found in the NHI Style and Standards Guide.

Media

Media standards provide a consistent look and feel to courses. They also increase the likelihood that the media will function as intended on the training platform.

For each module, use the most suitable medium to support and reinforce the subject material or interactive components. Media include computer graphics, photographs, audio, video, animation, and graphs or tables.

Graphics

Refer to the NHI Style and Standards Guide, for general graphics requirements.

- Use custom illustrations and interactions to teach complex concepts.
- Recreate tables and graphs wherever possible instead of inserting as an image. Scanned graphics should be avoided entirely.
- Use the most modern technology generally available to generate visuals, including computer-generated graphics.
- Be aware that any computer software required for the visual aids must be readily available; do not use proprietary software.
- Blur out brand names and logos from photographs.
- Ensure that alt text for charts and other complex graphics reflects their complexity. A sentence or two is not always sufficient.
- Data that is presented in a table must be accessible to a screen reader, provided in alt text, or explained in the surrounding narration. The information or data must make sense when presented in a narrative format. Redundant or repeated information should be presented logically and not simply repeated.

Audio

- Avoid phrases that are not meaningful on their own or apply only to a select group of users.
- Include a semi-colon after each item in a narrated list, add the word “and” after the penultimate item, and place a period after the last item. This ensures that a screen reader can identify the items as a list.
- Avoid special characters in the narration (notes) section; they do not always publish properly.
- Ensure audio volume levels are consistent throughout the course.

- Use one voice talent to narrate all modules within the same course. If role-playing, you may use multiple voice talent, but roles must be consistent.
- Build a consistent amount of audio silence at the beginning and end of every slide. Narration must not cut off abruptly.

Video

- In video content, avoid techniques such as zooming, panning, transitional wipes, dissolves, and fast motion subjects.

Animation

- Allow the user to control the animation, to include start, stop, and replay.

Interactivity

Exercises, calculations, skills practice, and other experiential work provide an opportunity to test understanding and relate training content to work-related scenarios.

It may be appropriate to design modules within the same course for different levels of interactivity.

Level of Interactivity	Description
Level I—Passive Interaction	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.
Level II—Limited Interaction	The learner makes simple responses to instructional cues. The responses may include answering multiple choice or true or false questions.
Level III—Moderate/Complex Interaction	The learner actively engages with the content using technically complex activities that support challenging instructional methods. Example: Building a model or diagram
Level IV—Advanced/Real-time/Full Interaction	The learner practices new skills, maintains full control over learning, and receives timely feedback. Examples: Interactive videos, virtual reality, simulations, gamified scenarios, avatars

Table 1: Level of Interactivity Descriptions

Learner Engagement

At NHI, we emphasize not simply “interactivity level,” but user **engagement**.

The table below outlines some low-cost techniques for designing quality Web-based training that achieves learner buy-in and engagement and results in improved learner retention at any level of interactivity. NHI regards these techniques as basic industry best practices that should not add to project cost.

DO's	DON’Ts
Capture Learner Attention	
▪ Capture the learner’s attention effectively. Provide opening screens that illustrate the relevance of the content to the learner with a thought-provoking question or contextual anecdote. ▪ Find ways to keep learners engaged and motivated throughout the training. Break the monotony of reading text on the screen. Use interactivities. Activate their thinking! ▪ Leave learners eager to open the next module and ready to follow the instructional path you have designed.	▪ Don’t rhetorically start with “Welcome to NHI.” Learners know they have signed up for a NHI course. ▪ Don’t overuse the multiple choice question style for Knowledge Checks and End-Of-Course Assessments. ▪ Don’t teach content; teach the learners!
Designing Bite-Sized Training	
▪ Chunk content into bite-size segments that are easy for learners to digest. Courses in general are often too long and result in content overload. Courses should be targeted and focused.	▪ Don’t include extraneous information, which leads to cognitive overload for the learner.
Using Media Effectively	
▪ Animate and use graphics whenever possible. Provide white space for aesthetic purposes. Place denser text and tables in a resources file. ▪ Use meaningful graphics. Images should be a visual representation of the message, graphically communicating the key point. ▪ Use videos and scenarios to depict situations if applicable, and be sure to guide the learner in what to look for.	▪ Don’t overwhelm learners with too much text on a screen. ▪ Don’t overuse graphics that are simply decorative.

DO's	DON'Ts
Using Text Effectively	
▪ When using screen text, focus on key words and phrases, not paragraphs. Screen text should capture the main gist of content, while the narration should provide the full context. ▪ Prioritize and emphasize key takeaways. ▪ Ensure that slide text and bullets do not conflict with the narration. It is confusing for the learner to hear one thing while seeing another. ▪ Especially for longer slides, use animation to sequence the appearance of text with narration. It's distracting for the user to see large amounts of text on screen before it is addressed through narration.	▪ Do not design screens that are filled with dense text. ▪ Do not introduce content on the screen, that is not explained in the narration.
Making the Connection	
▪ Include transitional narration to guide the learner from topic to topic or module to module. ▪ Make explicit associations to real life applications. ▪ Provide positives examples. For example, describe the before and after scenarios where a change was made at an intersection using data for Crash Modification Factors.	▪ Don't let 'Back' and 'Next' buttons be the only transition signal. ▪ Don't show only the bad examples from the transportation industry.
Making It Stick	
▪ In Knowledge Checks, explain right and wrong answers and point the learner back to the content source within the course for review (remediation). ▪ Provide learners with tangible takeaways, such as outlines, infographics, worksheets, workbooks, etc. Such tools should support engagement, helping learners to work with and through the content. For example, they should provide space for learners to take notes, space for learners to reflect on what they've learned, and activities that complement the training.	▪ Don't simply tell learners they got an answer right or wrong. ▪ When including a companion workbook, don't simply create a slide dump.

Assessments

NHI uses both formative and summative assessments for Web-based training. Formative assessments include knowledge checks. Summative assessments include end-of-course assessments and course evaluations.

Knowledge Checks

- Provide practice opportunities to reinforce each learning outcome concept or skill
- Include feedback on correct answers
- Scores typically not sent to LMS

End-of-Course Assessment

- Should be introduced by instructions that appear at the end of the course content and guide the user in how to locate and complete the assessment
- Created and published as a separate, stand-alone course content item (SCO)
- Never titled as a lesson
- Loaded to online curriculum
- Evaluates participants' mastery of the content
- Requires every question to be answered
- Sends answers to LMS to be tallied
- Provides final score to learner
- Uses randomization to scramble the order of question stems and distractors with each user attempt
- Includes instructions for any additional course completion requirements as needed

Note: The developer should submit to NHI a brief document that ties each assessment question to its respective course learning outcomes. Refer to your SOW for any additional details related to assessment construction.

Scoring and Feedback Requirements

NHI recommends that a score of 70 percent be required for passing status; however, please consult your TPM or COR for the specific requirements of your project.

In addition, the method for providing feedback on correct responses for the final assessment is also project-specific. Consult with your TPM or COR.

Section 508 Compliance of Assessments

Course assessments should be Section 508 compliant. A user should be able to navigate and pass the assessment without the use of a mouse. For this reason, drag-and-drop style questions are not compliant.

Question Formats

The following question formats may be used:

- Multiple choice
- Matching
- Completion or “fill in the blank”
- Short answer
- Likert
- Sequence
- Hot spot (user identification)
- True or False (if used, must only comprise ten percent of total questions)

Other testing types, including performance testing (skill demonstrations) and critical thinking (case studies), can be accommodated.

Course Evaluations

NHI assesses the participant's overall training experience using a standardized, online evaluation, which is accessible to participants via the NHI My Training page once they complete the training.

(NHI produces and administers this assessment. It is not the developer's responsibility.)

Including Evaluation Instructions in Courseware

On one of the final screens of the course, direct participants to the course evaluation link. A text example of directions to participants for accessing the course evaluation is shown below. This example "pass" slide would be viewed by the participant at the conclusion of the end-of-course assessment after receiving a passing score.

Conclusion
Congratulations! You have completed NHI-134109O Base and Subbase Stabilization and Repair WBT.
Return to the "My Training" page, as shown below, to complete a course evaluation and print a certificate of completion.

	Course Title	Course Number	Type	Purchase Date	Progress	Launch	Evaluation/ Certificate
+	Effective Target Setting	138013	WBT	2/8/2018	Completed	Launch	Take Evaluation View Certificate Download Certificate

Select the "X" in the upper right corner of your browser to close this module.

The developer also should create, within the assessment, a "fail" slide for instances in which the participant does not pass the end-of-course assessment.

You did not pass the end-of-course assessment.
Please return to "My Training" to re-take this assessment. You have a maximum of X attempts to pass this assessment.
If this is your final attempt, please contact NHI to reset your access to this course so that you can attempt the course again, from start to finish.
Select the "X" in the upper right corner of your browser to close this module.

Requesting Evaluation Data

NHI manages the collection and analysis of course evaluation data. The developer can request copies of this data from NHI.

NHI Web-Based Courseware Development Process and Phases

NHI follows a typical courseware development process that consists of the following basic phases:

1. Course Design Plan
2. Proof of Concept Demo
3. Storyboards
4. Prototype Checkpoint
5. Alpha Courseware
6. Beta Courseware
7. Final Courseware

Note that **this process is not entirely linear**—some phases may overlap and interact with each other during the review process.

The development process in this document defines the typical NHI process; however, refer to your task order and COR for any deviations or unique instructions.

Courseware Development Process Overview

Phase (for Event)	Description	Delivery Format	Purpose	Required Elements
1 - Course Design Plan	Detailed instructional plans for course development	▪ Word document	▪ Demonstrates a plan for inclusion of all required elements to meet the stated learning needs of the target audience (the more detailed, the better)	▪ Basic course information ▪ Target audience ▪ Instructional and assessment strategies (with actual examples of interactions) ▪ Theme, tone, approach ▪ Character persona suggestions or sketches (images or descriptions) ▪ Plans for development, testing, implementation, and evaluation
2 - Proof of Concept (Demo)	Functional/visual sample providing an accurate representation of final product	▪ SCORM package	▪ Demonstrates the expected course interface (not required to feature actual course content) ▪ Demonstrates execution of elements described in Course Design Plan ▪ Provides early validation of required features, functionality, compatibility with NHI LMS, and Section 508 compliance ▪ May be optional for certain contracts (required for all new innovations or authoring tools)	▪ Visual layout/display ▪ Headers/footers ▪ Section dividers ▪ Table of contents ▪ Navigation tools ▪ Captioning ▪ Sample knowledge check format ▪ Access to external resources ▪ Sample characters ▪ Sample narration (duration and quality must match final output) ▪ System compatibility

Phase (for Event)	Description	Delivery Format	Purpose	Required Elements
3 – Storyboards (TWT)	Detailed drafts for courseware	▪ Contractor preference, but must allow for reviewing and commenting ▪ Examples: Word, PowerPoint, WBT authoring tool	▪ Provides a draft version of the courseware for review prior to WBT development ▪ Allows for SME review of technical content ▪ May support technical walkthrough review	▪ On-screen text ▪ On-screen visuals or descriptions of visuals (e.g., photos, illustrations, etc.) ▪ Description of animation or desktop simulations to be created ▪ Scripts for videos to be created ▪ Proposed narrative script and pronunciation guide ▪ Knowledge checks and debrief/remediation ▪ Exercises ▪ Embedded links ▪ Alt tags ▪ End-of-course assessment questions/answers and/or exercises
4 - Prototype (Checkpoint) **Note:** Should be developed based on an early storyboard—do not wait until all storyboards are completed.	Preview of Alpha courseware using representative module or functionality	▪ SCORM package	▪ Allows confirmation of all required courseware elements, using a portion of actual course content ▪ Provides a second opportunity to adjust any features or approaches early in courseware development	▪ Should bring together all aspects of both Proof of Concept and Storyboards ▪ Character samples (if applicable) and 2-3 professional narrator options (long enough to allow sufficient review; e.g., 3-5 min.) ▪ Overall length enough to demo all relevant concepts, interactions, and functionality (e.g., 15-20 screens)

Phase (for Event)	Description	Delivery Format	Purpose	Required Elements
5 - Alpha Courseware (TWT)	Initial draft of functional courseware	▪ SCORM packages ▪ Ancillary files (as applicable)	▪ Allows initial review of full courseware	▪ Fully functional courseware ▪ Text-to-speech audio is acceptable
6 - Beta Courseware (Pilot Delivery)	Second draft of courseware, which includes Alpha edits	▪ SCORM packages ▪ Ancillary files (as applicable)	▪ Provides a reviewed and edited version of the courseware for Pilot delivery	▪ Fully functional courseware ▪ Professional narration
7 - Final Courseware (Public Launch)	Final draft of courseware, which includes Pilot edits	▪ SCORM packages ▪ Ancillary files (as applicable) ▪ All source files	▪ Provides a final version of the courseware that incorporates edits from the Pilot review	▪ Fully functional courseware ▪ Professional narration ▪ All source files

Course Design Plan

Description and Delivery Format

The Course Design Plan provides detailed instructional plans for course development. It is typically delivered using MS Word format.

Course Design Plan Example

Consult the Course Design Plan example from the **Developing an NHI Course** page on the NHI website: https://www.nhi.fhwa.dot.gov/resources/intro_developing.aspx

Purpose

A Couse Design Plan serves as the framework for developing course content. In general, a Course Design Plan is developed based on the findings and recommendations from the training needs analysis.

One purpose of the Course Design Plan is to establish that the finished training product will meet the training needs of the target audience and be designed in accordance with accepted instructional systems design practices. Course Design Plans ensure the course is instructionally sound, which means it is job-relevant, task-based, problem-centered, interactive, engaging, and well-organized.

Required Elements

Course Design Plans contain the following information:

1 Introduction

2 Course Information

2.1 Title

2.2 Course Type

2.3 Statement of Need (3-4 lines)

2.4 Description

2.5 Course Level

2.6 Target Audience

2.7 Related Courses

2.8 Estimated Course Time

2.9 Course Goal

2.10 Learning Outcomes

3 Course Design

3.1 Structure

3.2 Learning Taxonomy

3.3 Learner Progression

3.3.1 Sequencing Description

3.3.2 Progression Flowchart

3.4 Course Look and Feel (GUI for each type of screen/functionality)

3.4.1 Environment

3.4.2 Theme (Note that contractors will have access to NHI samples as a baseline.)

3.5 Instructional Strategies

3.6 Assessment Strategy

3.6.1 Techniques

3.6.2 Format

3.6.3 Alignment

3.7 Accessibility Compliance Strategy

3.7.1 Section 508 Strategy

4 Instructional Plans

5 Course Development

5.1 Development Tool

5.2 Storyboard Process

5.3 Prototype plan for each type of format suggested

5.4 Courseware

6 Testing and Implementation

7 Course Evaluation

Variations

Depending on the project, the Course Design Plan may be completed in a series of iterations. This may begin with a high-level plan that details basic course content and a course overview.

Following, a more detailed plan may include an extensive content outline, explanation of instructional activities, information on graphics and resources to be used. The contractor shall provide an instructional strategy and format for each topic. Examples may include (as appropriate) videos, web-based training, white papers, web quests, podcasts, interactive PDFs, stand-alone quizzes, or other materials as it benefits the learner in grasping and using the content appropriately.

Refer to the development contract and NHI Training Program Manager (TPM) for additional clarification on what should be included.

Proof of Concept Demo

Description and Format

The Proof of Concept Demo provides a fully functional visual sample that provides an accurate representation of the final product. The Proof of Concept must be produced as a published, SCORM-conformant file and demonstrated from the FHWA Adobe Connect Server.

Purpose

The Proof of Concept demonstrates the expected course interface, although it is not required to feature actual course content. It also demonstrates successful execution of all the key elements described in the Course Design Plan and required by the standards of this document. It provides early validation of all required features, functionality, compatibility with NHI LMS, and Section 508 compliance. Changes at this stage are considerably less time- and cost-intensive than later in the development process.

The Proof of Concept may be optional for certain contracts, but is required for all new innovations or authoring tools.

Required Elements

The Proof of Concept should include the following key elements:

- Visual layout/display
- Headers/footers
- Section dividers
- Table of contents
- Navigation tools
- Captioning
- Sample knowledge check format
- Access to external resources
- Sample characters
- Sample narration (duration and quality must match final output)
- System compatibility

Storyboards

Description and Format

Storyboards provide detailed drafts of the courseware, produced and delivered as unpublished content. The contractor may chose the format for the storyboards (for example, MS Word, MS PowerPoint, or the WBT authoring tool); however, the format used must allow for review and comment.

Purpose

A storyboard is a draft version of Web-based courseware created for the purpose of review, which presents content sequentially and segmented in accordance with the Course Design Plan. The storyboard allows reviewers to confirm that technically accurate and sufficient content is being presented via text, narration, on-screen graphics, or another medium. It also allows NHI to confirm that the developer is correctly applying Section 508 guidance and other programmatic settings to the courseware.

The development of storyboards is project-dependent. The development contract dictates whether storyboards are required as part of courseware development.

The storyboards may undergo a Technical Walkthrough review process.

Required Elements

For each module, the designer or developer creates draft storyboards that should include the following:

- On-screen text
- On-screen visuals or descriptions of visuals (e.g., photos, illustrations, etc.)
- Description of animation or desktop simulations to be created
- Scripts for videos to be created
- Proposed narrative script and pronunciation guide
- Knowledge checks and debrief/remediation
- Exercises
- Embedded links
- Alt tags
- End-of-course assessment questions/answers and/or exercises

Prototype Checkpoint

Description and Format

The Prototype Checkpoint is a fully functional early preview of the Alpha courseware, using either a representative module or a sampling of representative functionality or instructional strategies.

The Prototype must be produced as a published, SCORM-conformant file and demonstrated on the FHWA Adobe Connect Server.

Purpose

The purpose of the Prototype Checkpoint is to allow confirmation of all required courseware elements, using a portion of actual course content. It provides a second early opportunity to adjust any features or approaches in courseware development before too many modules have been programmed.

Required Elements

The Protoype should bring together all the aspects of both the Proof of Concept and the Storyboards. It should also include character samples (if applicable) and two to three professional narrator options. Narration samples should be long enough to allow sufficient review: approximately 3 to 5 minutes.

The overall length of the Prototype should be long enough to demonstrate all relevant concepts, interactions, and functionality: approximately 15 to 20 screens.

The prototype should also demonstrate the presence of the following:

- Adherence to standards
- Writing style
- Creativity
- Level of learner engagement
- Opportunities for practice
- Application of adult learning principles
- Access to external resources (documents, bibliography, websites, etc.)
- Accuracy of content

Variations

Depending on the project, the course content, and the intended target audience, a series of prototypes may be appropriate. Examples of other prototypes may include, but are not limited to:

- Simulations
- Customized video or multimedia

Alpha Courseware

Description and Format

Once the contractor receives final written approval of the prototype and storyboards, the contractor may begin the process of creating the Alpha courseware for review. The Alpha delivery represents the first complete draft, which should be fully functional courseware, but may use scratch or text-to-speech narration instead of final voice talent. NHI reviews this draft and provides comments back to the developer.

The draft material must be produced as published SCORM-conformant file(s) and uploaded to the FHWA Adobe Connect Server. NHI will grant the contractor sandbox access to the FHWA Adobe Connect server. The contractor will publish the Alpha courseware SCORM files to the server and send NHI the relevant links to constitute the delivery.

Refer to the contract or TO for any additional details on standards for the submittal(s) of Alpha courseware.

Purpose

The Alpha courseware provides a detailed and functional initial draft version of the training that is designed and developed in accordance with the WBT standards, screen design, and instructional strategies identified in the Course Design Plan.

The Alpha courseware should include the following:

- On-screen content
- Narration* (may be text-to-speech placeholder narration)
- Content adherence to learning outcomes
- Proper content flow and pace
- Functional user navigation
- Access to associated attachments or ancillary files
- Embedded multimedia (if applicable)

- Knowledge checks
- End-of-course assessment questions and answers relating to each learning outcome

*The Alpha courseware should include scratch audio or text-to-speech (TTS) audio narration. Inclusion of draft audio provides a more authentic reviewing experience, allowing reviewers a better opportunity to experience the course and catch script-related errors, prior to final narration recording.

Required Elements

The submittal of the draft courseware for review includes:

- Published .zip files that are:
  - SCORM-conformant
  - HTML5-compatible
  - Section 508-compliant
- Videos packaged as MP4 with scripted VTT files for Closed Captioning in IE
- Other Ancillary Files (if applicable)
- Printer-friendly, Section 508-compliant PDF participant workbook* (if applicable)

*Consult your contract or TO for details on participant workbook requirements.

Delivery Schedule

Alpha courseware is intended to be developed to 100 percent completion. However, refer to the contract or TO for details on standards for the submittal(s) of Alpha courseware.

The delivery of the Alpha content may be divided into a few or several modules. The decision on how these "chunks" of Alpha WBT content are submitted may be defined and determined in a number of ways:

- In the TO
- At the kickoff meeting
- By the contractor (with approval of the COR)

Review Process and Contractor Responsibilities

NHI reviews the Alpha delivery and returns comments to the contractor. The contractor addresses these comments toward delivery of the Beta courseware.

Refer to the contract or TO for specific guidance on every project. Discuss any deviations from this document with the NHI COR before performing work or delivering a product.

Beta Courseware

Description and Format

The Beta delivery incorporates all edits the developer makes in accordance with the review of Alpha courseware. This Beta delivery should be 100% complete courseware, including professional narration.

The contractor submits to NHI all SCORM files and any other necessary files to create a fully functional course. NHI loads these files to the main production area on the FHWA Adobe Connect server and packages it in a course curriculum. The contractor does not load Beta courseware to the sandbox testing area.

Purpose

Once reviewed and approved by NHI, this delivery is used to run the Pilot, in which a group of target audience learners complete the course and provide comments.

Required Elements

The submittal of the Beta (Pilot) courseware for review includes:

- Published .zip files that are:
  - SCORM-conformant
  - HTML5-compatible
  - Section 508-compliant
- Videos packaged as MP4 with scripted VTT files for Closed Captioning in IE
- Other Ancillary Files (if applicable)
- Any special instructions for loading the files and constructing a functional course on the server
- Printer-friendly, Section 508-compliant PDF participant workbook* (if applicable)

*Consult your contract or TO for details on participant workbook requirements.

Review Process and Contractor Responsibilities

Once NHI has reviewed and approved the Beta courseware, the contractor is expected to run the Pilot, in cooperation with NHI. The contractor should solicit, collect, organize, and analyze all participant-provided comments from the Pilot and submit a summary list to NHI.

After NHI reviews and approves this list, the contractor will address all comments toward production of the final courseware.

Refer to the contract or TO for specific guidance on every project. Discuss any deviations from this document with the NHI COR before performing work or delivering a product.

Final Courseware

Description and Format

The Final Courseware delivery incorporates all edits the developer makes in accordance with the Pilot delivery and associated user comments. This delivery includes all final courseware, including all relevant source files. NHI reviews this final delivery, ensures that all comments have been satisfactorily addressed, and accepts the product from the developer.

The contractor submits to NHI, not only all SCORM files and any other necessary files to create a fully functional course, but any and all source files, as detailed below. The final delivery should essentially include all electronic files associated with the course development.

Purpose

The Final Courseware provides a 100 percent fully functional courseware that has been updated based on comments and edits from the Pilot phase. This “production-ready” courseware will be reviewed and launched upon final approval from the COR.

Required Elements

The submittal of the final courseware for soft launch includes:

- Published .zip files that are:
  - SCORM-conformant
  - HTML5-compatible
  - Section 508-compliant
- Videos packaged as MP4 with scripted VTT files for Closed Captioning in IE
- Any special instructions for loading the files and constructing a functional course on the server
- WBT source files (e.g., Presenter, Captivate, etc.)
- Graphics as compressed, processed files, .PSD files with layers preserved (if created from scratch), .AI or .EPS files with layers preserved with text outlined and/or a font that is available through Adobe Fonts
- All audio and video files

- Other resource materials, such as spreadsheets or tables that are accessed via external links
- Source files (e.g., MS Word) for PDFs
- Multimedia Model Release Form(s) and written permission for copyright material (if applicable)
- Any written approvals for modifications
- Other Ancillary Files (if applicable)
- Printer-friendly, Section 508-compliant PDF participant workbook* (if applicable)

*Consult your contract or TO for details on participant workbook requirements.

Source Files

- Note that NHI shall hold ownership of the final courseware, including all source files and all final and raw audio, video, graphic files, and other media files.

Additional Standards

- The U.S. Department of Transportation (DOT) Standard indicates that all printed materials, including visual aids, must be developed using Microsoft Office. This requirement allows NHI to edit all documents delivered by the developer. Refer to your TO for required software versions.
- Documents should not be delivered in read-only, presentation-only, or password-protected format.
- Keep the use of macros and other complex formatting to a minimum.

Folder Structure

Organize final delivery files in the following general folder structure:

- SCORM Files
- Source Files
- Other Files

SCORM Files

- This folder should include all final SCORM (zip) files, ready for placing on the FHWA Adobe Connect Server.
- For details on creating a SCORM-conformant .zip file, refer to the development software's technical manual.

- There should be a SCORM file for each module/lesson and one for the final assessment.

Source Files

This folder should include all source files as detailed above.

- Provide some organization by subfolders, such as the following:
  - WBT modules
  - Graphics
  - Audio
  - Video

Other Files

- Use this folder to house any additional files that do not fit in the folders described above.

Readme File

- A Readme file should include any instructions on how to navigate the submittal, along with any special instructions the contractor may deem necessary or helpful.
- It should also include point of contact information for the contractor.

File-Naming Standards

Please use the following guidelines when naming files:

- Include the following information in filenames:
  - Date
  - Course number
  - Module/lesson number
- Use correct application extensions (e.g., pdf for Adobe Acrobat).

Review Process and Contractor Responsibilities

NHI will thoroughly review and test the final courseware. If NHI identifies any outstanding issues, the contractor will make the changes and resubmit the courseware for follow-up review. Once NHI approves the final courseware, the COR will provide formal acceptance of the courseware.

Refer to the contract or TO for specific guidance on every project. Discuss any deviations from this document with the NHI COR before performing work or delivering a product.

Appendix A: Field Examples of Best Practices

Introductions and Transitions

Narrative Scripts

This sample module introduction narration script provides smooth and effective transition from Module 2 to Module 3 by recapping key points from Module 2 and setting the stage for Module 3. It also engages the learner by highlighting real life examples of importance.

> *In Module 2, we spent some time looking at the impact of crossing incidents, including some specific examples. We discussed statistical trends in crossing safety over time, at the national level. You also had a chance to explore statistical trends in your own state.*
>
> *Now we'll begin Module 3. We've established the focus of this course as improving safety at highway-rail grade crossings. A highway-rail grade crossing is an intersection where a roadway crosses railroad tracks at the same level, or "grade." Intersections are, by definition, points of potential conflict. As you learned in your pre-assignment reading from the grade crossing handbook, many thousands of highway-rail grade crossings appear across our American landscape. Because the highway-rail crossing is a unique type of intersection involving multiple modes of travel, there are various aspects and entities involved.*
>
> *We'll use Module 3 to explore the details of the highway-rail grade crossing. We'll discuss components, types, and users of grade crossings, as well as physical and operational characteristics. We'll also talk about human factors involved in crossing dynamics and safety. Recall from Module 2 the train-SUV crash in Valhalla, New York. The driver pulled onto the tracks, despite the warning systems in place. A comprehensive understanding of physical and operational characteristics must be combined with an understanding of the less concrete human factors involved at a crossing, in order to determine an overall safety solution.*
>
> *Let's get started.*

Creative Presentation of Learning Outcomes

This course overview slide provides a graphical presentation of the course learning outcomes, as an alternative to the typical bulleted list.

Scenarios

This course opens with a scenario that introduces the topic and engages learner attention. It ties course content to a realistic example with human consequences.

Characters

This module opens with a character-based scenario that sets up the goal of the module. This scenario appears before the learning outcomes are stated. It secures learner engagement with a relevant application, rather than simply a bulleted list of expected outcomes. The characters keep the scenario going throughout the module.

Screen Text in Conjunction with Narration

This example illustrates proper use of screen text in conjunction with narration.

- Screen text should highlight key points, while narration should provide the full context.
- Screen text should not add content that is not addressed in the narration.

Train Engineer

- Responsible for operating train and other mechanical operations
- Limited in ability to prevent collision

(accompanying narration):

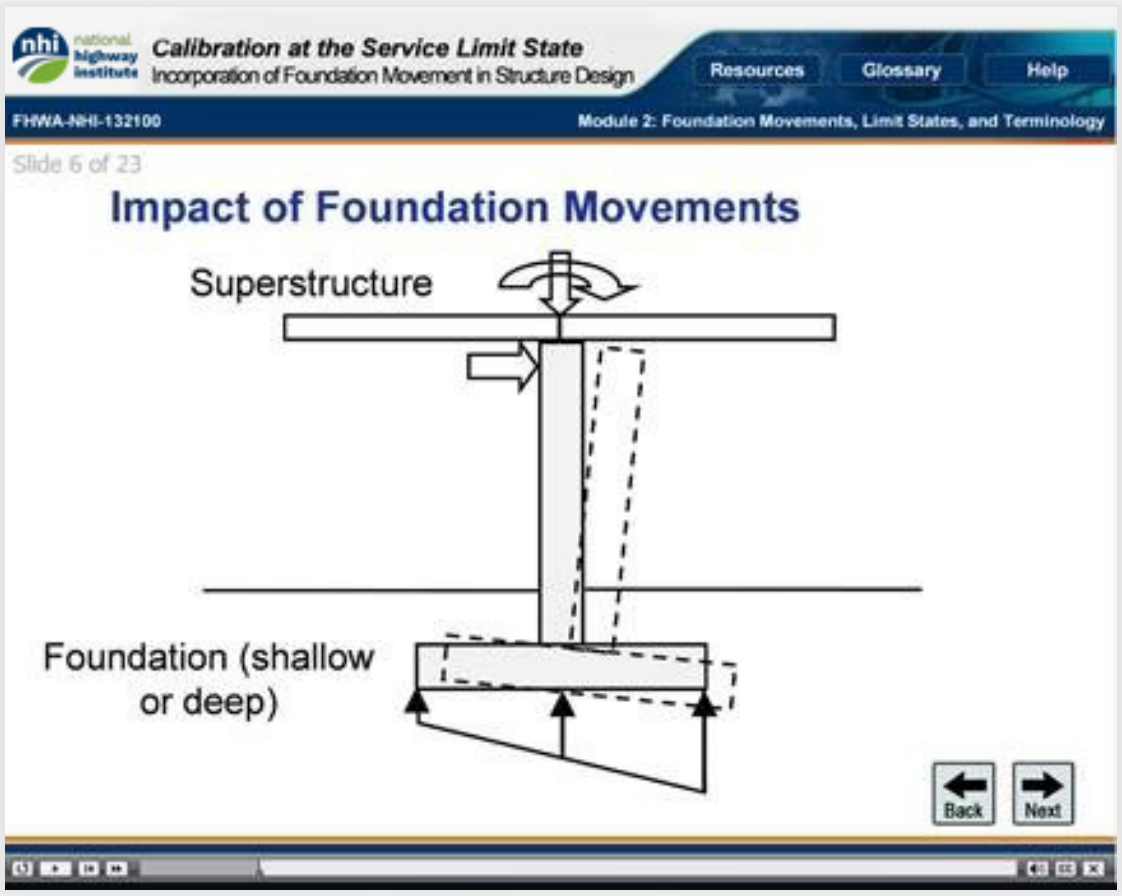
The engineer is the person responsible for operating, or driving, the train--as well as other mechanical operations.

The train engineer is notably limited in ability to prevent collision at grade crossing, due to the inability of the train to stop quickly or to deviate from the track. In addition, the engineer can only see down the track, with very limited vertical and horizontal views, which may be even further obscured by vegetation or buildings.

Instructional Media

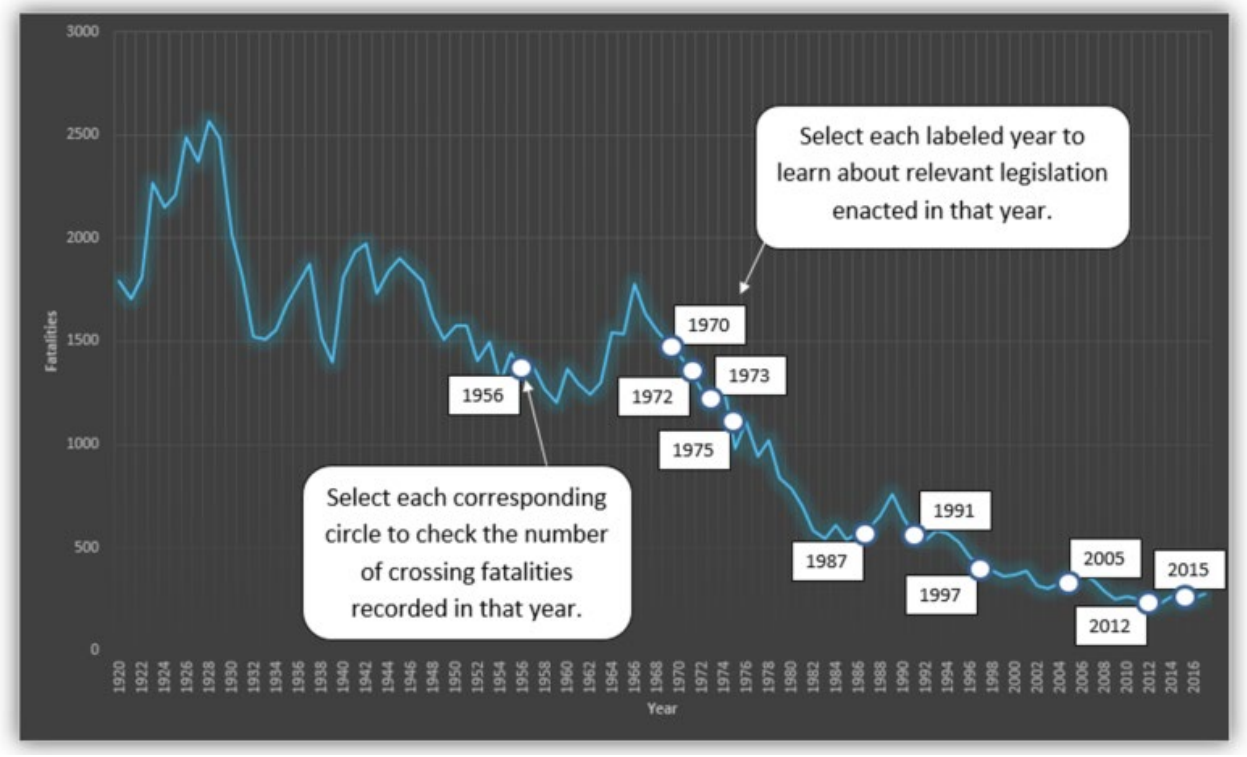
Concept Illustration

This simple line drawing illustrates the concept being explained in the narration.



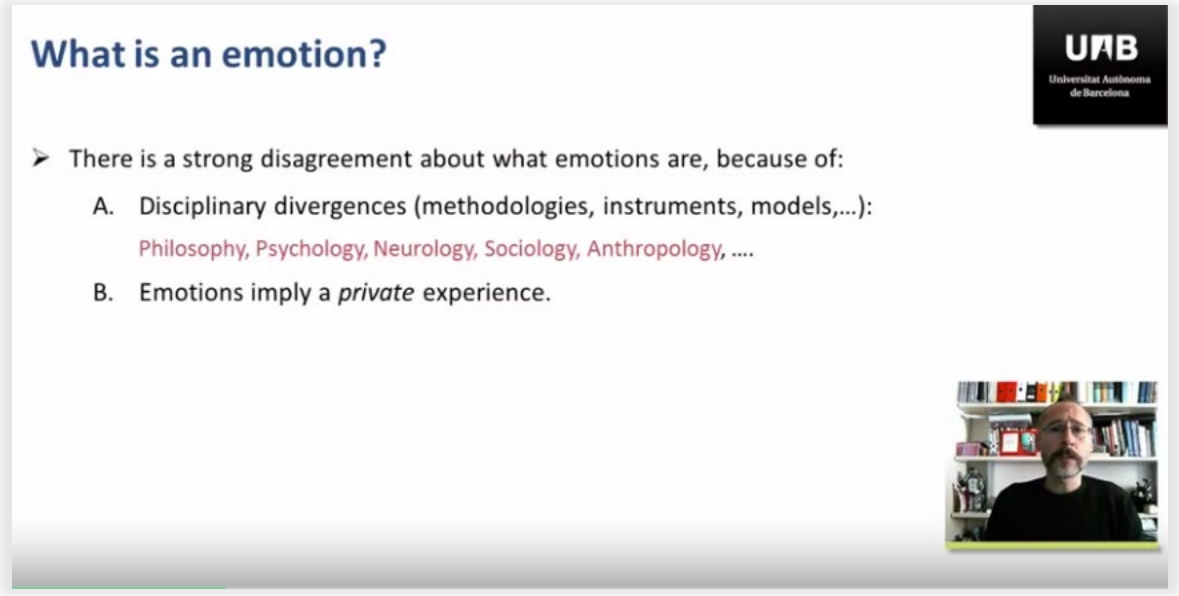
Interactive Graphic

This graphic serves multiple functions at once. It provides a learner-driven interactivity for learning more about legislation across a timeline. It also visually illustrates how rail crossing fatalities decreased over time as new legislation was passed.



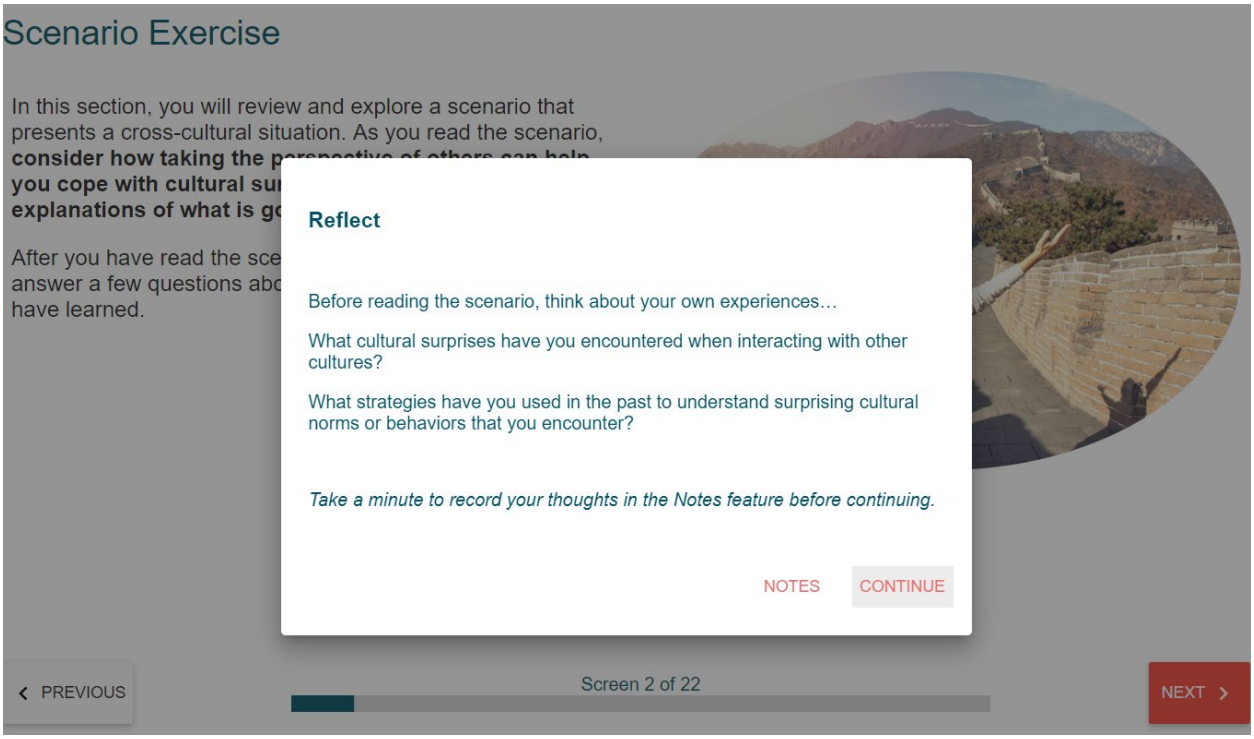
Expert Video

This design incorporates an instructor video alongside screen content—in this case, a knowledge check.



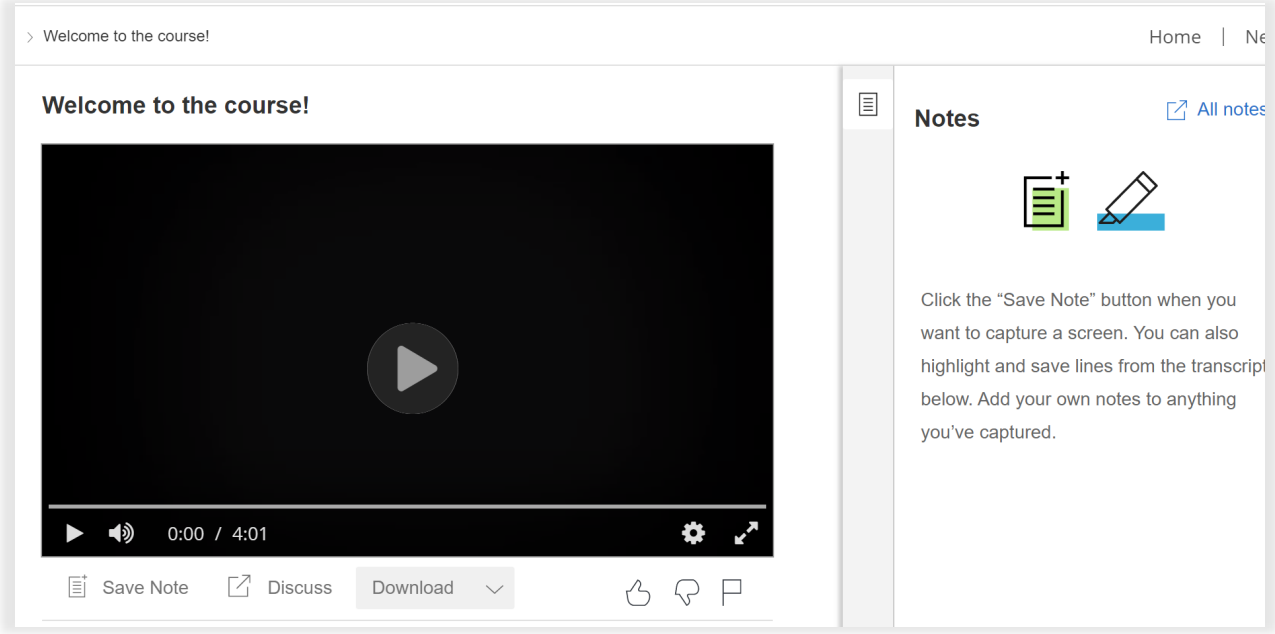
Thought Prompts

This simple interactivity prompts the learner to pause, think about a presented scenario, and type personal responses before moving on. Some interfaces may even allow the learner to consolidate and print out personal notes at the conclusion of the course, as shown on the next page.



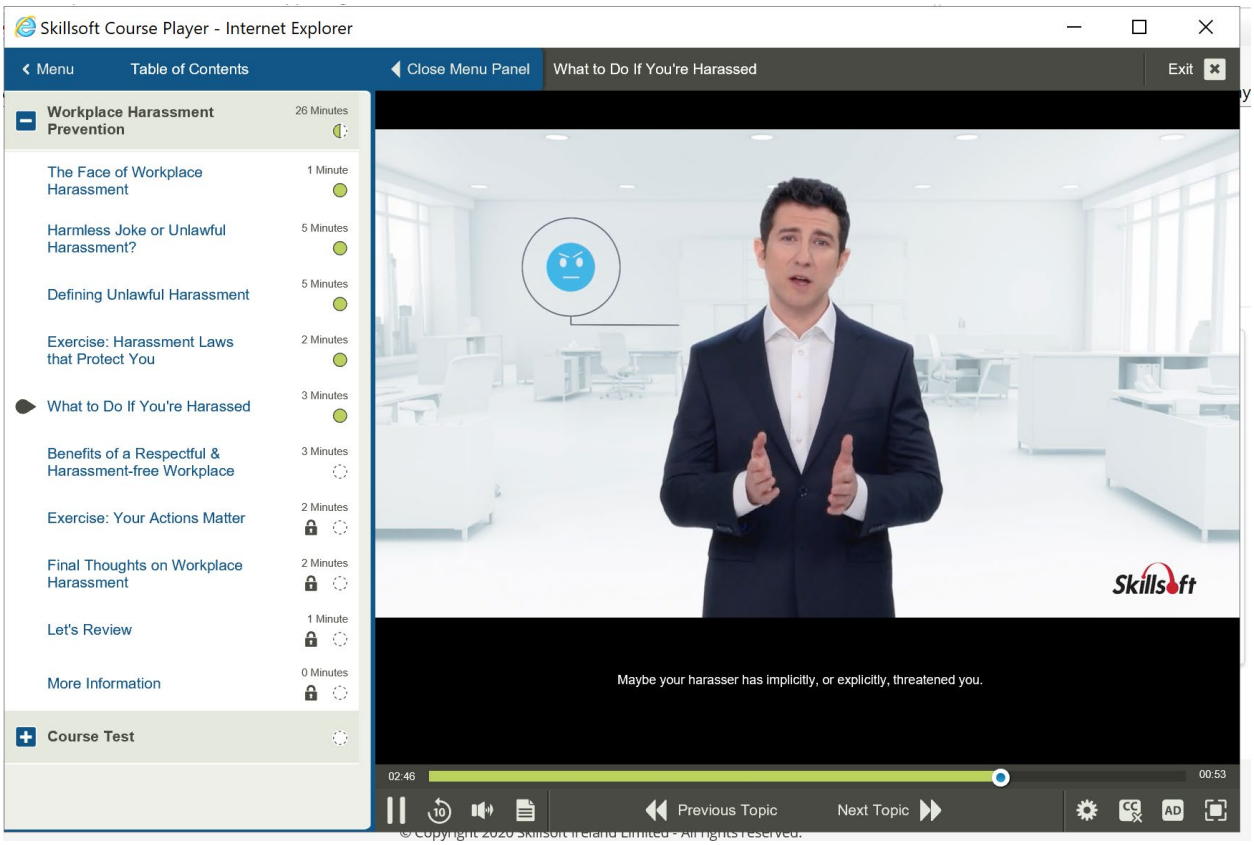
Printable User Notes Feature

This feature allows learners to capture a screen, save portions of the transcript, and add personal notes.



User Progress Tracking

This interface provides detailed visual indicators of progress through the course.



Access to Relevant Resources

This interface provides direct links to job aids at the end of the relevant content.