



pennsylvania
DEPARTMENT OF TRANSPORTATION

**INSTRUCTIONAL SYSTEM DESIGN
METHODOLOGY**

**HIGHWAY ADMINISTRATION
BUSINESS LEADERSHIP OFFICE
TECHNICAL TRAINING AND DEVELOPMENT SECTION
JULY 2010**

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Prepared by CIBER, Inc.

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Overview

INTRODUCTION

Training is defined as “The systematic, analytical based designing of methods and media so as to enable an individual or group to learn predetermined knowledge and/or processes against predetermined objectives and apply it to a required standard” (Hogarth, 2004).

The Design Community Training Program provides an organized learning experience with the purpose of increasing job performance and growth by training on new policies, procedures, design methods, etc. Training programs developed for the Technical Training and Development Section (TTDS), Business Leadership Office follows the ADDIE Instructional Systems Design (ISD) Model methodology.

TRAINING ROLES

Several major training roles exist in planning, developing, and instructing training for the Design Community. The possibility exists that one person will perform more than one role listed below.

TTDS PROJECT MANAGER (PM)

- Ensures that training development and implementation is in accordance with the TTDS Instructional System Design (ISD) Model
- Contracts training developers and instructors to complete the training process
- Coordinates all efforts between the PennDOT Training Team (training team), developers, and instructor
- Observes training and assures that training is developed and conducted according to guidelines established by TTDS

SUBJECT MATTER EXPERT (SME)

- PennDOT, consultant employees, or a team of both who have technical knowledge on the subject
- Provides guidance on training objectives and technical content of training development
- Provides data, examples, photos, etc. for class discussion, activities, exams, and exercises

DEVELOPER

- Obtains requirements from PM and SME then develops the training in its entirety
- Develops objectives and designs the training delivery, learning activities, project schedule, etc.
- Provides the training deliverables, such as outlines, agenda, participant and instructor materials, and submits them for approval to the PM
- May also develop the course exam / test.¹¹
- May also be the instructor

INSTRUCTIONAL SYSTEM DESIGN (ISD) CONSULTANT

- Provides recommendations and guidance for training and exam development to assure the TTDS ISD methodology is implemented
- Analyzes evaluation results
- Observes training to assure the presentation meets all training objectives and offer suggestions to improve the overall effectiveness of the course
- May also develop the course exam

INSTRUCTOR

- Conducts training using the materials provided by the developer
- Presents content, facilitates group discussions and activities, and administers the exam and course feedback form
- May also function in the role of developer

PARTICIPANT

- A PennDOT or business partner employee who attends the training course to enhance knowledge or to obtain required certification for performing the job

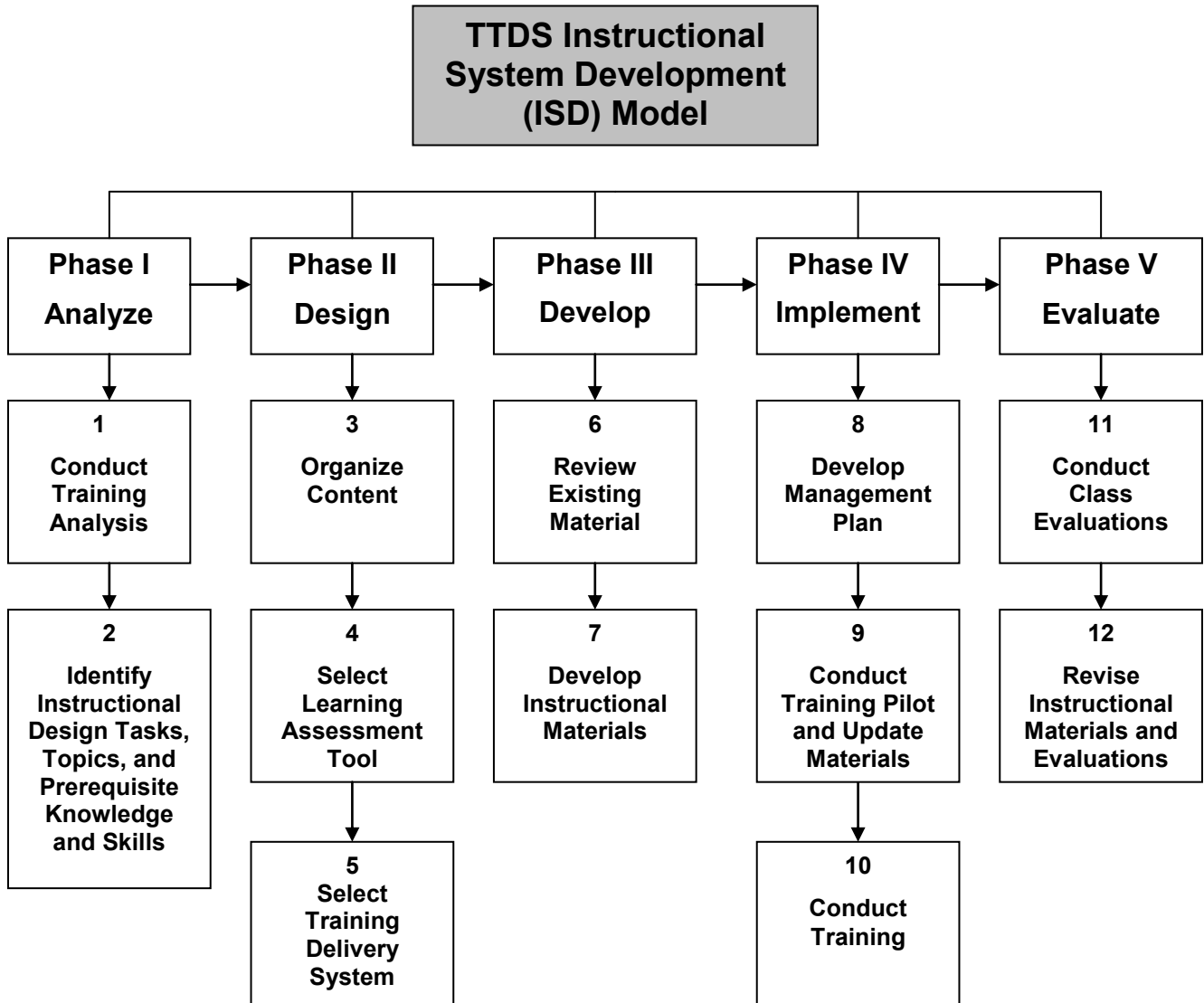
PENNDOT TRAINING TEAM

- Consists of the PM, SME, ISD consultant, and other persons as necessary
- Responsible for reviewing and approving all instructional materials submitted by the developer

¹ For the purpose of this document, the words exam and test are used interchangeably.

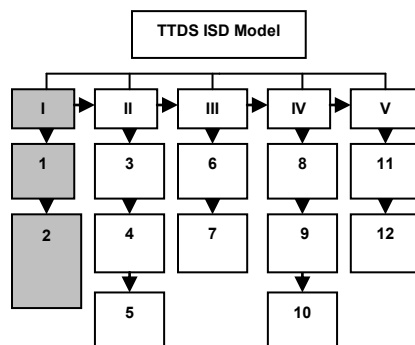
TTDS Instructional System Development Model

Training courses developed for the Design Community must follow the ADDIE ISD model (A – Analyze, D – Design, D – Develop, I – Implement, E – Evaluate). Following the ADDIE model ensures development of an effective training program that meets the objectives of all parties involved including PennDOT, participants, instructor, etc.



- Follow the ISD Model in sequential order
- In order to progress through the ISD Model, obtain approval from the PM before continuing to the next step

Phase I Analysis



1. CONDUCT TRAINING ANALYSIS

The first step in developing training in the TTDS ISD process is conducting a training analysis, which includes:

- Performance analysis
- Audience analysis
- Learning goals and objectives development

The PM conducts the performance analysis, in coordination with the ISD consultant. The training team and the developer conduct both the audience analysis and learning goals and objectives development.

Performance Analysis

Completing a performance analysis allows TTDS to identify and suggest solutions to a performance discrepancy, the “difference between what is being done, and what should be done.” (Burt & Westerfield, 1996)

Steps in conducting a performance analysis:

1. Identify the problem and define the performance discrepancy in concrete terms.
2. Analyze the causes of the performance discrepancy. Performance problems may be the result of lack of knowledge/skills, motivation, organizational support, or environmental support.
3. Recommend training solutions (instruction, job aids, coaching, etc.) if the cause is lack of knowledge or skills.
4. Calculate the cost of each training solution.
5. Select the most practical of the cost-effective solutions.

Audience Analysis

Use audience analysis to target a specific training audience by defining the current skill level, educational background, and experience of intended participants. Use the following A.U.D.I.E.N.C.E. analysis technique to identify the training audience.

Analysis—who are they? How many will be there?

Understanding—what is their current knowledge of the subject?

Demographics—what is their educational background? Will there be cultural or language barriers?

Interest—why are they there? Who asked them to be there?

Environment—where are they located?

Needs—what are their needs?

Customized—what specific needs are to be addressed? (seasonal job/organizational constraints)

Expectations—what do they expect to learn or hear from you? (Laskowski, 1996).

Learning Goals and Objectives Development

Training must be outcome-based and created upon approved learning objectives. Developing clear learning goals and objectives reflect both the purpose and reflection of the course.

LEARNING GOALS

- Identify the existing need to be met by training
- Quantify the training by developing a broad goal statement that defines the end outcome of the training program. For example, “Design two-lane highways in a rural setting.”
- Ask questions. For example, “What will measure the success of the training?”

LEARNING OBJECTIVES

- Specific outcomes you want participants to achieve as a result of the training
- Written in clear, specific, and precise terms to specify what the participants will be able to do at the end of each stage of the learning process
- Comprised of three components—action/behavior, condition, and criteria

Action/Behavior

- Describe what participants are going to do. Please refer to Attachment A, *ISD Guide to Writing Objectives* to view a list of verbs used in writing learning objectives. Example: Complete appropriate permits for regulatory agencies.

Condition


- State under what condition participants are going to demonstrate the action/behavior. Example: Given environmental areas of concern

Criteria

- State how well participants are to demonstrate the behavior. Example: With 100% accuracy.

EXAMPLE OF COMPLETE LEARNING OBJECTIVE

Given environmental areas of concern, the participant will complete the appropriate permits for regulatory agencies with 100% accuracy.

 **Note:** Typically, TTDS does not use either the condition or the criteria components in developing learning objectives.

PennDOT Training Team & Developer Deliverable

- Audience analysis results report and preliminary list of objectives
- Performance analysis results report

2. IDENTIFY INSTRUCTIONAL DESIGN TASKS/TOPICS AND PREREQUISITE SKILLS

Identifying instructional design tasks/topics to cover in the training and prerequisite skills and knowledge that the participants must possess prior to attending the course ensures delivery of only content relevant to accomplishing the learning objectives and appropriate to the experience level of the participants.

Course Outline

An outline is used to communicate the content of the course, identify instructional design tasks and/or topics and to identify the sequence of training. Use the standard outline format of indented numbers and letters to indicate levels of importance.

Include the following items in the outline:

- Course Name
- Course Description—a brief overview of the course (limit to 1,000 characters to adhere to the space restraint on the Technical Training Calendar)
- Target Audience—list the job classifications that will benefit from the training
- Duration—length of the course in hours
- List of Learning Modules —list of topics and sub-topics chunked into related concepts, ideas and tasks and sequenced in order of delivery


 **Note:** Use the information in the approved course outline to create the Timed Course Agenda (Phase II).

Course Project Schedule

Following the creation of the course outline, the developer will create a course project schedule using Attachment B, *TTDS Project Schedule Template*.

The course project schedule contains the following items, minimally:

- Course name
- Scheduled meeting dates
- Start and end dates for the development of the instructor guide by learning modules followed by the participant manual and supplemental training materials
- PennDOT review periods (minimum of two weeks for each review)
- Pilot dates and feedback session (optional)
- Course delivery dates (if known)

 **Note:** Before development activities proceed, submit both the course outline and the course project schedule in electronic format to the PM for review and approval.

Prerequisite Skills and Knowledge

Participants may not always possess the specific skills required for successful completion of the training. Based on the instructional design tasks/topics, identify skills and knowledge that the participants must possess prior to attending the training.

Examples of specific prerequisite skills and knowledge:

- Have used MicroStation to define geometry for project sites
- Proficient in algebra, geometry and trigonometry
- Proficient in soil properties and calculating the strength of materials

Developer Deliverables

- Course outline, course project schedule, and list of prerequisite skills and knowledge

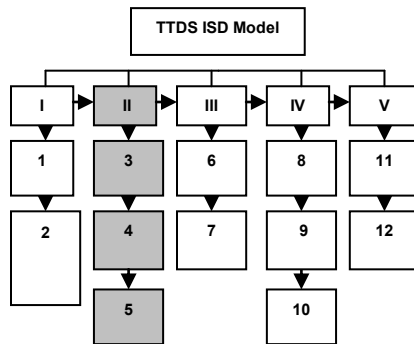
PennDOT Training Team Deliverables

- Review and provide comments for developer deliverables from Phase I, Step 2

PM Deliverables

- Advertise the course on the Technical Training Calendar and TP2006 systems with information gathered in Phase I
- Send notification of the course
- Consolidate training team review comments and provide to the developer

Phase II Design



3. ORGANIZE CONTENT

After the PM approves the macro-level outline, systematically organize the content to enable participants to accomplish the training objectives. Use information captured in Phase I in choosing an organizational style that conforms to both participant learning styles and training content. The following are several methods of organizing training material:

- **Forward Chaining**—present training materials in the order of performance, i.e., software courses, procedures, etc.
- **Backward Chaining**—begin by introducing the result then *work backwards* in explaining the necessary steps taken to accomplish the result. For instance, begin with teaching how a waterway permit is to be completed. Then, work backwards to train the participants on how to calculate data necessary to complete the permit.
- **Hierarchical**—begin with the most important concept and progress to the least important item necessary for training.
- **General to Detail**—train participants on general information; then begin adding more specific, detailed information as the training progresses.
- **Simple to Complex**—begin with the less difficult topics and continue to build into the higher level, complex topics. For instance, in MS Word, start with training on how to develop and save documents, then move to teaching how to merge documents, interact with other software programs, etc.

4. SELECT LEARNING ASSESSMENT TOOL

After approval of the macro-level outline and the learning objectives, select a learning assessment tool to measure the degree to which participants have attained the required knowledge. Examples of learning assessment tools include paper and pencil exams, projects, hands-on demonstrations, experiments, computer-based simulations, etc.

TTDS's preferred assessment tool is a summative exam consisting of knowledge (concepts, theories, rules, etc.) and skill level (calculations, computer-based tasks, etc.) questions in a multiple choice paper/pencil format.

The following questions should assist you in determining the appropriateness of a learning assessment tool to measure training:

- What knowledge, skills, or attitudes are you assessing?
- Will the learning assessment tool measure the learning objectives?
- How much preparation time is available?
- How much class time is available to complete the assessment?
- Are the resources available for the participants to complete the assessment?

At this time, the developer begins to formulate specific questions, case studies, etc. and/or identify testing topic areas that will be included in the exam. Identification of additional exam questions and revisions to current questions extend throughout the creation of training materials.

Please refer to the Test Development Guidelines for further guidance on selecting a learning assessment tool.

5. SELECT TRAINING DELIVERY SYSTEM

Selecting the proper training delivery system is an important aspect of developing an effective training course. The training delivery system is comprised of choosing the instructional delivery method and media options appropriate to accomplish the course objectives and meet the learning needs of the participants.

Delivery Methods

The three most widely used instructional delivery systems are lecture, demonstration, and discussion. To accommodate a variety of participant-learning styles, combine all three learning styles in training delivery.

LECTURE

The purpose of a lecture is to clarify information to a large group in a short period. Lectures require a great deal of preparation time and need the support of various audio-visuals. The lecture is instructor-centered. Programmed instruction, information handouts, modules/lessons, guest speakers, films, and reading assignments are adaptations of lectures.

The following questions should assist you in determining the appropriateness of a lecture:

- What knowledge, skill, or attitude needs to be learned?
- How many students need to know the content?
- How much preparation time is available?
- Can you develop participant interest in the lecture?
- Are there appropriate audio-visual support systems?
- Can you devise a means to ensure the use of more than one sense by participants?
- Are there natural divisions in the content that equate to 20 minutes or less?
- Could you provide an outline of the important parts of the lecture?
- What portion of your teaching time do you spend lecturing?
- Do you summarize regularly in the lecture?
- Do you pose questions in your lectures?

DEMONSTRATION

The purpose of a demonstration is to transmit the big picture to a relatively small group of students in a short period. Demonstrations usually require a great amount of preparation time and support from various audio-visuals. Demonstrations are particularly useful in teaching skills and are more instructor-centered than participant-centered. Projects, peer tutoring, research papers, practice/exercises, field trips, on-the-job training, simulated experiences, and audio/visual media are adaptations of demonstrations.

The following questions should assist you in determining the appropriateness of a demonstration:

- Does the participant need to see the process?
- How many participants need to know or demonstrate the content?
- How much preparation time is available?
- Can you tell and show the content?
- Can you appeal to other senses?
- Do you want the participants to imitate you?
- Will the demonstration last more than 20 minutes?
- Can you ask or take questions during the demonstration?
- Will there be practice time for the participants students?
- Can the participant easily identify the steps?
- Is there only one correct way to complete the task?
- Will you support the demonstration with handouts?

DISCUSSION

The purpose of a discussion is to solicit and involve the participant in presenting the content. Discussions are limited to small groups and require considerable time. The discussion method requires little audio-visual support. It promotes understanding and clarification of concepts, ideas, and feelings. There are numerous variations, and the discussion method can vary from instructor-centered to participant-centered. Role-playing, debate, panel discussion, reviews, supervised study, brainstorming, case studies, worksheets, conferences, and interviews are examples.

The following questions should assist you in determining the appropriateness of a discussion:

- Do you need active involvement from the participant?
- How many participants need to be involved?
- Must you hear everything the participants say?
- How much time is available?
- Is divergent thinking a desirable end?
- Can there be more than one correct answer?
- Is there time to clarify differences?
- Can you accept the participants' views?
- Can interest be aroused and maintained?
- Is there time to draw conclusions?
- Is there time to follow-up?
- Is two-way communication necessary?
- Are checks and balances available to prevent certain participants from dominating?
- Are there means to keep the participants focused on the topic?

Media Options

It is best to make media choices by selecting the most practical, cost-effective media that will assist the instructor in presenting the delivery method. In choosing a medium for the training delivery method, consider the following three criteria:

1. Which media will best help accomplish the training objectives?
2. Is it easily available?
3. If any special equipment is required, is its cost justified?

The following are examples of types of media:


- Microsoft PowerPoint® presentations
- Software (especially needed in a software training course)
- Participant manuals
- Maps, charts, and graphs
- Models
- Overhead transparencies
- Flipcharts

- Dry-erase board
- Audio-visual media (film, music, photographs, etc.)
- Handouts
- Tools and equipment/machinery

Once you have decided upon your training delivery system, develop a Timed Course Agenda, which includes details such as lecture portions, exercises, activities, demonstrations, icebreakers, etc. The timed agenda must indicate the flow of the entire course and measure the amount of presentation material to ensure all information required to meet the learning objectives is included in the training. Please place all information into Attachment C, *ISD Timed Course Outline Template*.

The Timed Course Agenda includes the following sections:

- Course Opening – brief presentation (45 minutes or less) dedicated to welcoming participants, facilitating TTDS class administration processes, conducting icebreaker, distributing training materials, and presenting an overview of the course
- Learning Modules – presentation of training materials including an introduction, list of topics/sub-topics and their coordinating training delivery system(s) (i.e., lecture, facilitation, videos, exercises, demonstrations, workshops, icebreakers, etc.) and a summary for each module
- Course Conclusion – summary of the course including a recapitulation of the course objectives, addressing final participant questions/concerns, and distributing and administering the course evaluations and exams.

 **Note:** For the Pilot course only, append the Timed Course Agenda with an additional one to two-hour Small Group Discussion section, which allows for the gathering of participant feedback/suggestions.

Developer Deliverables

- Timed Course Agenda including delivery options and draft of the Learning Assessment Tool

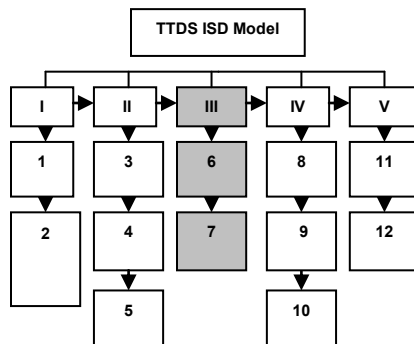
PennDOT Training Team Deliverables

- Review and provide comments on the Timed Course Agenda and draft of the Learning Assessment Tool option

PM Deliverable

- Give approval for Timed Course Agenda and Learning Assessment Tool option

Phase III Develop



6. REVIEW EXISTING AVAILABLE MATERIALS

There are two ways to develop a training course: adapt/update existing materials or create new materials. Ask yourself, “Do training materials and exercises exist which can be modified to suit the objectives of the course?” When identifying a new training course, the tendency is to assume that new training materials, along with new exercises need to be developed. Adapting existing training materials, including exercises, will save much effort, time and cost.

If materials exist, review the available materials to determine the effort required in adapting/updating them. Adapting existing materials minimizes the level of labor and time put forth in the ISD process, which is cost-effective. The disadvantage to using existing materials is if an excessive number of adaptations or updates need to be made due to policy changes or proprietary issues of the original instructional designer.

Obtain existing materials (printed or electronic materials from publications, other training courses, videos, audios, etc.) from PennDOT’s Transportation Library, other Departments of Transportation, other state and federal agencies, colleges and universities, or commercial/industrial organizations.

Consider the following questions to determine the adaptability of existing training materials:

- Does the material, entirely or partially, meet the objectives of training?
- Is the material accurate?
- Is the material current?
- Is the material proprietary or copyrighted?

If you answered yes to the last question, *obtain full permission from the author or publisher to print and adapt the materials*. (If full permission is not granted, you cannot change any portion of the training material.) Provide proper references to the resource and indicate permission for use from appropriate resources when producing the materials. Some resources charge a fee for use of their materials.

Once you obtain proper permissions, consider modifying existing materials by:

- Substituting PennDOT information, examples, drawings, etc.
- Deleting material that is not supportive of the training objectives
- Editing material, as required
- Changing the order of the material
- Adding exercises, demonstrations, workshops, etc.

The two most compelling reasons for writing new materials are absence of existing materials or inadaptability of available materials. Developing new materials provides the instructional designer with complete control over content, training delivery systems, and course materials. A hybrid approach of modifying existing materials and developing new materials is also a feasible alternative.

Developer Deliverable


- Provide the PM with details supporting the decision to create new materials, adapt existing materials, or implement a hybrid approach

7. DEVELOP INSTRUCTIONAL MATERIALS

Instructional materials are any tools you use during the instructional process that are designed to meet the approved learning objectives. Minimally, TTDS instructional materials include the participant manual, supplemental materials/MS PowerPoint® slides, the learning assessment tool with answer key and objective map, and an instructor's guide. You may choose to employ worksheets, handouts, job aids, computer-based training, laboratory work, or audio/video materials to support the training.

During the development of both the instructor and participant manuals, the developer must adhere to the following TTDS format standards and procedures:

- The following copyright notice must appear on back of the title/cover page of each publication created: "Copyright © 2010 (use first year of course offering of the subject materials) by the Commonwealth of Pennsylvania. All rights reserved."
- Each cover for any training material must contain the name of the course, a statement that the course is part of the Design Community's Comprehensive Training Plan, a date (if appropriate), and the PennDOT logo. No contractor logo, name, or other identifier should appear on the cover. A short *credit* statement may appear inside the material, but must acknowledge participation by all contractors including subcontractors and the assigned ISD contractor. PennDOT employees do not receive acknowledgement for their participation.
- Provide a table of contents with page numbers for ease of finding material
- Use black text on white background, unless otherwise required
- Place the course name, chapter or lesson name in the header or footer and add page numbers. Number pages by chapter, such as "1-1, 1-2, 1-3", etc.
- Use Times New Roman font, 12 pt for the body text, Arial font for the headings

 **Note:** TTDS does not require developers to follow a standardized training material format/layout. The developer will use proper judgment or replicate TTDS sample material formats in designing training materials to clearly document the course subject and meet the needs of participants. The PennDOT training team reviews / comments on the training material format during the first review cycle.

The PM coordinates the review process by dispersing the materials to the training team members and others as necessary, monitoring the review process, gathering all comments/corrections in a comprehensive change document, and forwarding the change document to the developer in accordance with the approved course project schedule.

As per the approved course project schedule, the development of the instructor guide shall begin prior to all other instructional materials.

TTDS Review Process:

- The developer creates a draft of the Instructor Guide, Module 1 and submits it to the PM to distribute for review by the PennDOT Training Team.
- During the Module 1 review, the developer begins to create Module 2.
- Upon receiving the change document for Module 1 from the PM, the developer edits the training materials as applicable.
- This cyclical process continues until all learning modules and instructional materials have been developed, reviewed, and edited in preparation for the Course Package Final Review process.

Instructor Materials

The Instructor Guide (handbook, handouts, PowerPoint slides, etc.) is developed and approved prior to creating the participant manual. Instructor materials should be comprehensive, enabling a qualified instructor to train solely on the instructor materials.

The Instructor Guide should include the following components:

- **Design of the materials**—provides a brief overview of the course and materials to communicate the intent of the course and the layout of the instructional materials.
- **Administrative items**—provide guidance on the timing for handing out participant materials, sign-in sheet, CEUs, testing, completion certificates, etc.
- **Equipment, or other items**—provide a list of equipment and materials required to conduct the course and appropriate directions. This will assure that the instructor is properly prepared and that all required items are available during the course.
- **Training materials**—provide a list of training materials, such as PowerPoint slides, participant materials, and any other materials necessary.
- **Detailed Timed Agenda**—provides a schedule for the course to give the instructor information on the length of the session, length of each module, timing of exercises, etc.
- **Technical information**—provides a list of main *presentation points* for each topic, subtopic, slide, activity, etc. The *presentation points* will list key presentation information, indicate use of necessary media, and include a review or summary to relate materials to previous and future information.

Note: Presentation points are NOT a script for the instructor to follow. Each instructor must be knowledgeable in the subject area and able to enhance the technical information with anecdotes and examples from experiences.

- **Instructions for exercises, demonstrations and other activities**—provide clear, detailed directions for setting up, conducting, providing feedback and concluding exercises, demonstrations, etc.
- **Questions for facilitating discussion**—provide a list of questions for facilitating class discussions or summarizing the module.
- **References**—provide a list of additional references or resources that may aid the instructor in preparation for instructing the course.

Supplemental Instructional Materials


Supplemental instructional materials, in addition to the participant manual, enhance course instruction and enforce learning objectives. The most commonly used supplemental instructional materials are Microsoft PowerPoint® presentations, instructional videos, case studies, and handouts. Like the manuals, the developer submits the supplemental instructional materials to the PM for dissemination to and review by the training team.

When designing instructional PowerPoint® slides, please conform to the TTDS PowerPoint® guidelines listed below:


- Minimum font size on any slide should be 20
- Number of words per slide should not be excessive
- Words should be easily and quickly readable by any participant from any location in the room.
- Standard format is a maximum of six bullets per slide with six words per bullet
- Graphics and clip art must be used sparingly and with purpose
- Minimize the use of color backgrounds and other large color areas to reduce electronic storage requirements
- In general, limit slides to no more than 25 per hour of presentation

Learning Assessment Tool

The learning assessment tool (exam) allows management to evaluate the effectiveness of expenditures and the value of a training program. Training assessments provide ISD consultants, developers, and instructors with statistical results in order to improve the training materials and presentation. Testing confirms that the training met the learning objectives and participants are able to apply their knowledge in their job or it identifies where additional effort, study, or training is necessary.


 **Note:** To ensure instructional materials and the exam questions coincide with and support one another, it is wise to develop them in parallel.

The developer in coordination with the ISD consultant or the ISD consultant alone develops the assessment chosen and approved in Phase II Step 4 – Select Learning Assessment of the TTDS ISD Model. In each case, the SME supports the creation of an exam by validating that the exam questions meet the learning outcomes accurately and efficiently (content-validity check) and providing information for the questions, such as PennDOT-specific scenarios, specifications, drawings, or plausible exam distracters.

 **Note:** Refer to the Test Development Package, which includes the TTDS Test Development Guidelines, Test Template, and Objective Map / Answer Key Template, for direction on preferred testing formats and specifications.

Course Package Final Review

The developer must provide the completed course package to the PM at least four weeks prior to the pilot or first class offering based upon the course project schedule. The PennDOT training team provides comments/concerns to the overall course package and forwards them to the PM for delivery to the developer. The developer updates and reproduces instructional materials for the pilot or class.

 **Note:** PennDOT may decide to forego a final review; this decision is made when the course project schedule is created.

The following items are included in the review:

- Timed Course Agenda
- Instructor materials
- Participant materials
- Supplemental instructional materials (PowerPoint® slides, case studies, etc.)
- Exam and Objective Map / Answer Key

Checklist for Evaluating Instructional Materials

- Are the materials appropriate for defined learning objectives?
- Do the materials include adequate instruction for required skills?
- Are the materials sequenced logically?
- Are the materials written clearly and easily understood?
- Are the materials relevant to participants' needs?
- Do the supplemental materials enhance the learning experience?
- Do the materials allow adequate opportunity for practice and constructive feedback?
- Are the assessment items (exam items) relevant to performance objectives and do they test required behaviors?

Continuing Education Units

Professional training organizations (i.e., National Highway Institute, Microsoft, Inc, Appraisal Institute, etc.) may issue CEUs that are particular to that organization or a professional field of study.

TTDS courses containing real estate or real estate appraisal information may qualify to receive CEU approval through the State Board of Certified Real Estate Appraisers. Appraisal Board CEUs are applicable for participants who wish to obtain Initial Education or Continuing Education credits towards their state appraisal license. Information, instructions, and the Appraisal Board CEU application form are located on the Department of State, Bureau of Professional and Occupational Affairs website at <http://www.dos.state.pa.us/bpoa/cwp/view.asp?a=1104&q=432589>. Upon completion of the course, instructors will sign and distribute the Certificate of Completion form to all participants wishing to report Appraisal CEUs to the State Board of Certified Real Estate Appraisers.

DEVELOPER DELIVERABLES

- Participant, instructor, and supplement materials and learning assessment (exam/test)

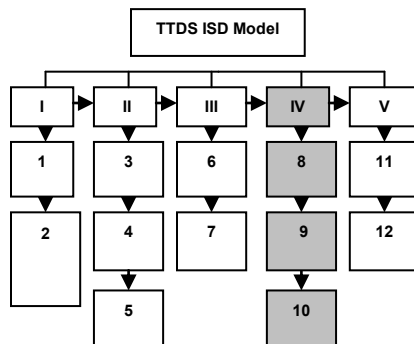
PENNDOT TRAINING TEAM DELIVERABLES

- Review and provide comments on all instructional materials submitted during Phase III

PM DELIVERABLE

- Approve all instructional materials


Phase IV Implement



8. DEVELOP MANAGEMENT PLAN

It is the PM's responsibility to develop a management plan, which includes all necessary arrangements and preparations for course training. Tasks include:

- Announcing the course and adding its details to the Technical Training Calendar
- Coordinating dates, location, etc. with the instructor
- Setting up registration for the course (TP 2003 software)
- Managing the project schedule and budget
- Reserving the facilities and/or special equipment
- Securing PennDOT guest speakers or other federal and state agency speakers
- Coordinating with IT and district staff on the installation of software (if required)
- Accommodating any special need requests from participants
- Mailing TTDS class packet (Highway Administration Guide for Instructors, current versions of the sign-in sheet and Course Evaluation Form, exam, and answer sheets) to the training location or vendor/instructor
- Attending pilots/classes (observe training presentation, ensure training materials are at training location, greet instructor, etc.)

 **Note:** Prior phases contained many of the activities listed above.

PM DELIVERABLE

Create and implement a Course Management Plan

9. CONDUCT TRAINING PILOT AND UPDATE MATERIALS


A training pilot offers the PennDOT training team, developer and select participants the opportunity to evaluate the instructional materials and training presentation. The main purpose of the training pilot is to identify and eliminate any remaining issues in the instructional materials or course instruction.


The PM coordinates the scheduling of a formal feedback session to assess the pilot. The preferred method is to facilitate the feedback session as a small group discussion (eight to twelve participants, PennDOT training team and developer) upon completion of the pilot training. Append the Timed Course Outline to allow for a one to two-hour small group discussion after the exam administration. If minimal time is available after the pilot training, the PM will schedule a feedback session within one to two weeks after the pilot. During the small group discussion, an assessment of the course identifies areas of opportunity for enhancements and finalizes changes for subsequent sessions.


Roles of Training Pilot Attendees

Verify...	Roles of Attendees			
	PM & ISD Consultant	Developer	SME	Participant
Learning objectives are met in the content presentation	√	√	√	√
Examples are relevant to PennDOT specific policies		√	√	√
Exercises/activities are meaningful and relevant to the content	√	√	√	√
Instructor demonstrated professional presentation skills (pace, tone, eye contact, etc.)	√	√	√	√
Instructional materials were written clearly and supported the training	√		√	√
Instructor demonstrated a proficient level of knowledge in the topic	√	√	√	√
Participants were interested and involved in the training	√	√	√	√

Verify...	Roles of Attendees			
	PM & ISD Consultant	Developer	SME	Participant
Target audience members were in attendance			√	√
Exam items tested learning objectives and materials covered in the presentation	√	√	√	√
Attendees met prerequisite requirements			√	√

 **Note:** The PM may schedule a separate feedback session among the PennDOT training team, developer, and instructor to discuss input on the presentation of the training.

 **Note:** When instructing participants on their role in the training pilot, it is important to encourage them to highlight unclear or confusing portions in the instructional materials and emphasize the value of their input in analyzing the instructor's presentation of the instructional content and materials in the group discussion.

 **Note:** Please refer to Attachment D: *ISD Pilot Class and Feedback Session Guidelines* for a list of suggested areas and questions for participant feedback.

DEVELOPER DELIVERABLE

- Attend the training pilot and participate in the small group discussion

SME DELIVERABLE

- Attend the training pilot and participate in the small group discussion

PM DELIVERABLE

- Attend the training pilot, participate and record feedback in the small group discussion, provide a summary of the feedback, specific course updates, and discussion items to the developer and instructor

ISD DELIVERABLE

- Attend the training pilot, participate in the small group discussion, and provide the PM with test result statistics and summary of the Course Evaluation comments

Revise Training Materials

After all pilot activities commence, the developer analyzes and revises the course agenda (may effect CEUs), instructional materials, and exam based upon feedback from the training pilot. After completion of the course revisions, the developer forwards all updated instructional materials to the PM for dispersion to the PennDOT training team for a final review before reproduction.

DEVELOPER DELIVERABLE

- Provide updated training materials based upon pilot feedback (dependant upon budget constraints and contract restraints), and project schedule for revisions, if required by PM

PENNDOT TRAINING TEAM DELIVERABLE

- Review and provide comments on all revised instructional materials following the pilot

PM DELIVERABLE

- Provide approval of instructional materials
- Update course information on the ECMS calendar and TP2003 registration system
- Revise CEU application or delegate to a representative, if necessary
- Notify future class participants of any adjustments to the course (class times, prerequisites, materials, etc.)

10. CONDUCT TRAINING

After the review and approval of pilot revisions, present the course per the Design Community training class schedule.

The PM or a TTDS representative will attend each class to:

- Ensure the room is ready for the training
- Greet instructors and verify all materials are present
- Clean and organize the room after the class has finished
- Remove all extra training materials or store them in a designated area

For all classes, the instructor shall:

- Review the Technical Training Calendar to confirm the training location, class dates, and times
- Conduct the class and exam per the guidelines set forth in the Highway Administration Guide for Instructors included in the course packet
- Use the most current TTDS forms, exams, and sign-in sheets provided in the TTDS Course Packet
- Report any class issues and provide feedback to the PM on the instructor feedback form.
- Return all TTDS forms, exams, and sign-in sheets in the provided UPS envelope within three business days of the class

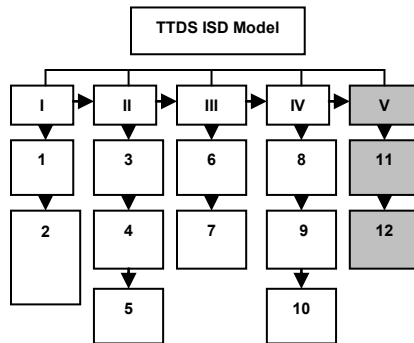
INSTRUCTOR DELIVERABLE

- Instruct participants as directed by the timed course agenda and using the instructional materials
- Mail all TTDS forms, exams, and sign-in sheets in the pre-paid UPS envelope

PM DELIVERABLE

- Attend the scheduled classes

PHASE V EVALUATE



11. CONDUCT CLASS EVALUATIONS

At the completion of class, the instructor distributes evaluations to measure the participants' reaction to the training and level of understanding in relation to the course objectives. The instructor receives a TTDS Course Packet containing the most recent course evaluation form and exams upon entering the classroom.

PennDOT follows the four levels of evaluation as outlined by Donald Kirkpatrick in evaluating training courses (Kirkpatrick, 1996). The four levels of Kirkpatrick's evaluation model essentially measure:


- **Level 1 – Evaluate Reaction:** what students thought and felt about the training (course evaluation form)
- **Level 2 – Evaluate Learning:** the resulting increase in knowledge or skills (exam/test)
- **Level 3 – Evaluate Behavior:** extent of improvement in the implementation or application of skills or knowledge
- **Level 4 – Evaluate Results:** the effects on the business or environment resulting from the trainee's performance

Course Evaluation Form Analysis

Upon receiving the UPS package containing the class materials, the ISD consultant processes the instructor and participant course evaluation forms and creates an evaluation summary report. The summary report is reviewed by the PM and ISD consultant who both use the information to evaluate course materials/content, effectiveness of the instructor(s), and training facilities. The SME, developer, and instructor may also view the summary report to gain insight into participant reactions and consider participant comments to improve the course.

Exam Analysis

The ISD consultant scores and analyzes the class exams. When required due to technical content, the course developer or instructor scores the exams prior to sending them to TTDS. The ISD consultant contacts the instructor and/or developer regarding any low scoring questions and/or required or suggested exam revisions. Test results are confidential; only the participant has knowledge of the actual score. Supervisors or other interested parties may inquire as to the participant's pass/fail status. Currently, the passing score is 70%.

 **Note:** Participants have the right to view their graded exam. If a participant has failed the exam, they may coordinate with the ISD consultant or PM to either re-take the exam or repeat the course and exam.

ISD CONSULTANT DELIVERABLE

- Analyze course evaluation forms and exams to identify course updates / inconsistencies and mail test results to participants
- Review test analysis and evaluation summary with PM
- Coordinate with the instructor and/or developer in revising the exam, if necessary

12. REVISE INSTRUCTIONAL MATERIALS AND EVALUATIONS

All instructional materials and exams are revised using feedback from the instructor, training team and participants.

Steps 10 through 12 of the ADDIE ISD Model follow a cyclical process throughout the life of the course. Over time, the course topic may have updates of policies/procedures or require the addition of current examples/case studies that may spur revisions to the course materials.

References

Burt, Miriam and Westerfield, Kay. (1996). *Assessing Workplace Performance Problems: A Checklist*. Center for Applied Linguistics, Washington, DC.

Hogarth, Maurice (2004). *What is your best definition of Training?*. June 13, 2006 from http://www.masternewmedia.org/2004/07/06what_is_your_best_definition.htm.

Kirkpatrick, D. (1996) *Evaluating Training Programs: The Four Levels*. San Francisco, CA: Berrett-Koehler Publishers.

Laskowski, Lenny. (1996). *A.U.D.I.E.N.C.E. Analysis – It's Your Key to Success*. LJI Seminars. <http://www.ljlseminars.com>.

Attachment A

ISD Guide to Writing Objectives

Level 1: Knowledge

Definition: Participant recalls or recognizes information, ideas, and principles in the approximate form in which they were learned.

Verbs:

Cite	Identify	Quote	Relate	Sort	Match
Mark	Indicate	Read	Repeat	Trace	Record
Define	List	Select	Recite	Write	Tabulate
Describe	Name	Recognize	State	Draw	Label

Level 2: Comprehension

Definition: Participant translates, comprehends, or interprets information based upon prior learning.

Verbs:

Associate	Describe	Explain	Locate	Translate	Review
Classify	Differentiate	Illustrate	Predict	Compare	Interpret
Discuss	Identify	Report	Compute	Distinguish	Estimate
Paraphrase	Summarize	Contrast	Designate	Categorize	Reproduce

Level 3: Application

Definition: Participant selects, transfers, and uses data and principles to complete a problem or task with a minimum of direction.

Verbs:

Apply	Employ	Calculate	Practice	Relate	Sketch
Examine	Operate	Report	Solve	Complete	Illustrate
Order	Restate	Translate	Demonstrate	Interpolate	Construct
Review	Use	Dramatize	Interpret	Isolate	Schedule

Level 4: Analysis

Definition: Participant distinguishes, classifies, and relates the assumptions, hypotheses, evidence, or structure of a statement or question.

Verbs:

Analyze	Debate	Distinguish	Detect	Question	Contract
Diagram	Infer	Separate	Criticize	Inspect	Summarize
Combine	Compare	Conclude	Contrast	Deduce	Defend
Evaluate	Explain	Induce	Formulate	Discriminate	Structure

Level 5: Synthesis

Definition: Participant originates, integrates, and combines ideas into a product, plan, or proposal that is new to the participant.

Verbs:

Arrange	Construct	Formulate	Organize	Produce	Assemble
Create	Generalize	Plan	Propose	Collect	Design
Integrate	Prepare	Specify	Reorder	Manage	Chart
Document	Alter	Develop	Modify	Reconstruct	Systematize

Level 6: Evaluation

Definition: Participant appraises, assesses, or critiques based upon specific standards and criteria.

Verbs:

Appraise	Determine	Judge	Recommend	Test	Assess
Estimate	Measure	Revise	Choose	Evaluate	Rank
Score	Critique	Grade	Rate	Select	Revise

Insert Course Name
Date approved by PennDOT:

Key:	
 Consultant work	
 PennDOT Review	
 Meetings	

Fiscal Year 06-07 2007 Fiscal Year 07-08

	Proposed Submission Date	Actual Submission Date	Project Week #	Fiscal Year 06-07												2007												Fiscal Year 07-08																							
				Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul																
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Attachment B

TTDS Project Schedule Template

Attachment C

TTDS ISD Timed Course Outline Guide for Instructors

This template is designed to help you plan your course structure, including spaces for entering times allotted for each section. You may adjust this document as needed for your training.

Course Name Course Date(s)

I) Course Opening (*Enter allotted time*)

- A) Welcome participants and introduce yourself and any PennDOT subject-matter experts (SMEs) (*Enter allotted time*)
- B) Facilitate TTDS class administration processes (*Enter allotted time*)
 - 1) Sign-in sheet
 - 2) Start/stop times of class
 - 3) Location of restrooms, emergency exits, cafeteria
 - 4) Location of available computers to check email, phones, and fax for general use
 - 5) Estimated time to break for lunch
 - 6) Silence cellular phones and pagers
 - 7) Expectations of participants
 - (a) Be prompt and on time to class
 - (b) Be respectful of instructor and other participants
 - (c) Be respectful of facility—clean up after self
 - (d) Be open to ideas presented in class; willingly participate in activities
- C) Conduct icebreaker activity (*Enter allotted time*)
- D) Distribute participant workbook and other training materials (*Enter allotted time*)
- E) Present brief overview of course (*Enter allotted time*)
 - 1) Mention reason / goal for course
 - 2) State course objectives
 - 3) Query group on what they expect to gain from class and what topics they are interested in learning. Keep the list on flip-chart paper and review the list at the end of training.

II) Module 1 (*Enter allotted time*)

- A) Introduction (*Enter allotted time*)
- B) Main Topic 1 (*Enter allotted time*)
 - 1) Sub-topic 1
 - 2) Sub-topic 2
- C) Main Topic 2 (*Enter allotted time*)
- D) Summary (*Enter allotted time*)
 - 1) Summarize objective(s) covered
 - 2) Poll participants for general observations
 - 3) Address participant questions/concerns

III) Module 2 (*Enter allotted time*)

IV) Enter remaining modules and allotted times for your course. This template should adjust its numbering automatically to accommodate your information.

V) Course Conclusion (*Enter allotted time*)

- A) Summarize the course
 - 1) Restate the course objectives
 - 2) Revisit the list of expected topics/expectations the participants generated at the beginning of the course. If any items were not addressed, ask the SMEs if they can provide a brief answer/explanation. If not, let the participants know you will research the items and send a response to them. (Identify the participants who want the answers and make sure you have their correct contact information.)
 - 3) Address any additional participant questions/concerns
- B) Distribute class evaluation forms and exam
- C) Administer exam or other learning assessment

VI) Pilot Feedback Session (Pilot class ONLY)

- A) Facilitate a one to two-hour small group discussion lead by a TTDS PM or TTDS representative
- B) Record feedback/suggestions

Attachment D

TTDS Pilot Class Guidelines

A Pilot Class offers participants the opportunity to influence course content and presentation by not only evaluating their experience but by providing ideas, suggestions and endorsements of the course. The main purpose of the Pilot Class is to locate and eliminate any remaining problems in the instruction.

The following questions may be given to participants prior to class as a suggested list of areas and questions to consider. These questions can also be used during the after-session discussion.

Materials	<p>Are the instructional materials adequate for:</p> <ul style="list-style-type: none">○ Vocabulary○ Pacing○ Chunk-size (amount of information per lesson/topic)○ Clarity of description○ Clarity of examples○ Adequacy of sequence of content and activities○ Interest level of exercise <p>Do the materials support the learning context and are there any improvements that can be made?</p> <p>Were the materials easy to use or too complicated?</p> <p>Are there any misspellings, grammatical errors, or other mistakes?</p> <p>If visual aids were used, were they appropriate to support the content, too many/too few, readable, etc.?</p>
Content Presentation	<p>Were the course objectives/outcomes clearly stated? Was content presented to support each of the objectives/outcomes?</p> <p>Was the instruction:</p> <ul style="list-style-type: none">○ Interesting○ Too easy, too difficult, or just right○ Too fast, too slow, or just right <p>Was sufficient time allotted to cover content, answer questions, and complete exercises/activities?</p>

	<p>Were the examples used relevant and did they clarify the instructional topic?</p> <p>Was the content presented in a logical and organized manner?</p> <p>Was the instructor knowledgeable in the subject matter and able to answer questions?</p> <p>Did the instructor demonstrate excellent communication skills, presentation skills, and classroom management skills?</p>
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Learner Participation	<p>What skills/knowledge or life experiences should a participant have prior to the class?</p> <p>Did you feel that the correct audience (i.e., job titles and experience level) was in attendance?</p> <p>Did you receive sufficient feedback on your practice exercise(s)?</p> <p>Were you given the opportunity to share your own experiences or learn from other participants' experiences?</p> <p>Did the class environment provide an opportunity to network with other participants?</p>
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Exercises / Test	<p>Were sufficient activities/exercises included?</p> <p>Were adequate and clear instructions given to you to successfully complete the exercises?</p> <p>Were the practice exercises relevant and did they reinforce the content?</p> <p>Did you feel confident when answering questions on the test?</p> <p>Did the test really measure your knowledge of the objectives?</p> <p>Are the test instructions, vocabulary, questions, and response expectations clear?</p>
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Impact	<p>What skills/knowledge have you gained that you can directly apply to your job performance?</p> <p>Was this course personally relevant to your job performance/duties?</p> <p>Was this an interesting and satisfying course to experience?</p> <p>Would you recommend this course to others and what would you tell them?</p>
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