The Learning and Training specialization

Contents

DITA Learning and Training specialization overview

- Summarize what the Learning and Training specialization is.
- List three or more benefits for using the Learning and Training specialization.
- Cite three or more applications for the Learning and Training specialization.
- Describe how the Learning and Training specialization supports curriculum development.

This lesson covers some housekeeping matters, then introduces you to the DITA Learning and Training specialization.

Note: Because “DITA Learning and Training specialization” is such a long phrase for titles and such, this course abbreviates it to “L&T”.

Housekeeping and sample files

To view the sources for some of the examples in this course, download learning_and_training_samples.zip now. Extract the contents and put them in a directory that you can access easily. If you have access to an output generator (usually the DITA Open Toolkit), you can use it to generate output and see these principles in action.

The lessons will instruct you on which files to use for the samples.

Create a local copy of each file to work in as you complete the lessons. That way, if you reach a point where your working file doesn’t match the examples, or is broken for any reason, you can make a fresh copy and resume your work or start over.

In the instructions and examples, we show you the DITA code for the sample files. Most DITA editors have auto-complete or other similar features to guide you through the process of adding elements (for example, if you type the opening tag of an element, most DITA editors will automatically add the closing tag for you). Therefore, you will probably not need to create every piece of code from scratch as you work.

What is in the Learning and Training specialization?

The DITA Learning and Training specialization is a set of DITA topic types and elements designed to meet the needs of those creating instructional content, such as course developers and instructors.

The topic types and elements allow you to indicate the specific intent of each piece of content. For instance, the assessment topic type allows you create quizzes. Within that topic type, there are specific elements for various styles of questions: true/false, multiple choice, and so on. Those elements can contain other elements that convey information such as the correct answer, the point value for the answer, responses to give to the student for correct and incorrect answers, and so on. As with all elements in DITA, the names of these elements describes for the author the precise type of information they are creating.

The Learning and Training Specialization also allows training content to be used in multiple ways. For example, a learning assessment topic could be used as a test for students, and have condidtional information including answer keys for instructor use.

This rich set of objects enables you to create DITA content that covers the entire process of planning, creating, and organizing learning content. The topic types and elements in the L&T specialization allow you to plan a great range of content from individual topics to lessons to courses, right up to entire curricula.

You use the Learning and Training topic types to plan your learning content, to list objectives, to author content, to create review materials, and to create assessments.

You can use the Learning and Training map types to organize your learning topics into sets of learning objects and to group those learning objects.

The three Learning and Training domains provide:

- A framework for creating assessments that can appear in a number of topic types
- Elements to contain basic learning metadata
- Reference elements used in the learning map types

Benefits of using the Learning & Training specialization

Using the Learning and Training Specialization to create learing content allows you to output to many different formats. You could output to PDF for a printed textbook, or you could output to HTML for eLearning (with the help of a plugin). There is the option to use the same map for each, or even to create a seperate map that excludes specific learning topics. You might choose to exclude certain types of assessments from a print learning

The L&T specialization, like the rest of DITA, utilizes semantic elements, meaning that the names of the elements give insight to how they are used. The element table indicates that what follows it are the contents of a table. In the Learning and training, the semantic elements are specific to the specialization: the learningOverviewbody element contains the body of a learningOverview topic

The learning object element within the map types of this specialization allows you to group learning topics together into one learning object. Learning plans, overviews, contents, assessments, and summaries for one lesson can be grouped together into one learning object.

The learning object element also allows you to add any DITA authored content, even if it was created without L&T topics.

L&T Specialization use cases

Here are just a few use cases for where you might use the DITA Learning & Training specialization:

- Developing content for instructor-led training. You can use the Learning & Training specialization to create the slides used for the presentation as well the printed materials handed out to students, including: course outlines, workbooks, review materials, and pre- and post-assessments.
- Developing content for web or learning management system (LMS) delivery. Just as Scriptorium does for LearningDITA, the Learning & Training specialization allows you to prepare and organize learning content and assessments.
- If both the training and documentation teams use DITA, both can develop and share content between the groups. While actual presentation and discussion of materials might take different forms, both groups can share common blocks of text, images, tables of data, and the like through DITA warehouse topics.

L&T and curriculum development

The L&T specialization enables you to create learning materials, including content and assessments, right out of the box.

However, many groups prefer a formalized approach, creating their content after careful planning and analysis. The L&T specialization includes a planning topic type that allows you to identify goals, needs, and objectives. The learningGroup and learningObject elements allow you to use planning topic types at many levels of your development.

In addition, the L&T specialization allows you to create learning objects (objective, content, assessment)

The Learning and Training specialization defines many, many elements, so that it is quite flexible and can be adapted to many uses. However, transforming the content into materials, exams, or e-learning content is entirely up to you. One of the reasons that there is no default plugin in the DITA Open Toolkit for Learning and Training content is that there are so many possible output types, it would be hard to pick only a handful. Even if the output types could be narrowed, each output target has its own formatting requirements.

If you are considering working with the DITA Learning and Training specialization, we strongly recommend that you either hire your own in-house DITA transform staff, or you find a consultant who has experience creating the types of output you require.

Assessment

Answer the following questions to check how well you understand the concepts in this lesson.

The Learning and Training topic types

- Understand the purpose of the learningPlan topic type.
- Understand the purpose of the learningObjective topic type.
- Understand the purpose of the learningContent topic type.
- Understand the purpose of the learningSummary topic type.
- Understand the purpose of the learningAssessment topic type.

The DITA Learning and Training specialization defines five topic types that contain different types of course information:

- <learningPlan>—provides a framework for planning learning content.
- <learningOverview>—contains overall learning objectives and specifics for a course, such as audience, duration, and prerequisites.
- <learningContent>—contains the actual learning content.
- <learningSummary>—contains review materials.
- <learningAssessment>—contains exercises, quizzes, or tests.

These topic types describe a wide range of information. Not everyone will use all of these topic types. For example, the source content for LearningDITA lessons do not use the <learningPlan>, <learningOverview>, or <learningSummary> elements. However, your course development process may require those elements.

The following sections provide an overview of the topic types.

The learningPlan topic type

The <learningPlan> topic type helps you organize information for planning lessons. This information includes:

- Project description, including title, dates (modification and delivery, for example), subject, and so on
- Needs analysis, including organizational needs, audience needs, and the required environment for delivering the training
- Gap analysis
- Approach and strategies
- Technical requirements, such as the classroom environment or what type of learning management system (LMS) will contain the content

You specify the preceding information with elements within the learningPlan topic. For example, to specify the description for a course, use the <lcPlanDescrip> element, which can contain paragraphs and unordered lists:

```
            <lcPlanDescrip id="lcPlanDescrip_dnw_3bs_rcb">
               <title>Course Description</title>
               <p>This course is intended for owners of small- to medium-
sized flocks of domestic ducks. Topics covered include:</p>
               <ul>
                   <li>Feed Quality<ul id="ul_i2d_lds_rcb">
```

```
                    <li>Source</li>
                    <li>Protection</li>
                    <li>Contamination and spoilage</li>
                </ul></li>
            <li>Feed Form</li>
            <li>Feeders and waterers</li>
            <li>Nutritional requirements</li>
            <li>Controlling disease</li>
            <li>Avoiding predation</li>
        </ul>
</lcPlanDescrip>
```

Even though the learning and training specialization contains elements exclusively for training content, these elements can contain DITA elements you use elsewhere in concept, task, and reference topics.

Related information

DITA version 1.3 specification, learningPlan

The learningOverview topic type

The learningOverview topic type contains objectives and prerequisites. It describes the learning objectives (what students should gain from the course), course prerequisites (what do students need before beginning a course), and intended audience (expectations about the students).

In a learningOverview the main body-level element is the learningOverviewbody. This element can include the following elements in this order:

1. lcIntro
2. lcAudience
3. lcDuration
4. lcPrereqs
5. lcObjectives
6. lcResources

These elements may be followed by an unlimited number of section elements.

Related information

DITA version 1.3 specification, learningOverview

The learningContent topic type

The learningContent topic type contains the actual learning content.

Within the learningContent's main element, the learningContentbody element, you can add elements lcIntro, lcDuration, lcObjectives, lcChallenge, lcInstruction, and section.

The learningContent topic also allows you to use content from DITA task, concept, and reference topics. You can nest these directly within the learningContent topic or add them using a map. We will discuss this in further detail in the lesson on the learningContent topic, but it means that you can reference previous material from outside of the learning and training specialization. If you were creating a course from a previously written book, you could easily reference the existing DITA material to include in your course.

The learningSummary topic type

The learningSummary topic type contains review materials. This allows you to review the content and puts it in perspective with your learning objectives. This is also the topic to include instructions on what to do next.

Within a learningSummarybody element you can include the lcSummary, lcObjectives (this time with the completed objectives), lcReview, lcNextSteps, lcResources, and section elements.

The learningAssessment topic type

The learningAssessment topic type contains exercises, quizzes, or tests. This information can be included before learning content as a preliminary test, or after content to reiforce content or assess understanding.

The assessment type includes several interaction types that you can use to present questions. The interaction types include true-false, multiple-choice, open question, matching, sequence, and hot-spot (which allows the student to click on the appropriate area of an image). If these questions are meant for an interactive learning environment, it will requirea specific output type as well as a learning management system (LMS).

The main body elemenet is the learningAssessmentbody which can include lcIntro, lcObjectives, lcDuration, lcInteraction, section, and lcSummary elements. Questions types are included in the lcInteraction element.

Assessment

Answer the following questions to check how well you understand the concepts in this lesson.

Learning content

- Describe the two common organizations of learning content.
- Properly order elements within the learningContentbody element.
- Give examples of when it is useful to use learningContent with an embedded topic.
- Author an embedded task topic in a learningContent topic.

The learningContent topic type will likely contain the bulk of your course content. It is where the instructional part of the course should go.

The learningContent topic type

The learningContent topic type contains the instructional content of a course. Depending on how your course is structured, a learningContent topic can serve as a single topic within a lesson, a lesson within a course, or an entire (short) course.

The instructional content can be written in the main body element, learningContentbody, or it can be written in other DITA topics that can be nested within the learningContent topic.

The learningContent elements

learningContentbody: containing element for the other elements within the body of this topic type; specialized from <body>; analogous to <conbody>, <taskbody>, etc.

lcInstruction: containing element for the instructional content in that lesson topic. Can include conceptual information, examples, activities, exercises, etc.

Other optional elements inside learningContentbody:

- lcIntro (introduces the lesson topic, often with a detailed description or instructor notes that <shortdesc> may not adequately cover)
- lcDuration (estimates the length of time it should take the student to read all materials and/or complete all activities within the topic)

- lcObjectives (lists specific objectives, or things the student should know/be able to do after completing the lesson topic)
- lcChallenge (explains what you want the student to practice)

LearningContent with embedded topics

In addition to the learningContent elements, learningContent topics can contain embedded topics.

Your instructional content might include a series of steps for the student to follow to complete an activity. In this case, you can embed a task topic within the learningContent topic to handle these steps:

```
<learningContent id="watching_ducks">
        <title>Watching ducks</title>
        <learningContentbody>
            <lcInstruction>
                <p>Read this to learn more about what you need to have a
 satisfying duck-watching experience.</p>
            </lcInstruction>
        </learningContentbody>
        <task id="how_to_watch_ducks">
            <title>How to watch ducks</title>
            <taskbody>
                <steps id="steps_watching_ducks">
                    <step>
                        <cmd>Choose a location to watch ducks.</cmd>
                    </step>
                    <step>
                        <cmd>Pick a field guide to identify the ducks.</cmd>
                    </step>
                    <step>
                        <cmd>Find some good optics.</cmd>
                    </step>
                </steps>
            </taskbody>
        </task>
    </learningContent>
```

There are several benefits to embedding a topic within a learningContent topic:

- *Reuse.* If you need to reuse content in your training materials, embedding topics allows you to use that content as written rather than re-structuring it into learningContent-specific elements. This can be especially useful for training departments that reuse a lot of content from other departments, such as tech comm or sales.
- *Control.* The lcInstruction element in the body of a learningContent topic contains a limited element set. Embedding another topic type inside the learningContent topic allows you to use its element set instead. For example, if you need to give your students step-by-step instructions, you cannot use the <steps> element inside <lcInstruction>, but you can use it inside an embedded task topic.
- *Flexibility.* You can embed more than one topic into the body of a learningContent topic. This adds flexibility to your learningContent topics; for example, you might embed a concept topic to explain an idea to your students, and then embed a task topic to provide hands-on instructions to enhance their understanding of that concept.

Practice

Assessment

Answer the following questions to check how well you understand the concepts in this lesson.

Elements for questions and responses

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This lesson introduces you to the learningDomain2, which defines the elements you use for questions and responses within the learningAssessment topic.

Related information

https://www.oxygenxml.com/dita/1.3/specs/archSpec/learningTraining/lc-spec-Overview-domains.html#concept_cvq_vzc_ll__section_95070B5E06F6489A94C301B0D77DF71E

The learningAssessment topic type and interactions

A learningAssessment topic is used to write assessment questions for students to answer. Questions are contained elements from the learningDomain2.

Interaction types

True/false

Single select

Multi select

Matching

Sequencing

Short answer

Hotspot

```
<learningAssessment id="la_l1_t1_ingredient_quality">
    <title>Ingredient quality</title>
    <shortdesc>Note that with an “all of the above” type answer, use the
 lcSingleSelect2 interaction type, rather than lcMultipleSelect2. If you use
 the lcMultipleSelect2 and a student selects all
       correct answers (with or without the “all of the above” selection),
 most learning management systems (LMS) will mark this as an incorrect
 response. </shortdesc>
    <learningAssessmentbody>
        <lcInteraction id="lcInteraction_sqq_xws_rcb">
            <lcSingleSelect2>
                <lcQuestion2>Do not use grains that are contaminated with:</
lcQuestion2>
                <lcAnswerOptionGroup2 id="lcAnswerOptionGroup2_skb_bxs_rcb">
                    <lcAnswerOption2>
                        <lcAnswerContent2>Molds</lcAnswerContent2>
                        <lcFeedback2>Not just molds, but weed seeds and dirt
 too.</lcFeedback2>
                    </lcAnswerOption2>
                    <lcAnswerOption2>
                        <lcAnswerContent2>Weed seeds</lcAnswerContent2>
                        <lcFeedback2>Not just weed seeds, but molds and dirt
 too.</lcFeedback2>
                    </lcAnswerOption2>
                    <lcAnswerOption2>
                        <lcAnswerContent2>Dirt</lcAnswerContent2>
```

```
                        <lcFeedback2>Not just dirt, but molds and weed seeds
 too.</lcFeedback2>
                    </lcAnswerOption2>
                    <lcAnswerOption2>
                        <lcAnswerContent2>All of the above</lcAnswerContent2>
                        <lcCorrectResponse2/>
                    </lcAnswerOption2>
                </lcAnswerOptionGroup2>
            </lcSingleSelect2>
        </lcInteraction>
    </learningAssessmentbody>
</learningAssessment>
```

Planning your interactions

About the topic...

Best practices for learningAssessment topics

Best practices for writing good assessment questions:

- Use the objectives in your lesson or course as a starting point. This will help you write questions that test whether the student achieved the learning goals you intended.
- Avoid creating assessments that depend on other assessments. DITA allows questions to be displayed in a random order in your output. Therefore, writing a question that builds on a previous question makes no sense.
- Just as the order of questions can be randomized, so can the order of the answer choices. Therefore, it's best to use a multi-select interaction type rather than a single-select with an "all of the above" answer choice, for example. If the order of your answer choices is important, see if that question might work best as a sequencing interaction type.
- When choosing an interaction type to frame your question, think about what you want students to prove they know. True/false or single-select interactions typically work best for testing their knowledge of facts, while matching or sequencing interactions may work better for testing their understanding of more complex concepts.

Assessment

Answer the following questions to check how well you understand the concepts in this lesson.

Learning objects and learning groups

At the completion of this lesson, students will be able to:

- Describe the differences between the <learningObject> element and the <learningGroup> element.
- State why the individual reference elements are important to learning maps.
- Correctly construct a learningGroupMap and a learningObjectMap.

This lesson introduces you to the learning objects and learning groups, which you can use to organize learning and training topics into courses, curricula, and other, larger structures.

Related information

http://ecolearnit.ifas.ufl.edu/documentation/concept_guide.pdf

Working with Learning Objects

The DITA Learning and Training specialization was created with the reusable learning object, or RLO, approach to learning content in mind. This derived from work by learning content designers at Autodesk®, Oracle®, Cisco®, and other companies. The idea is to create a collection of information objects that can be reused and repurposed, depending on how you need to deliver your learning content.

A learning object is a “discrete reusable collection of content used to present and support a single learning objective.”

The Learning & Training specialization implements learningObjects with the <learningObject> element. The <learingObject> element inherits its behavior from the <topicref> element. It can contain references to the standard learning topics:

- Learning plan (only one per learning object)
- Learning overview topics
- Learning assessment topics (for pre- and post-testing)
- Learning content topics
- Learning summary topics

The specific elements used in the <learningObject> are presented after a brief look at learning maps.

Learning Maps

Before describing how to create learning objects and learning groups, it's necessary to introduce two map types that you use to contain learning objects and learning groups.

- The learningObject map type contains a single <learningObject> element.
- The learningGroup map type contains a single <learningGroup> object.

Both of these types are specializations of the base map type. While the content models in the DITA 1.3 Specification indicate you can use many of the map elements in these types, the intent is that they should contain a single learning group or learning object element. However, it is possible to use <topicref> elements to pull in keymaps and other supporting content.

In practical terms, what this means is that although you can add standard map elements to these maps and the maps will validate correctly, most transforms and other applications that handle these map types will only expect a single learning group or learning object element.

A learning object map has this structure:

```
<!DOCTYPE learningObjectMap PUBLIC "-//OASIS//DTD DITA 1.3 Learning Object
 Map//EN" "learningObjectMap.rng">
<learningObjectMap>
   <learningObject>
      ...
   </learningObject>
</learningObjectMap>
```

A learning group map has this structure:

```
<!DOCTYPE learningGroupMap PUBLIC "-//OASIS//DTD DITA 1.3 Learning Group Map//
EN" "learningGroupMap.rng">
<learningGroupMap>
   <learningGroup>
      ...
   </learningGroup>
</learningGroupMap>
```

Learning Object elements

The <learningObject> element contains references to the topics that support the specific learning object. All of the reference elements inherit their behavior from the <topicref> element. The main reason for using these reference elements is that it becomes immediately apparent what type of topic the reference indicates.

A <learningObject> can contain:

- An optional <learningPlanRef> element that indicates a learning plan topic.

  If you're using the Learning Object Model, the learning plan topic should contain the needs and gap analysis, along with the approach and strategies for this specific content.
- Any number of <learningOverviewRef> and <learningPreAssessmentRef> elements.
  - The <learningOverviewRef> elements indicates learning overview topics.
  - The <learningPreAssessmentRef> element indicates learning assessment topics that are used as a pre-test or other initial assessment.
- One or more <learningContentRef> elements that indicate the learning content for this learning object.
- Any number of <learningSummaryRef> and <learningPostAssessmentRef> elements.
  - The <learningSummaryRef> element indicates learning summary topics.
  - The <learningPostAssessmentRef> element indicates learning assessment topics that are used to reinforce the learning or to assess what the student learned.

This is an example learning object from the Feeding Ducks example in your course materials:

```
<learningObject>
            <topicmeta>
               <navtitle>Topic 1</navtitle>
            </topicmeta>
            <learningPlanRef href="lp_l1_t1_feed_quality.dita"/>
            <learningOverviewRef href="lo_l1_t1_feed_quality.dita"/>
            <learningContentRef href="lc_l1_t1_where_to_buy.dita"/>
            <learningContentRef href="lc_l1_t1_storage.dita"/>
            <learningContentRef href="lc_l1_t1_spoiling.dita"/>
            <learningContentRef href="lc_l1_t1_ingredient_quality.dita"/>
            <learningSummaryRef href="ls_l1_t1_summary.dita"/>
            <learningPostAssessmentRef href="lg_l1_t1_quiz.dita"
 type="learningGroup"/>
         </learningObject>
```

Higher-level organization with learning groups

The point of learning objects is that once they are created, they can be reused. You can build a lesson, a course, or even a curriculum by referencing multiple learning objects from a <learningGroup>.

A learning group is similar in structure to a learning object. However, the learning group has two very large differences:

- Instead of containing references to learning content, the learning group can include
  - Other learning groups
  - References to learning groups
  - Learning Objects
  - References to learning objects

The organization of a <learningGroup> is quite flexible, particularly because it can contain other <learningGroup> elements.

Typically,

Assessment

Answer the following questions to check how well you understand the concepts in this lesson.