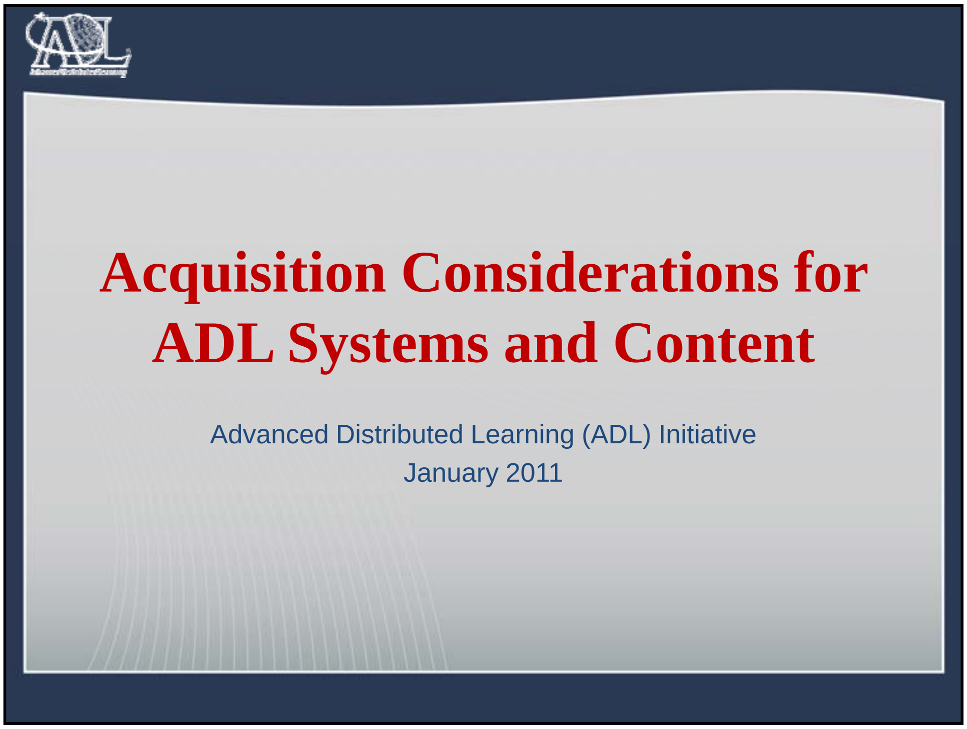
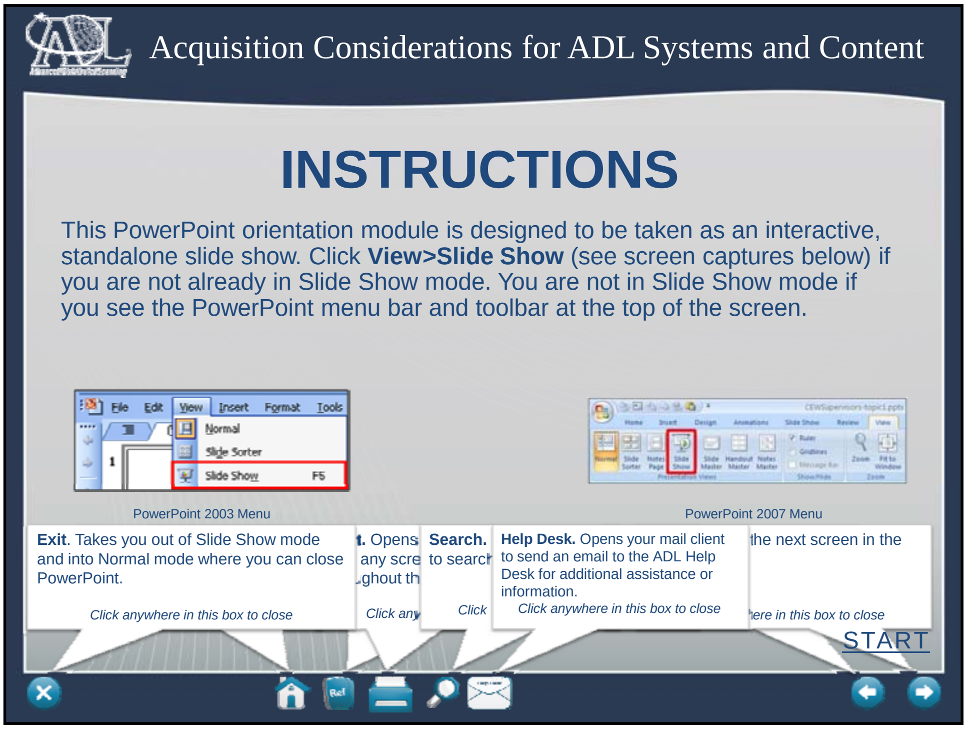


Acquisition Considerations for ADL Systems and Content

Advanced Distributed Learning (ADL) Initiative
January 2011



Acquisition Considerations for ADL Systems and Content

INSTRUCTIONS

This PowerPoint orientation module is designed to be taken as an interactive, standalone slide show. Click **View>Slide Show** (see screen captures below) if you are not already in Slide Show mode. You are not in Slide Show mode if you see the PowerPoint menu bar and toolbar at the top of the screen.

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Exit. Takes you out of Slide Show mode and into Normal mode where you can close PowerPoint.

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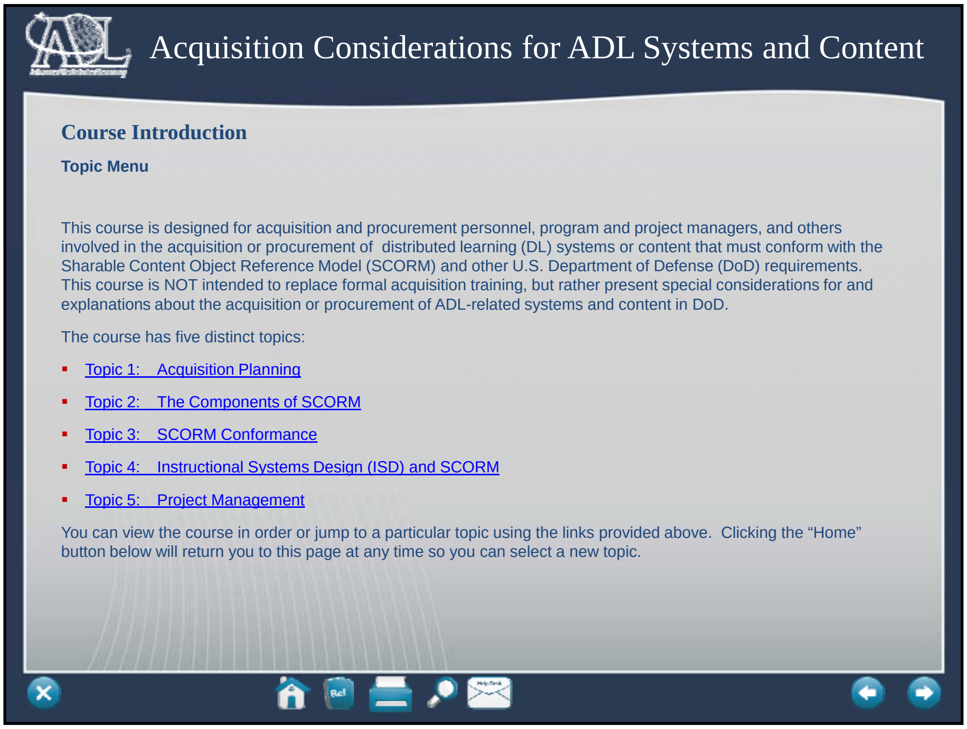


Acquisition Considerations for ADL Systems and Content

Course Introduction

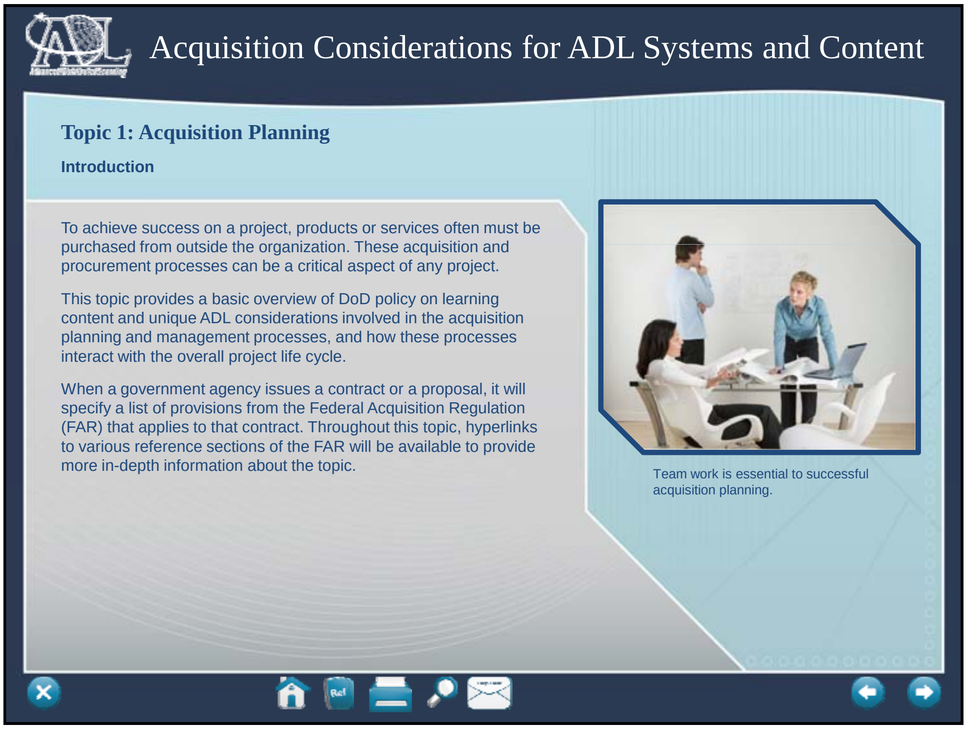
Topic Menu

This course is designed for acquisition and procurement personnel, program and project managers, and others involved in the acquisition or procurement of distributed learning (DL) systems or content that must conform with the Sharable Content Object Reference Model (SCORM) and other U.S. Department of Defense (DoD) requirements. This course is NOT intended to replace formal acquisition training, but rather present special considerations for and explanations about the acquisition or procurement of ADL-related systems and content in DoD.

The course has five distinct topics:

- Topic 1: Acquisition Planning
- Topic 2: The Components of SCORM
- Topic 3: SCORM Conformance
- Topic 4: Instructional Systems Design (ISD) and SCORM
- Topic 5: Project Management

You can view the course in order or jump to a particular topic using the links provided above. Clicking the “Home” button below will return you to this page at any time so you can select a new topic.



Acquisition Considerations for ADL Systems and Content

Topic 1: Acquisition Planning

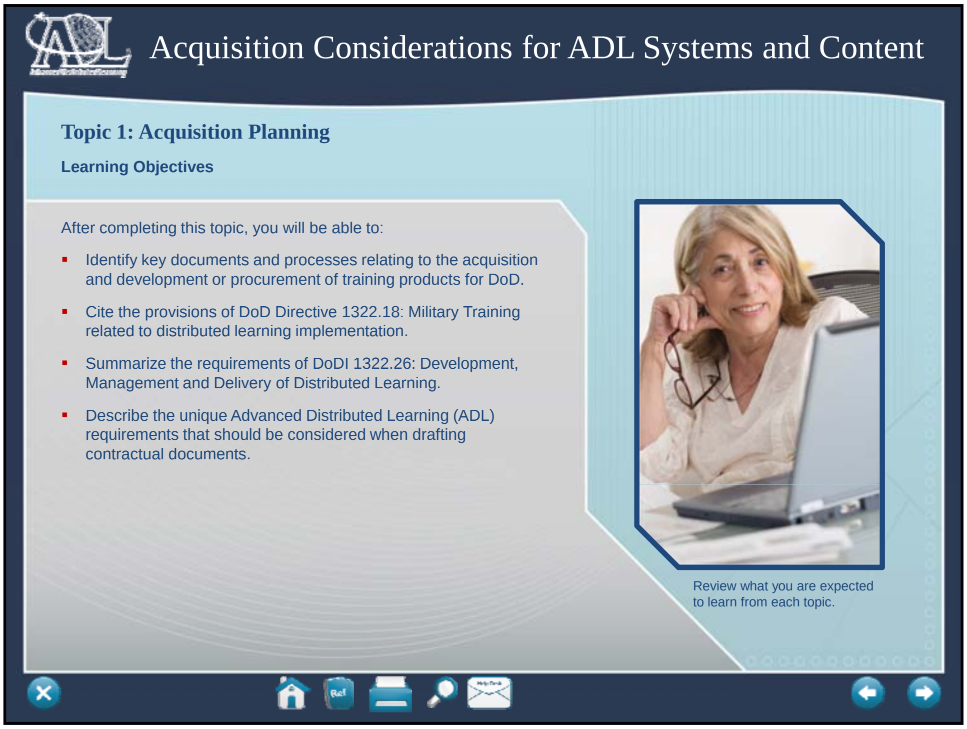
Introduction

To achieve success on a project, products or services often must be purchased from outside the organization. These acquisition and procurement processes can be a critical aspect of any project.

This topic provides a basic overview of DoD policy on learning content and unique ADL considerations involved in the acquisition planning and management processes, and how these processes interact with the overall project life cycle.

When a government agency issues a contract or a proposal, it will specify a list of provisions from the Federal Acquisition Regulation (FAR) that applies to that contract. Throughout this topic, hyperlinks to various reference sections of the FAR will be available to provide more in-depth information about the topic.

Team work is essential to successful acquisition planning.



Acquisition Considerations for ADL Systems and Content

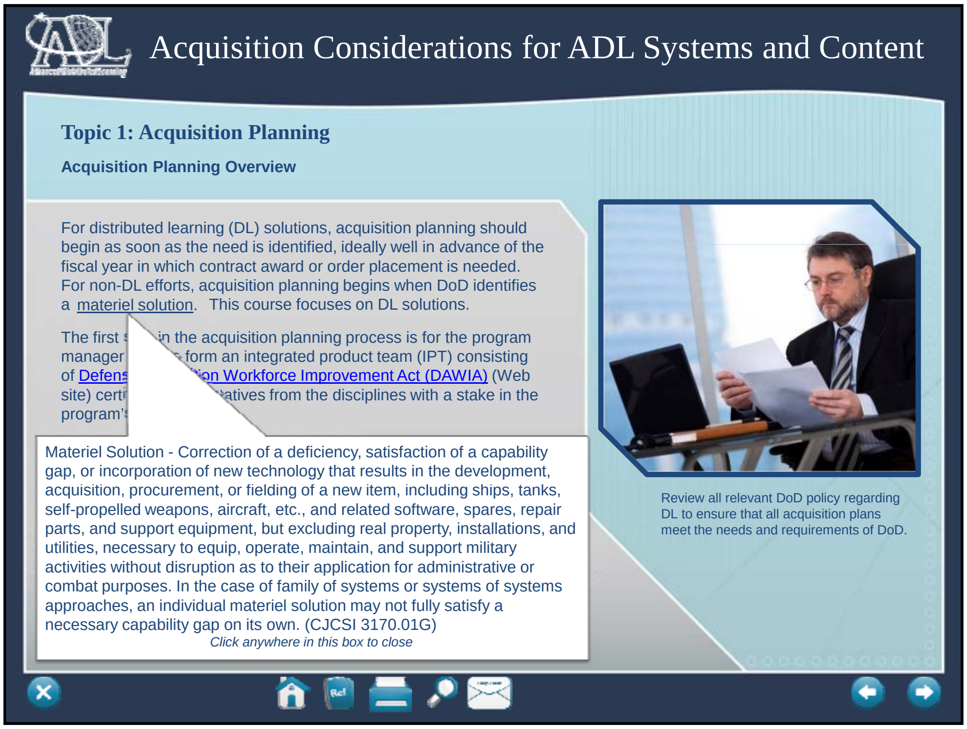
Topic 1: Acquisition Planning

Learning Objectives

After completing this topic, you will be able to:

- Identify key documents and processes relating to the acquisition and development or procurement of training products for DoD.
- Cite the provisions of DoD Directive 1322.18: Military Training related to distributed learning implementation.
- Summarize the requirements of DoDI 1322.26: Development, Management and Delivery of Distributed Learning.
- Describe the unique Advanced Distributed Learning (ADL) requirements that should be considered when drafting contractual documents.

Review what you are expected to learn from each topic.



Acquisition Considerations for ADL Systems and Content

Topic 1: Acquisition Planning

Acquisition Planning Overview

For distributed learning (DL) solutions, acquisition planning should begin as soon as the need is identified, ideally well in advance of the fiscal year in which contract award or order placement is needed. For non-DL efforts, acquisition planning begins when DoD identifies a materiel solution. This course focuses on DL solutions.

The first s in the acquisition planning process is for the program manager form an integrated product team (IPT) consisting of Defens ion Workforce Improvement Act (DAWIA) (Web site) certi atives from the disciplines with a stake in the program's

Materiel Solution - Correction of a deficiency, satisfaction of a capability gap, or incorporation of new technology that results in the development, acquisition, procurement, or fielding of a new item, including ships, tanks, self-propelled weapons, aircraft, etc., and related software, spares, repair parts, and support equipment, but excluding real property, installations, and utilities, necessary to equip, operate, maintain, and support military activities without disruption as to their application for administrative or combat purposes. In the case of family of systems or systems of systems approaches, an individual materiel solution may not fully satisfy a necessary capability gap on its own. (CJCSI 3170.01G)

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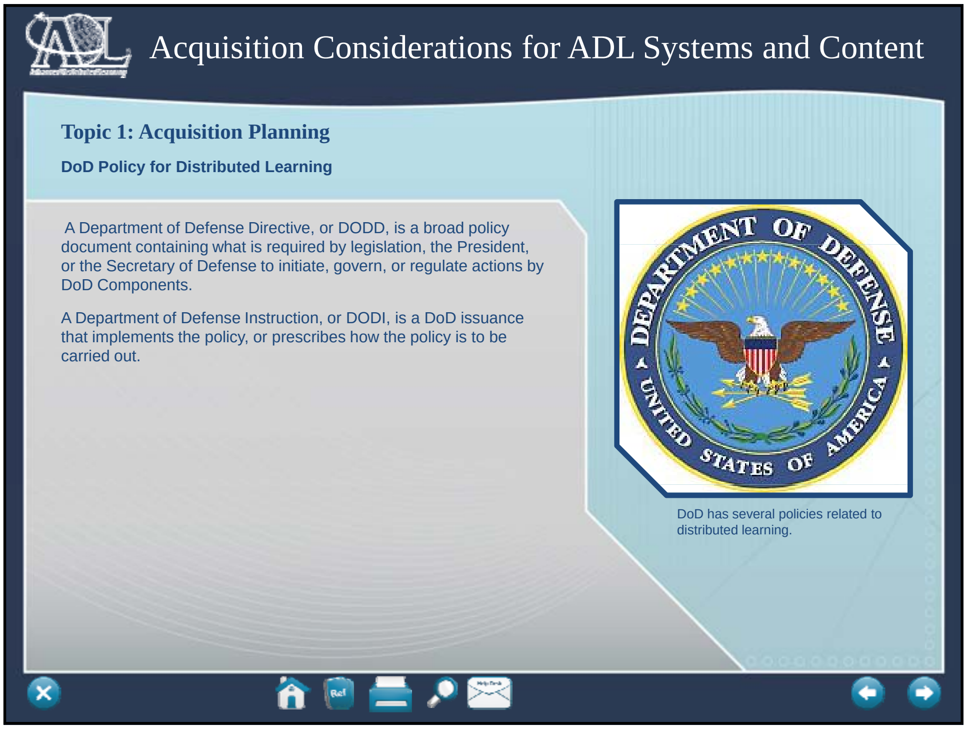
Review all relevant DoD policy regarding DL to ensure that all acquisition plans meet the needs and requirements of DoD.



Acquisition Considerations for ADL Systems and Content

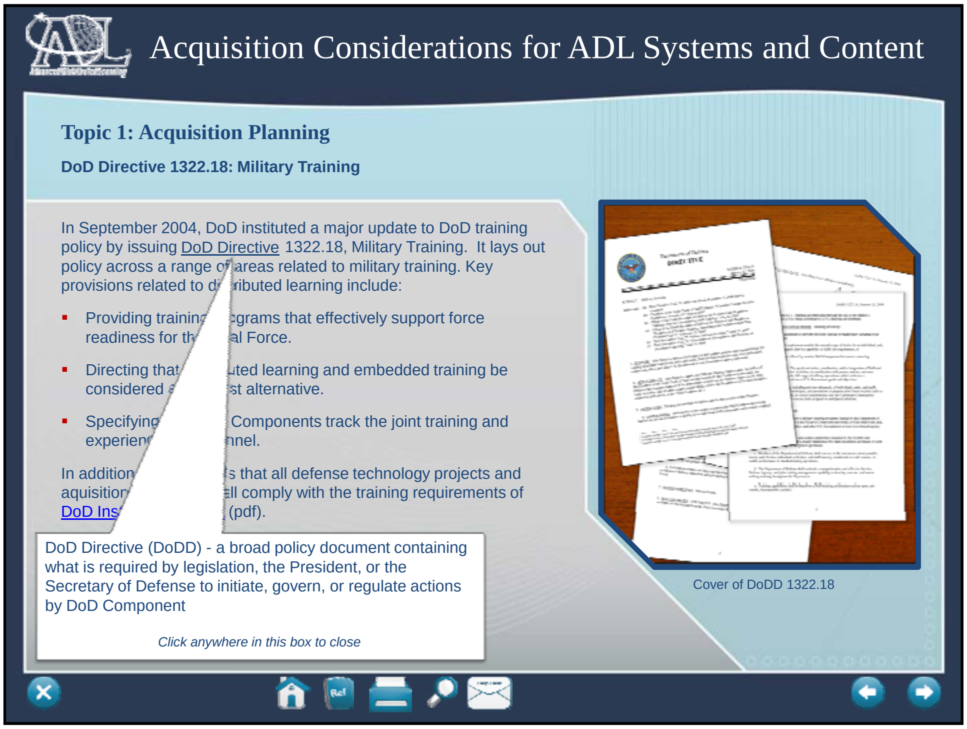
Topic 1: Acquisition Planning

DoD Policy for Distributed Learning

A Department of Defense Directive, or DODD, is a broad policy document containing what is required by legislation, the President, or the Secretary of Defense to initiate, govern, or regulate actions by DoD Components.

A Department of Defense Instruction, or DODI, is a DoD issuance that implements the policy, or prescribes how the policy is to be carried out.

DoD has several policies related to distributed learning.



Acquisition Considerations for ADL Systems and Content

Topic 1: Acquisition Planning

DoD Directive 1322.18: Military Training

In September 2004, DoD instituted a major update to DoD training policy by issuing DoD Directive 1322.18, Military Training. It lays out policy across a range o areas related to military training. Key provisions related to d ributed learning include:

- Providing trainin grams that effectively support force readiness for th al Force.
- Directing that uted learning and embedded training be considered a st alternative.
- Specifying Components track the joint training and experien nnel.

In addition s that all defense technology projects and aquisition ll comply with the training requirements of DoD Ins (pdf).

DoD Directive (DoDD) - a broad policy document containing what is required by legislation, the President, or the Secretary of Defense to initiate, govern, or regulate actions by DoD Component

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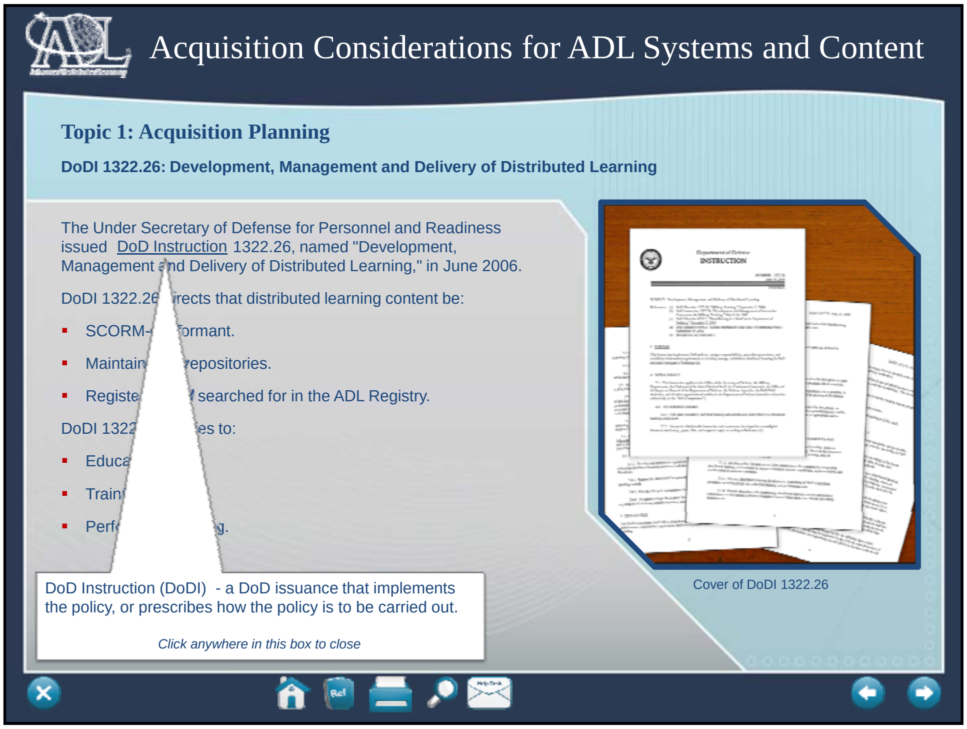
Cover of DoDD 1322.18



Acquisition Considerations for ADL Systems and Content

Topic 1: Acquisition Planning

DoDI 1322.26: Development, Management and Delivery of Distributed Learning

The Under Secretary of Defense for Personnel and Readiness issued DoD Instruction 1322.26, named "Development, Management and Delivery of Distributed Learning," in June 2006.

DoDI 1322.26 irects that distributed learning content be:

- SCORM- formant.
- Maintain repositories.
- Registe searched for in the ADL Registry.

DoDI 1322 es to:

- Educa
- Train
- Perf g.

DoD Instruction (DoDI) - a DoD issuance that implements the policy, or prescribes how the policy is to be carried out.

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Cover of DoDI 1322.26

Acquisition Considerations for ADL Systems and Content

Topic 1: Acquisition Planning

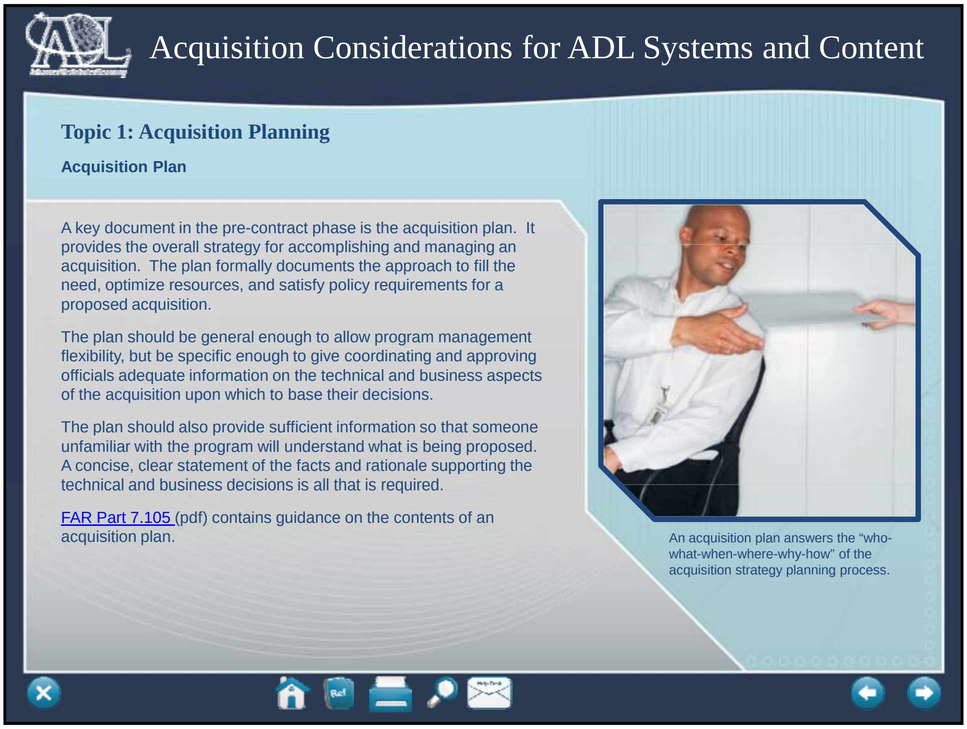
Previous Acquisition Review

In addition to understanding the DoD policies on distributed learning, the PM should also review previous plans for similar acquisitions and discuss them with the key personnel involved in those acquisitions. Key goals to acquisition planning should be to:

- Minimize the time and cost of satisfying validated needs.
- Maximize affordability throughout a program's useful life cycle.

After these initial steps are complete, the team can begin to craft an acquisition plan.

Review previous plans for similar acquisitions and discuss them with the key personnel from those acquisitions.



Acquisition Considerations for ADL Systems and Content

Topic 1: Acquisition Planning

Acquisition Plan

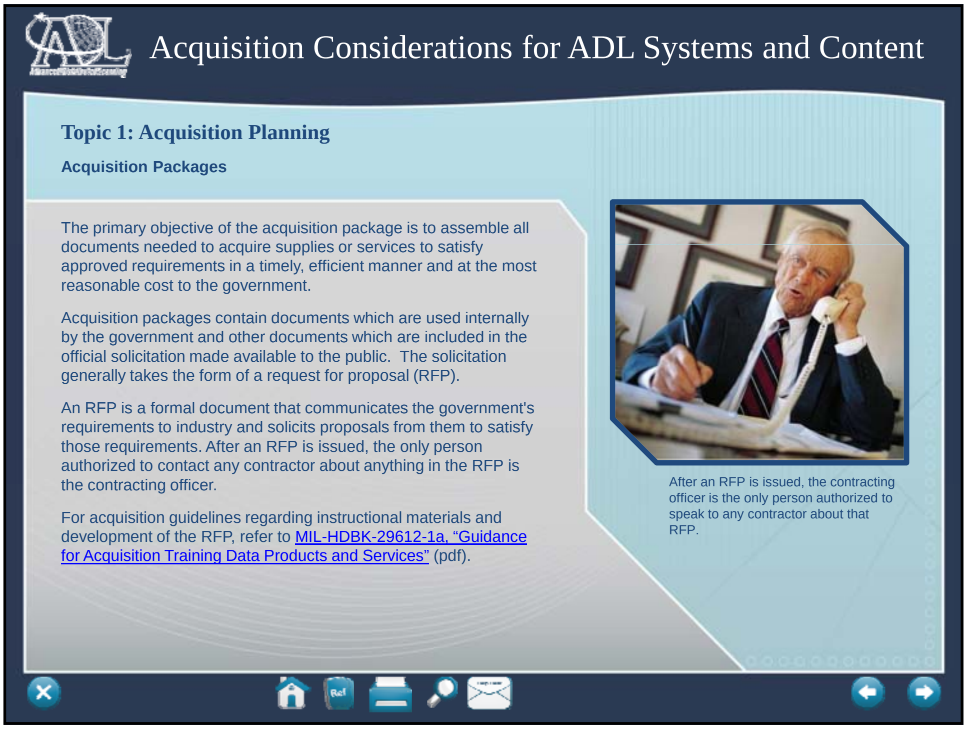
A key document in the pre-contract phase is the acquisition plan. It provides the overall strategy for accomplishing and managing an acquisition. The plan formally documents the approach to fill the need, optimize resources, and satisfy policy requirements for a proposed acquisition.

The plan should be general enough to allow program management flexibility, but be specific enough to give coordinating and approving officials adequate information on the technical and business aspects of the acquisition upon which to base their decisions.

The plan should also provide sufficient information so that someone unfamiliar with the program will understand what is being proposed. A concise, clear statement of the facts and rationale supporting the technical and business decisions is all that is required.

FAR Part 7.105 (pdf) contains guidance on the contents of an acquisition plan.

An acquisition plan answers the "who-what-when-where-why-how" of the acquisition strategy planning process.



Acquisition Considerations for ADL Systems and Content

Topic 1: Acquisition Planning

Acquisition Packages

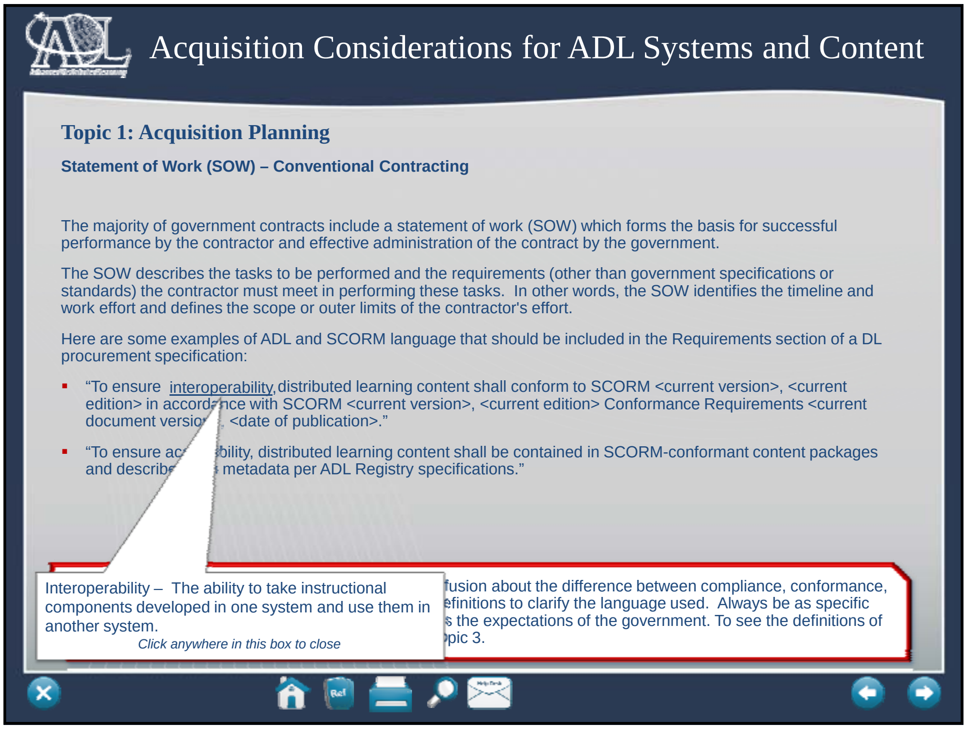
The primary objective of the acquisition package is to assemble all documents needed to acquire supplies or services to satisfy approved requirements in a timely, efficient manner and at the most reasonable cost to the government.

Acquisition packages contain documents which are used internally by the government and other documents which are included in the official solicitation made available to the public. The solicitation generally takes the form of a request for proposal (RFP).

An RFP is a formal document that communicates the government's requirements to industry and solicits proposals from them to satisfy those requirements. After an RFP is issued, the only person authorized to contact any contractor about anything in the RFP is the contracting officer.

For acquisition guidelines regarding instructional materials and development of the RFP, refer to MIL-HDBK-29612-1a, "Guidance for Acquisition Training Data Products and Services" (pdf).

After an RFP is issued, the contracting officer is the only person authorized to speak to any contractor about that RFP.



Acquisition Considerations for ADL Systems and Content

Topic 1: Acquisition Planning

Statement of Work (SOW) – Conventional Contracting

The majority of government contracts include a statement of work (SOW) which forms the basis for successful performance by the contractor and effective administration of the contract by the government.

The SOW describes the tasks to be performed and the requirements (other than government specifications or standards) the contractor must meet in performing these tasks. In other words, the SOW identifies the timeline and work effort and defines the scope or outer limits of the contractor's effort.

Here are some examples of ADL and SCORM language that should be included in the Requirements section of a DL procurement specification:

- “To ensure interoperability, distributed learning content shall conform to SCORM <current version>, <current edition> in accordance with SCORM <current version>, <current edition> Conformance Requirements <current document versio , <date of publication>.”
- “To ensure ac bility, distributed learning content shall be contained in SCORM-conformant content packages and describ metadata per ADL Registry specifications.”

Interoperability – The ability to take instructional components developed in one system and use them in another system.

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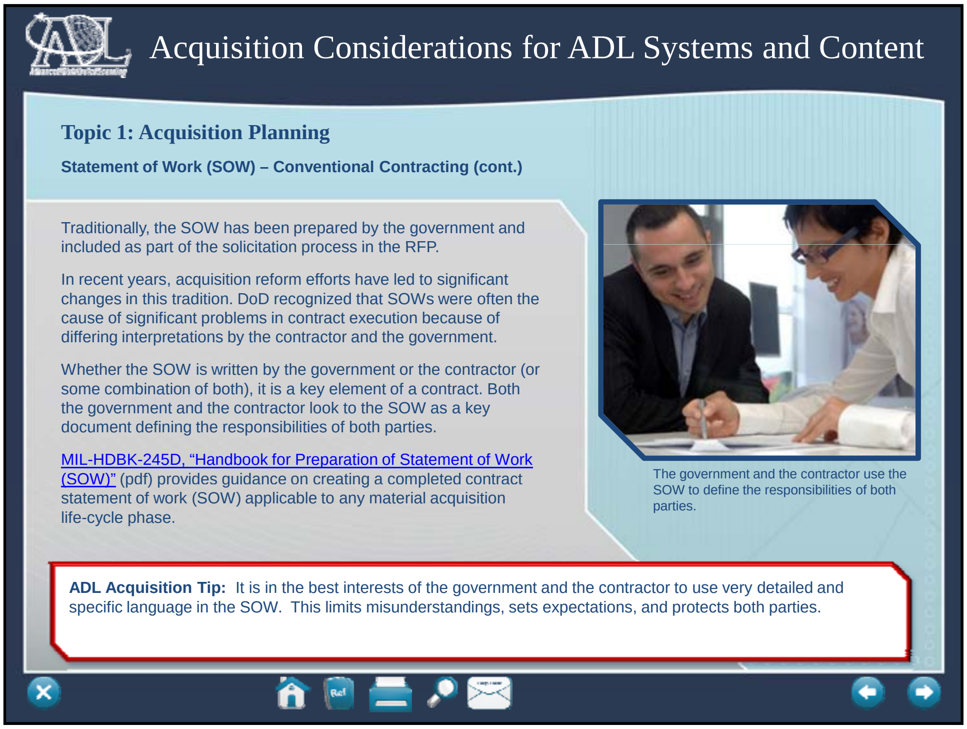
fusion about the difference between compliance, conformance, efinitions to clarify the language used. Always be as specific s the expectations of the government. To see the definitions of pic 3.



Acquisition Considerations for ADL Systems and Content

Topic 1: Acquisition Planning

Statement of Work (SOW) – Conventional Contracting (cont.)

Traditionally, the SOW has been prepared by the government and included as part of the solicitation process in the RFP.

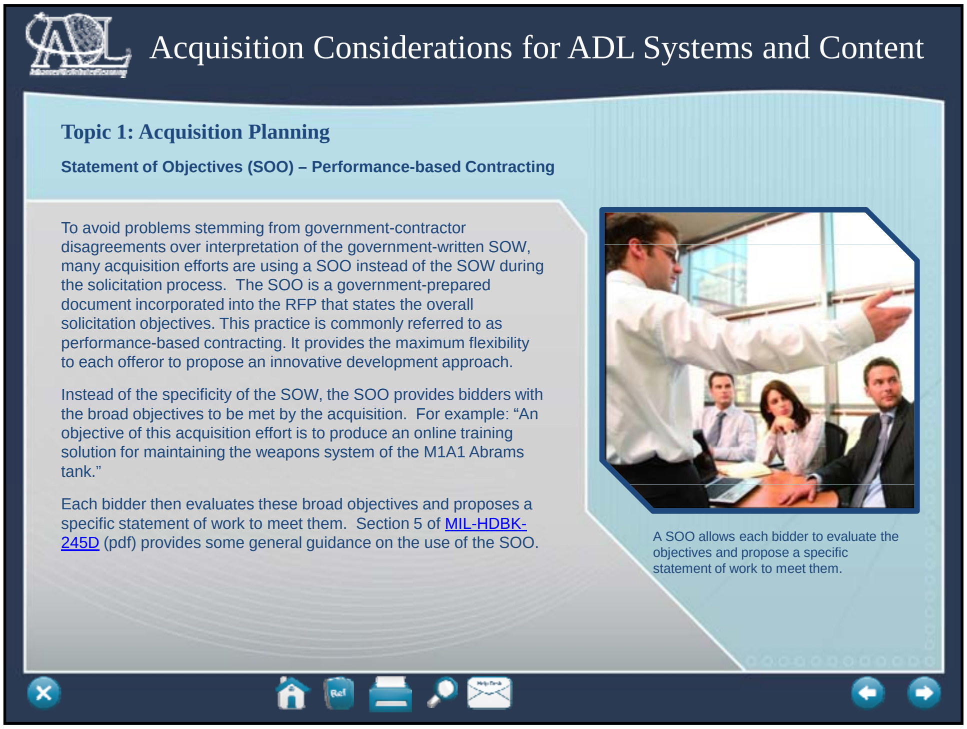
In recent years, acquisition reform efforts have led to significant changes in this tradition. DoD recognized that SOWs were often the cause of significant problems in contract execution because of differing interpretations by the contractor and the government.

Whether the SOW is written by the government or the contractor (or some combination of both), it is a key element of a contract. Both the government and the contractor look to the SOW as a key document defining the responsibilities of both parties.

MIL-HDBK-245D, “Handbook for Preparation of Statement of Work (SOW)” (pdf) provides guidance on creating a completed contract statement of work (SOW) applicable to any material acquisition life-cycle phase.

The government and the contractor use the SOW to define the responsibilities of both parties.

ADL Acquisition Tip: It is in the best interests of the government and the contractor to use very detailed and specific language in the SOW. This limits misunderstandings, sets expectations, and protects both parties.



Acquisition Considerations for ADL Systems and Content

Topic 1: Acquisition Planning

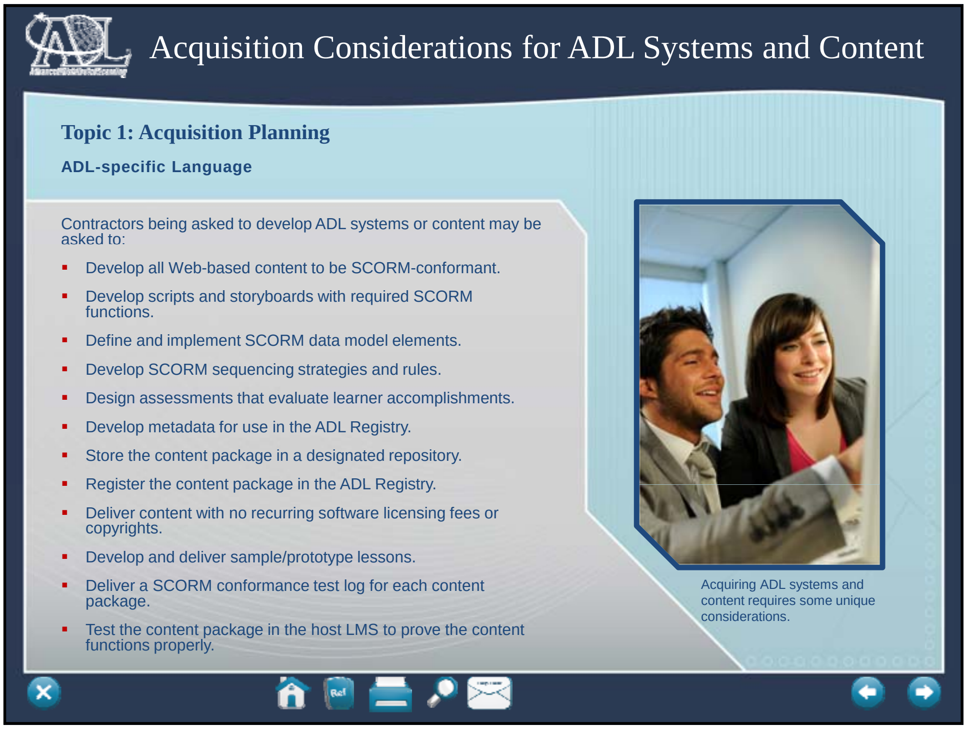
Statement of Objectives (SOO) – Performance-based Contracting

To avoid problems stemming from government-contractor disagreements over interpretation of the government-written SOW, many acquisition efforts are using a SOO instead of the SOW during the solicitation process. The SOO is a government-prepared document incorporated into the RFP that states the overall solicitation objectives. This practice is commonly referred to as performance-based contracting. It provides the maximum flexibility to each offeror to propose an innovative development approach.

Instead of the specificity of the SOW, the SOO provides bidders with the broad objectives to be met by the acquisition. For example: "An objective of this acquisition effort is to produce an online training solution for maintaining the weapons system of the M1A1 Abrams tank."

Each bidder then evaluates these broad objectives and proposes a specific statement of work to meet them. Section 5 of MIL-HDBK-245D (pdf) provides some general guidance on the use of the SOO.

A SOO allows each bidder to evaluate the objectives and propose a specific statement of work to meet them.



Acquisition Considerations for ADL Systems and Content

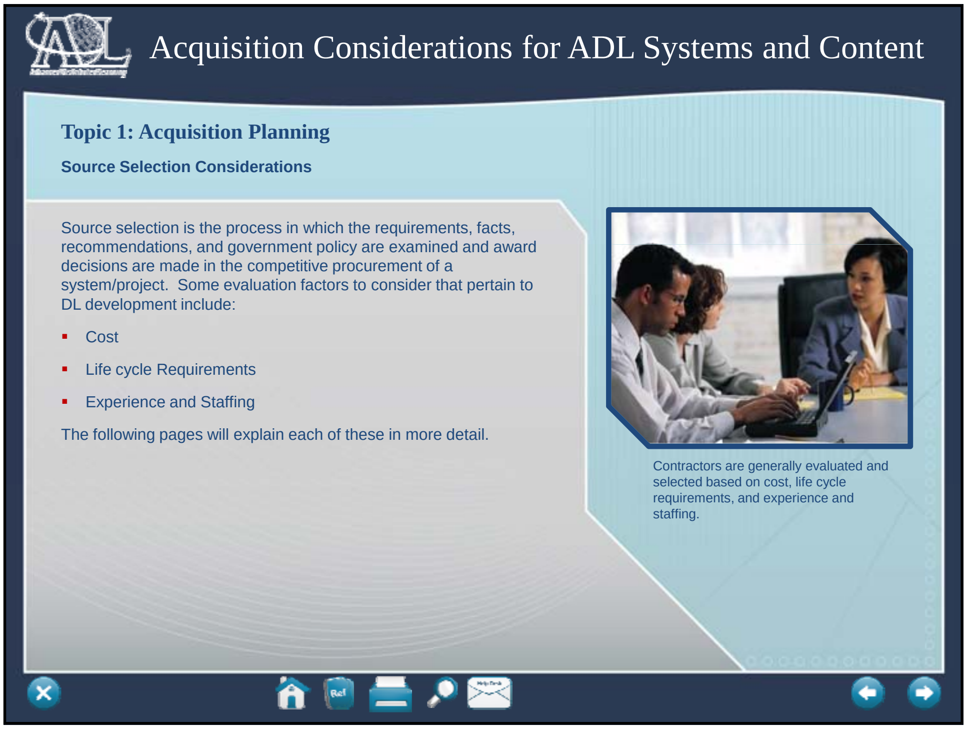
Topic 1: Acquisition Planning

ADL-specific Language

Contractors being asked to develop ADL systems or content may be asked to:

- Develop all Web-based content to be SCORM-conformant.
- Develop scripts and storyboards with required SCORM functions.
- Define and implement SCORM data model elements.
- Develop SCORM sequencing strategies and rules.
- Design assessments that evaluate learner accomplishments.
- Develop metadata for use in the ADL Registry.
- Store the content package in a designated repository.
- Register the content package in the ADL Registry.
- Deliver content with no recurring software licensing fees or copyrights.
- Develop and deliver sample/prototype lessons.
- Deliver a SCORM conformance test log for each content package.
- Test the content package in the host LMS to prove the content functions properly.

Acquiring ADL systems and content requires some unique considerations.



Acquisition Considerations for ADL Systems and Content

Topic 1: Acquisition Planning

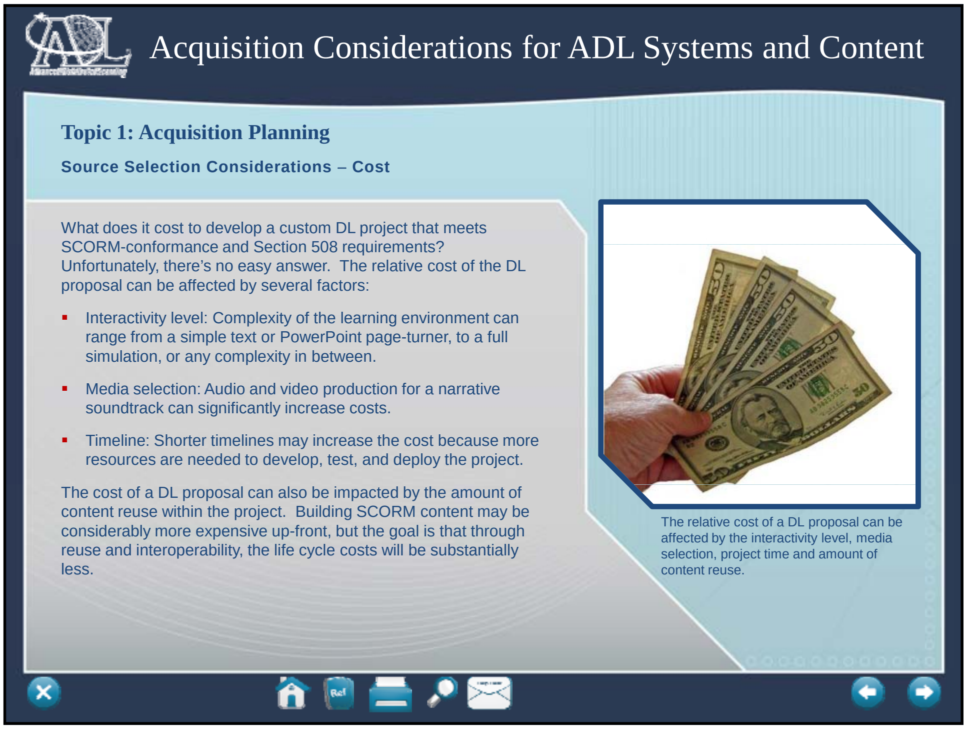
Source Selection Considerations

Source selection is the process in which the requirements, facts, recommendations, and government policy are examined and award decisions are made in the competitive procurement of a system/project. Some evaluation factors to consider that pertain to DL development include:

- Cost
- Life cycle Requirements
- Experience and Staffing

The following pages will explain each of these in more detail.

Contractors are generally evaluated and selected based on cost, life cycle requirements, and experience and staffing.



Acquisition Considerations for ADL Systems and Content

Topic 1: Acquisition Planning

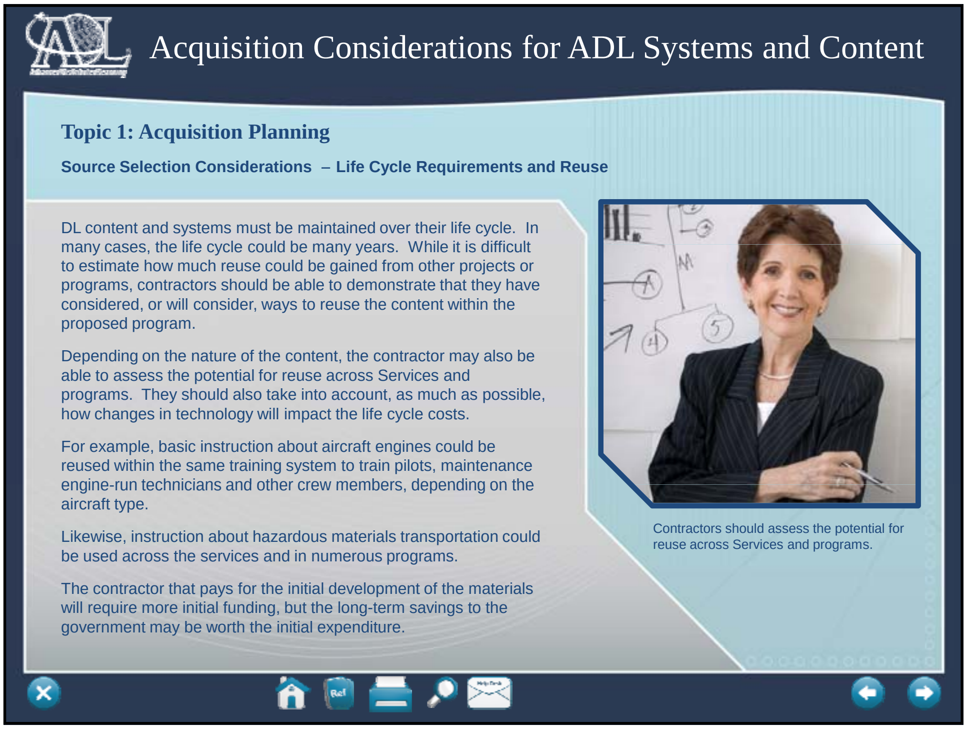
Source Selection Considerations – Cost

What does it cost to develop a custom DL project that meets SCORM-conformance and Section 508 requirements? Unfortunately, there's no easy answer. The relative cost of the DL proposal can be affected by several factors:

- Interactivity level: Complexity of the learning environment can range from a simple text or PowerPoint page-turner, to a full simulation, or any complexity in between.
- Media selection: Audio and video production for a narrative soundtrack can significantly increase costs.
- Timeline: Shorter timelines may increase the cost because more resources are needed to develop, test, and deploy the project.

The cost of a DL proposal can also be impacted by the amount of content reuse within the project. Building SCORM content may be considerably more expensive up-front, but the goal is that through reuse and interoperability, the life cycle costs will be substantially less.

The relative cost of a DL proposal can be affected by the interactivity level, media selection, project time and amount of content reuse.



Acquisition Considerations for ADL Systems and Content

Topic 1: Acquisition Planning

Source Selection Considerations – Life Cycle Requirements and Reuse

DL content and systems must be maintained over their life cycle. In many cases, the life cycle could be many years. While it is difficult to estimate how much reuse could be gained from other projects or programs, contractors should be able to demonstrate that they have considered, or will consider, ways to reuse the content within the proposed program.

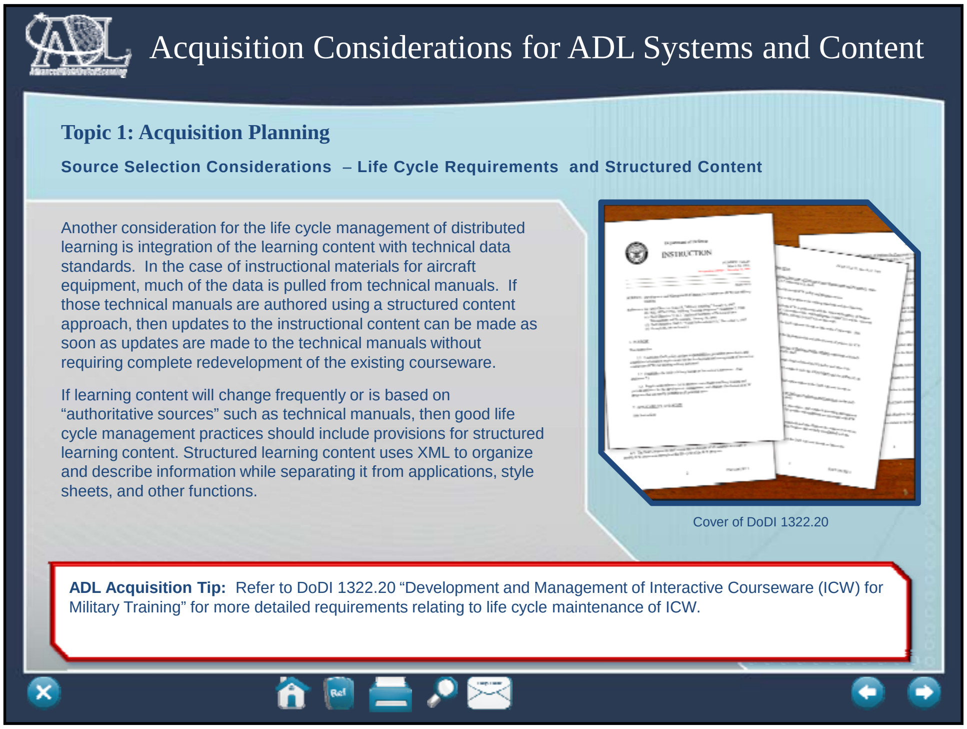
Depending on the nature of the content, the contractor may also be able to assess the potential for reuse across Services and programs. They should also take into account, as much as possible, how changes in technology will impact the life cycle costs.

For example, basic instruction about aircraft engines could be reused within the same training system to train pilots, maintenance engine-run technicians and other crew members, depending on the aircraft type.

Likewise, instruction about hazardous materials transportation could be used across the services and in numerous programs.

The contractor that pays for the initial development of the materials will require more initial funding, but the long-term savings to the government may be worth the initial expenditure.

Contractors should assess the potential for reuse across Services and programs.



Acquisition Considerations for ADL Systems and Content

Topic 1: Acquisition Planning

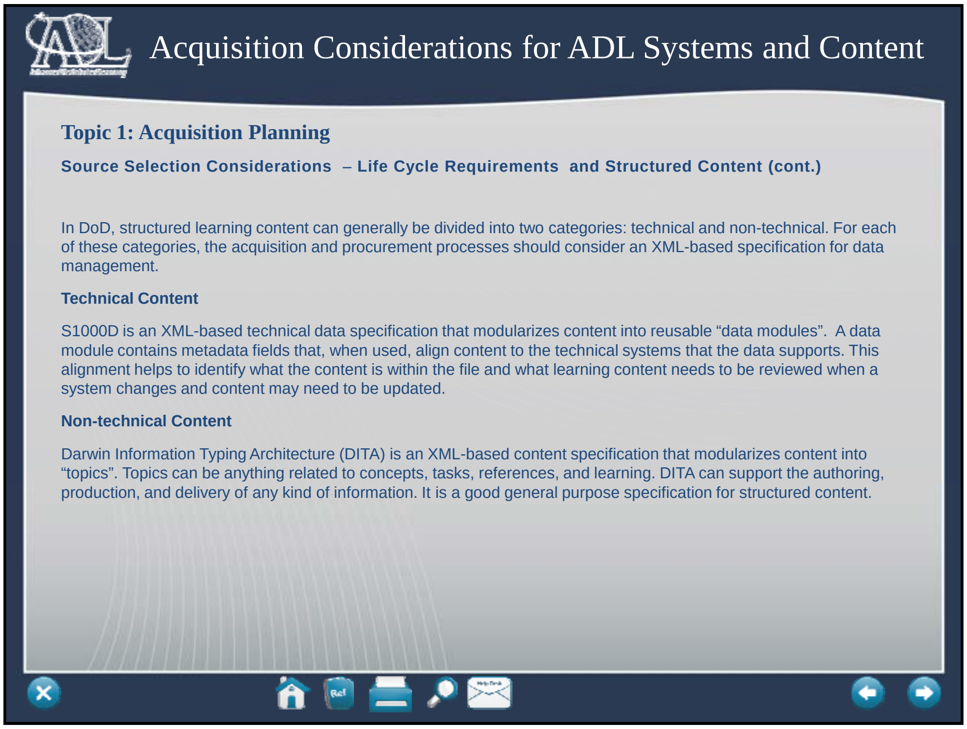
Source Selection Considerations – Life Cycle Requirements and Structured Content

Another consideration for the life cycle management of distributed learning is integration of the learning content with technical data standards. In the case of instructional materials for aircraft equipment, much of the data is pulled from technical manuals. If those technical manuals are authored using a structured content approach, then updates to the instructional content can be made as soon as updates are made to the technical manuals without requiring complete redevelopment of the existing courseware.

If learning content will change frequently or is based on “authoritative sources” such as technical manuals, then good life cycle management practices should include provisions for structured learning content. Structured learning content uses XML to organize and describe information while separating it from applications, style sheets, and other functions.

Cover of DoDI 1322.20

ADL Acquisition Tip: Refer to DoDI 1322.20 “Development and Management of Interactive Courseware (ICW) for Military Training” for more detailed requirements relating to life cycle maintenance of ICW.



Acquisition Considerations for ADL Systems and Content

Topic 1: Acquisition Planning

Source Selection Considerations – Life Cycle Requirements and Structured Content (cont.)

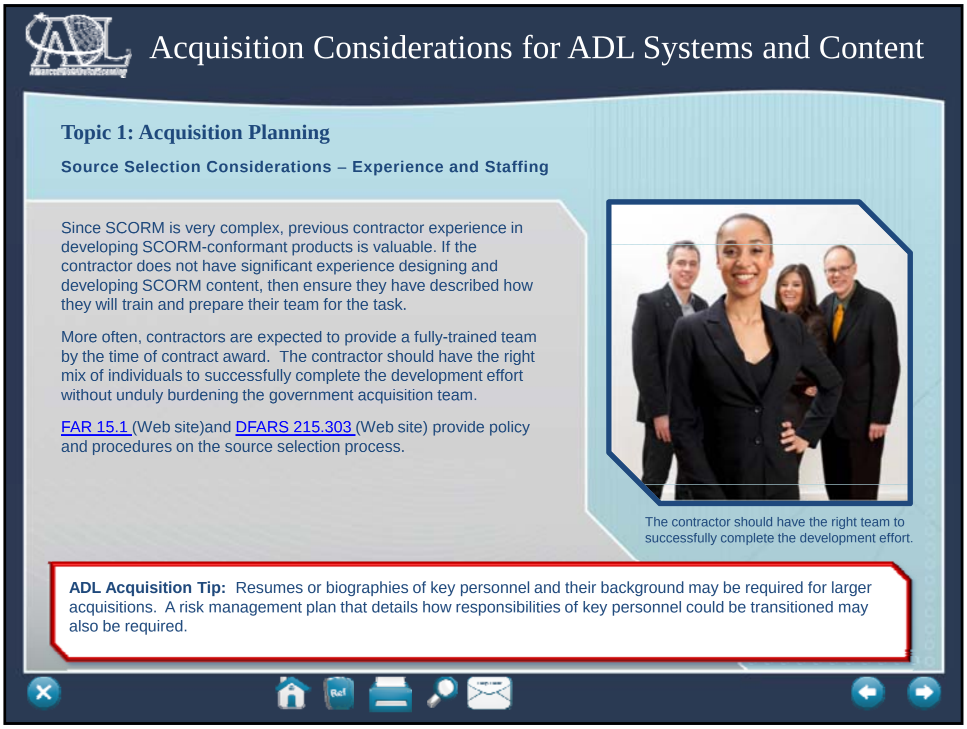
In DoD, structured learning content can generally be divided into two categories: technical and non-technical. For each of these categories, the acquisition and procurement processes should consider an XML-based specification for data management.

Technical Content

S1000D is an XML-based technical data specification that modularizes content into reusable “data modules”. A data module contains metadata fields that, when used, align content to the technical systems that the data supports. This alignment helps to identify what the content is within the file and what learning content needs to be reviewed when a system changes and content may need to be updated.

Non-technical Content

Darwin Information Typing Architecture (DITA) is an XML-based content specification that modularizes content into “topics”. Topics can be anything related to concepts, tasks, references, and learning. DITA can support the authoring, production, and delivery of any kind of information. It is a good general purpose specification for structured content.



Acquisition Considerations for ADL Systems and Content

Topic 1: Acquisition Planning

Source Selection Considerations – Experience and Staffing

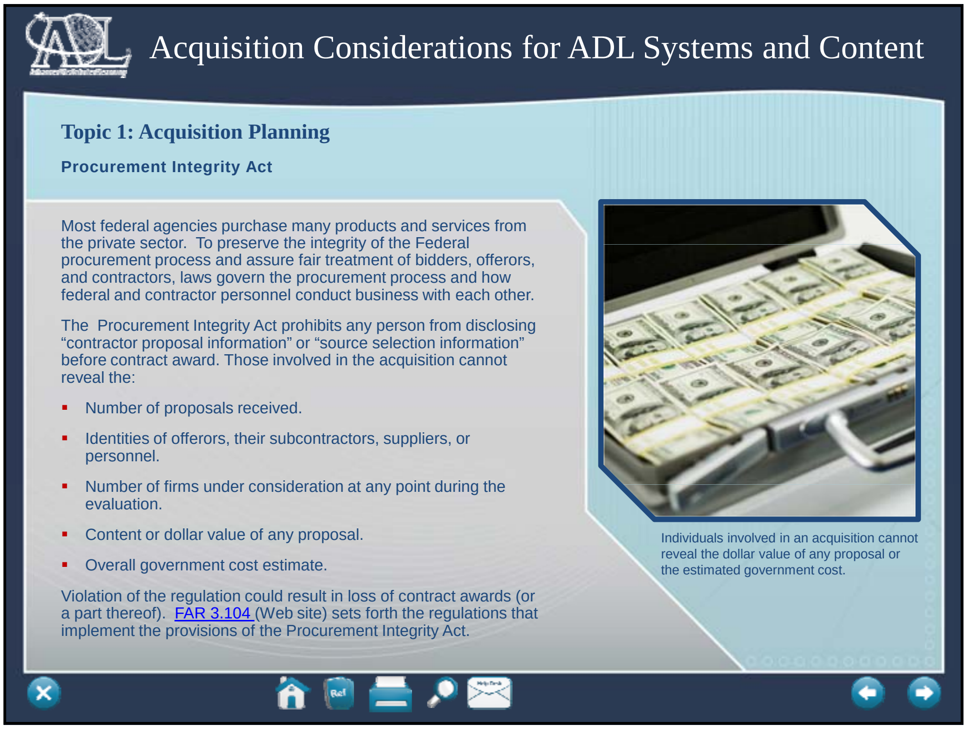
Since SCORM is very complex, previous contractor experience in developing SCORM-conformant products is valuable. If the contractor does not have significant experience designing and developing SCORM content, then ensure they have described how they will train and prepare their team for the task.

More often, contractors are expected to provide a fully-trained team by the time of contract award. The contractor should have the right mix of individuals to successfully complete the development effort without unduly burdening the government acquisition team.

FAR 15.1 (Web site)and DFARS 215.303 (Web site) provide policy and procedures on the source selection process.

The contractor should have the right team to successfully complete the development effort.

ADL Acquisition Tip: Resumes or biographies of key personnel and their background may be required for larger acquisitions. A risk management plan that details how responsibilities of key personnel could be transitioned may also be required.



Acquisition Considerations for ADL Systems and Content

Topic 1: Acquisition Planning

Procurement Integrity Act

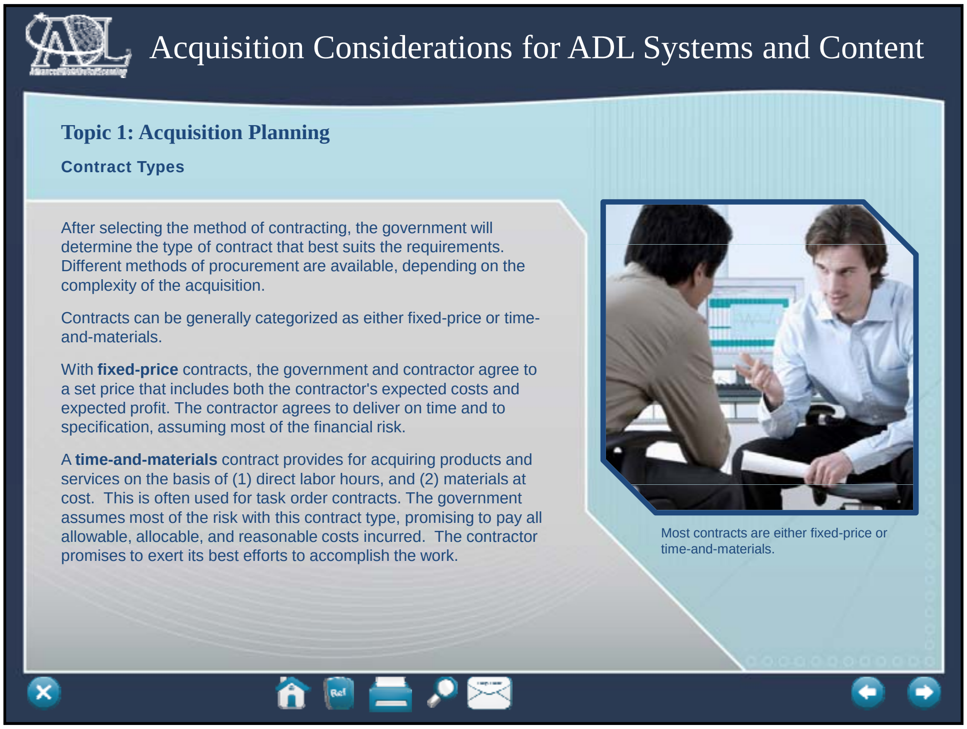
Most federal agencies purchase many products and services from the private sector. To preserve the integrity of the Federal procurement process and assure fair treatment of bidders, offerors, and contractors, laws govern the procurement process and how federal and contractor personnel conduct business with each other.

The Procurement Integrity Act prohibits any person from disclosing “contractor proposal information” or “source selection information” before contract award. Those involved in the acquisition cannot reveal the:

- Number of proposals received.
- Identities of offerors, their subcontractors, suppliers, or personnel.
- Number of firms under consideration at any point during the evaluation.
- Content or dollar value of any proposal.
- Overall government cost estimate.

Violation of the regulation could result in loss of contract awards (or a part thereof). FAR 3.104 (Web site) sets forth the regulations that implement the provisions of the Procurement Integrity Act.

Individuals involved in an acquisition cannot reveal the dollar value of any proposal or the estimated government cost.



Acquisition Considerations for ADL Systems and Content

Topic 1: Acquisition Planning

Contract Types

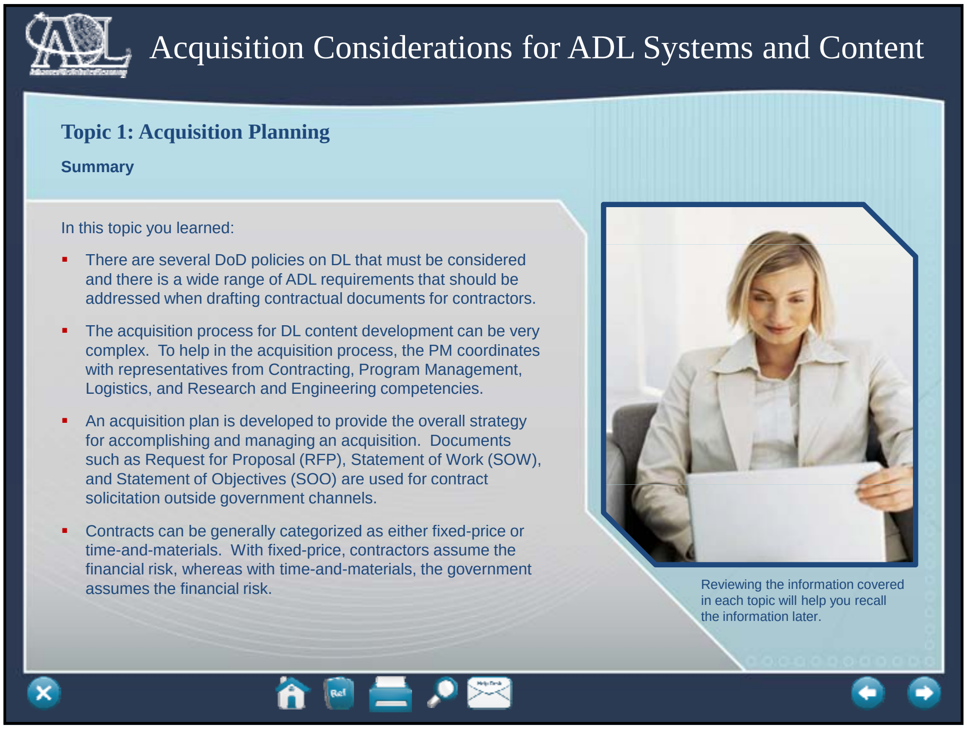
After selecting the method of contracting, the government will determine the type of contract that best suits the requirements. Different methods of procurement are available, depending on the complexity of the acquisition.

Contracts can be generally categorized as either fixed-price or time-and-materials.

With **fixed-price** contracts, the government and contractor agree to a set price that includes both the contractor's expected costs and expected profit. The contractor agrees to deliver on time and to specification, assuming most of the financial risk.

A **time-and-materials** contract provides for acquiring products and services on the basis of (1) direct labor hours, and (2) materials at cost. This is often used for task order contracts. The government assumes most of the risk with this contract type, promising to pay all allowable, allocable, and reasonable costs incurred. The contractor promises to exert its best efforts to accomplish the work.

Most contracts are either fixed-price or time-and-materials.



Acquisition Considerations for ADL Systems and Content

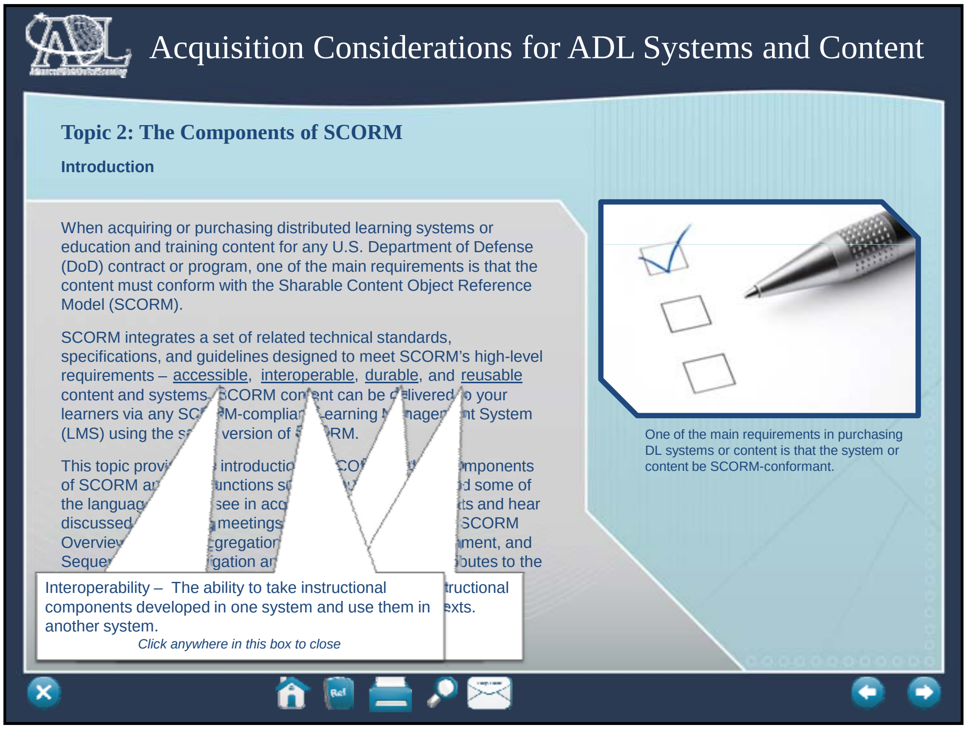
Topic 1: Acquisition Planning

Summary

In this topic you learned:

- There are several DoD policies on DL that must be considered and there is a wide range of ADL requirements that should be addressed when drafting contractual documents for contractors.
- The acquisition process for DL content development can be very complex. To help in the acquisition process, the PM coordinates with representatives from Contracting, Program Management, Logistics, and Research and Engineering competencies.
- An acquisition plan is developed to provide the overall strategy for accomplishing and managing an acquisition. Documents such as Request for Proposal (RFP), Statement of Work (SOW), and Statement of Objectives (SOO) are used for contract solicitation outside government channels.
- Contracts can be generally categorized as either fixed-price or time-and-materials. With fixed-price, contractors assume the financial risk, whereas with time-and-materials, the government assumes the financial risk.

Reviewing the information covered in each topic will help you recall the information later.



Acquisition Considerations for ADL Systems and Content

Topic 2: The Components of SCORM

Introduction

When acquiring or purchasing distributed learning systems or education and training content for any U.S. Department of Defense (DoD) contract or program, one of the main requirements is that the content must conform with the Sharable Content Object Reference Model (SCORM).

SCORM integrates a set of related technical standards, specifications, and guidelines designed to meet SCORM's high-level requirements – accessible, interoperable, durable, and reusable content and systems. SCORM content can be delivered to your learners via any SC RM-complian Learning M nagem nt System (LMS) using the s version of S RM.

This topic provi introductio CO mponents
of SCORM ar unctions s d some of
the languag see in acq ts and hear
discussed meetings SCORM
Overview gregation ment, and
Seque gation ar butes to the
tructional
exts.

Interoperability – The ability to take instructional components developed in one system and use them in another system.

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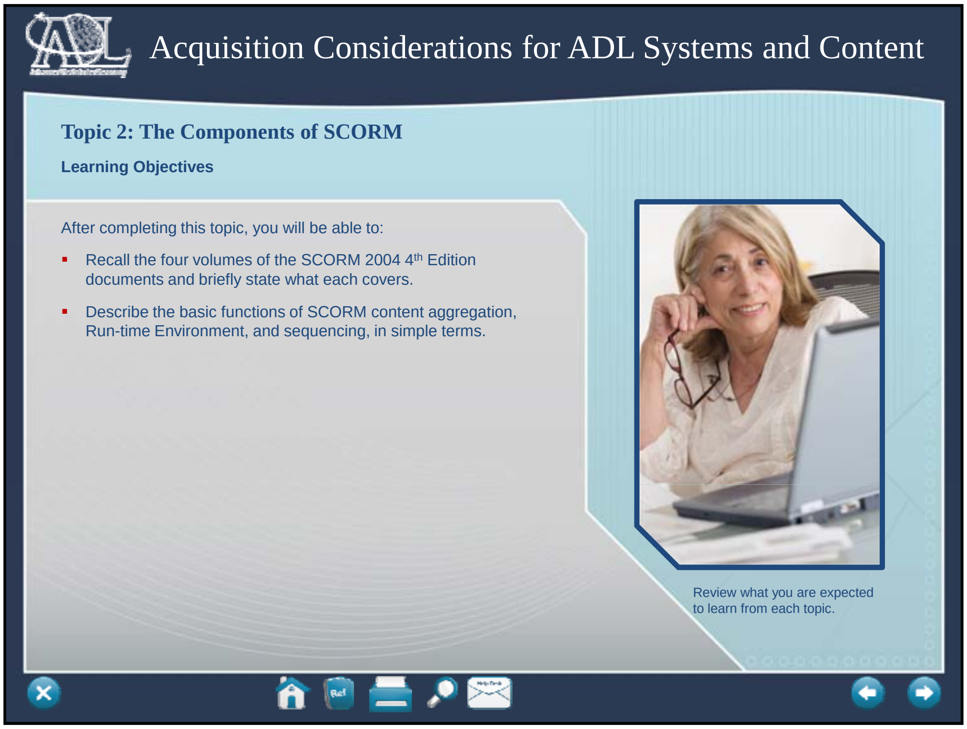
One of the main requirements in purchasing DL systems or content is that the system or content be SCORM-conformant.



Acquisition Considerations for ADL Systems and Content

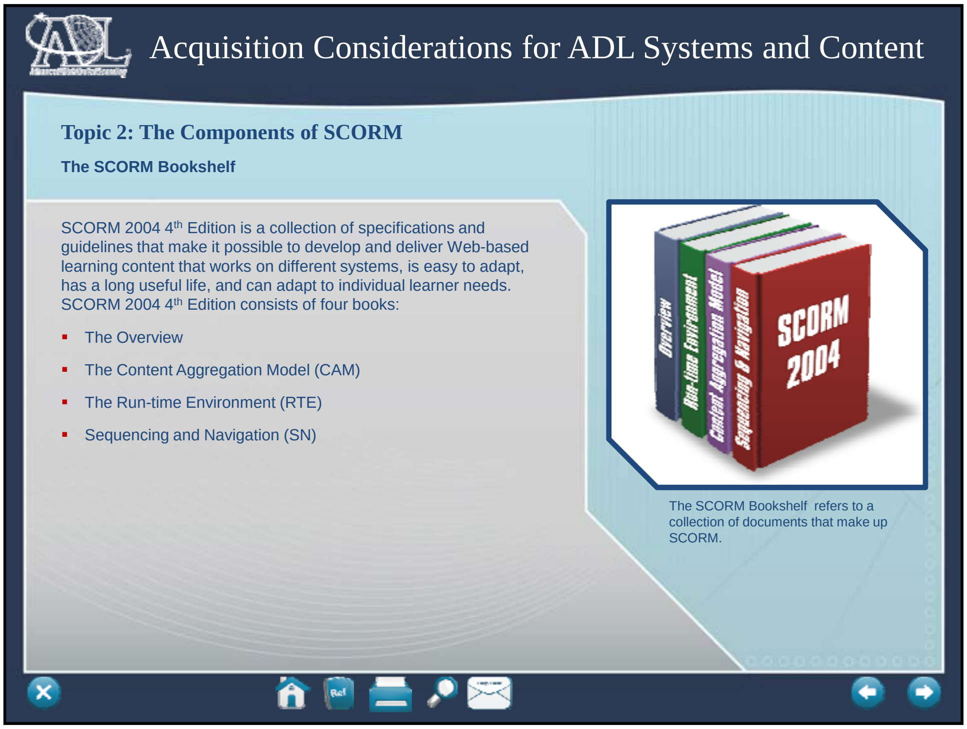
Topic 2: The Components of SCORM

Learning Objectives

After completing this topic, you will be able to:

- Recall the four volumes of the SCORM 2004 4th Edition documents and briefly state what each covers.
- Describe the basic functions of SCORM content aggregation, Run-time Environment, and sequencing, in simple terms.

Review what you are expected to learn from each topic.



Acquisition Considerations for ADL Systems and Content

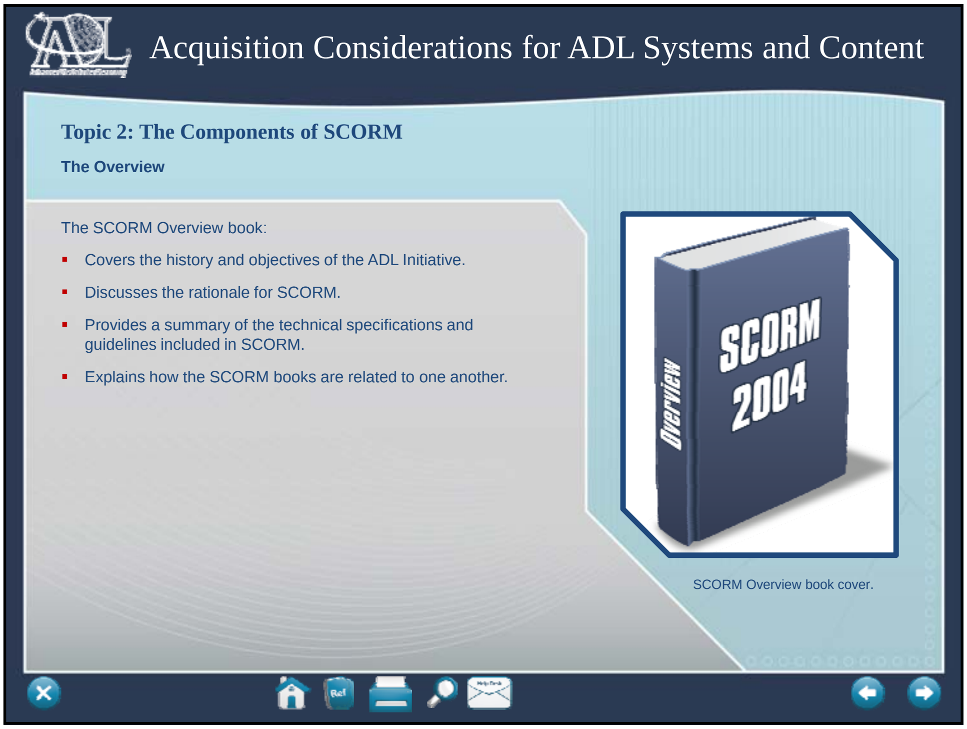
Topic 2: The Components of SCORM

The SCORM Bookshelf

SCORM 2004 4th Edition is a collection of specifications and guidelines that make it possible to develop and deliver Web-based learning content that works on different systems, is easy to adapt, has a long useful life, and can adapt to individual learner needs. SCORM 2004 4th Edition consists of four books:

- The Overview
- The Content Aggregation Model (CAM)
- The Run-time Environment (RTE)
- Sequencing and Navigation (SN)

The SCORM Bookshelf refers to a collection of documents that make up SCORM.



Acquisition Considerations for ADL Systems and Content

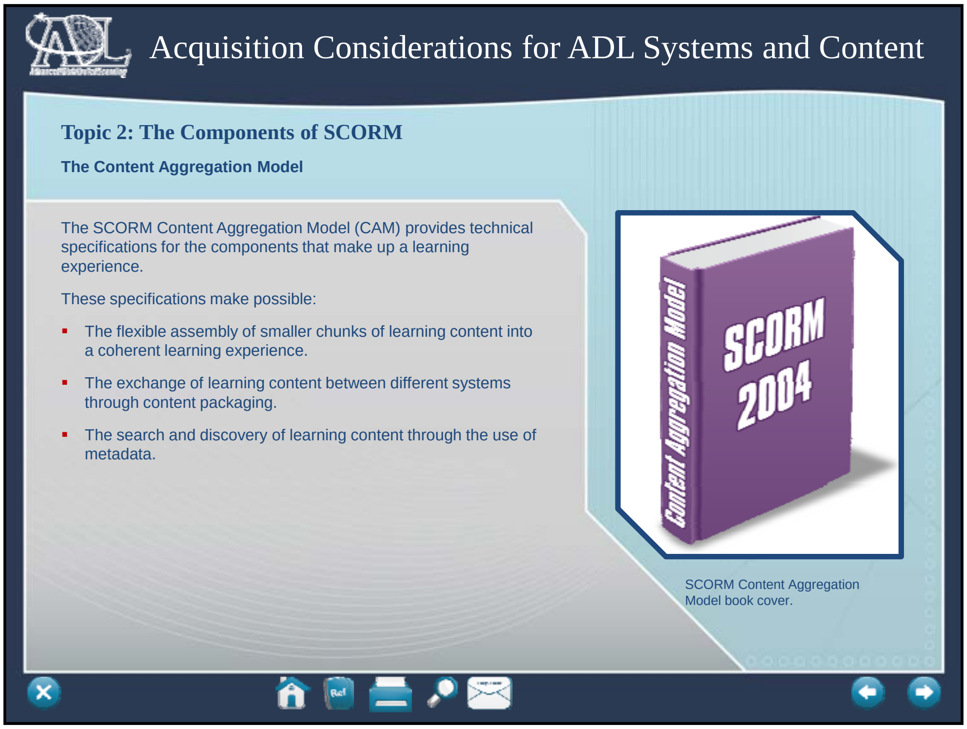
Topic 2: The Components of SCORM

The Overview

The SCORM Overview book:

- Covers the history and objectives of the ADL Initiative.
- Discusses the rationale for SCORM.
- Provides a summary of the technical specifications and guidelines included in SCORM.
- Explains how the SCORM books are related to one another.

SCORM Overview book cover.



Acquisition Considerations for ADL Systems and Content

Topic 2: The Components of SCORM

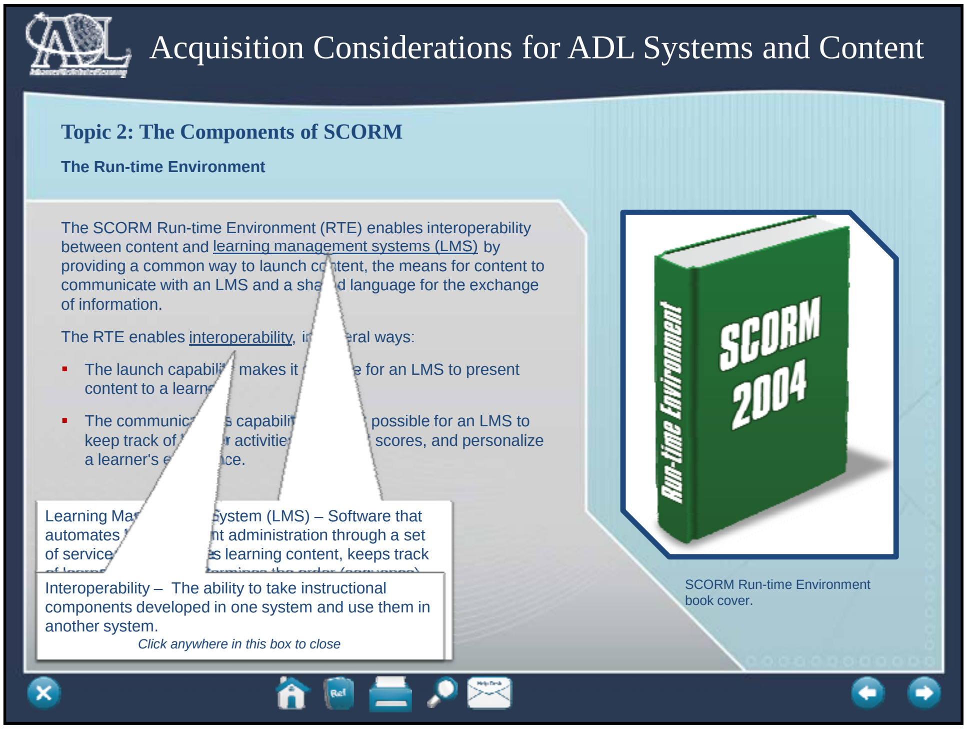
The Content Aggregation Model

The SCORM Content Aggregation Model (CAM) provides technical specifications for the components that make up a learning experience.

These specifications make possible:

- The flexible assembly of smaller chunks of learning content into a coherent learning experience.
- The exchange of learning content between different systems through content packaging.
- The search and discovery of learning content through the use of metadata.

SCORM Content Aggregation Model book cover.



Acquisition Considerations for ADL Systems and Content

Topic 2: The Components of SCORM

The Run-time Environment

The SCORM Run-time Environment (RTE) enables interoperability between content and learning management systems (LMS) by providing a common way to launch c tent, the means for content to communicate with an LMS and a sha d language for the exchange of information.

The RTE enables interoperability, i eral ways:

- The launch capabili makes it e for an LMS to present content to a learn
- The communic s capabili possible for an LMS to keep track of r activitie scores, and personalize a learner's e ce.

Learning Ma System (LMS) – Software that automates nt administration through a set of service s learning content, keeps track

Interoperability – The ability to take instructional components developed in one system and use them in another system.

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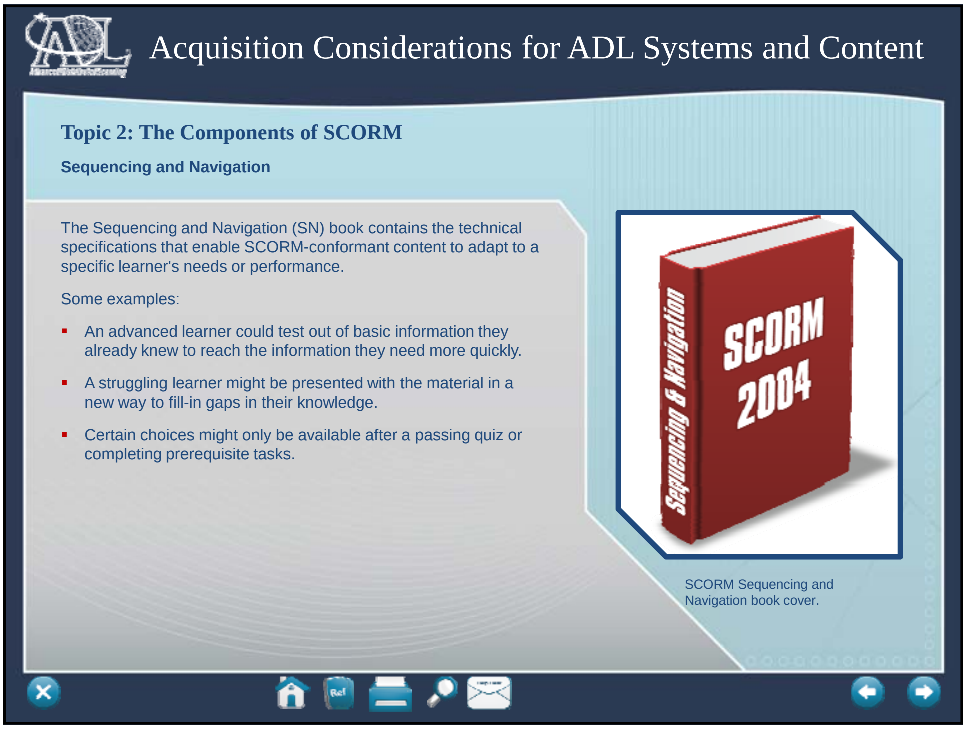
SCORM Run-time Environment book cover.



Acquisition Considerations for ADL Systems and Content

Topic 2: The Components of SCORM

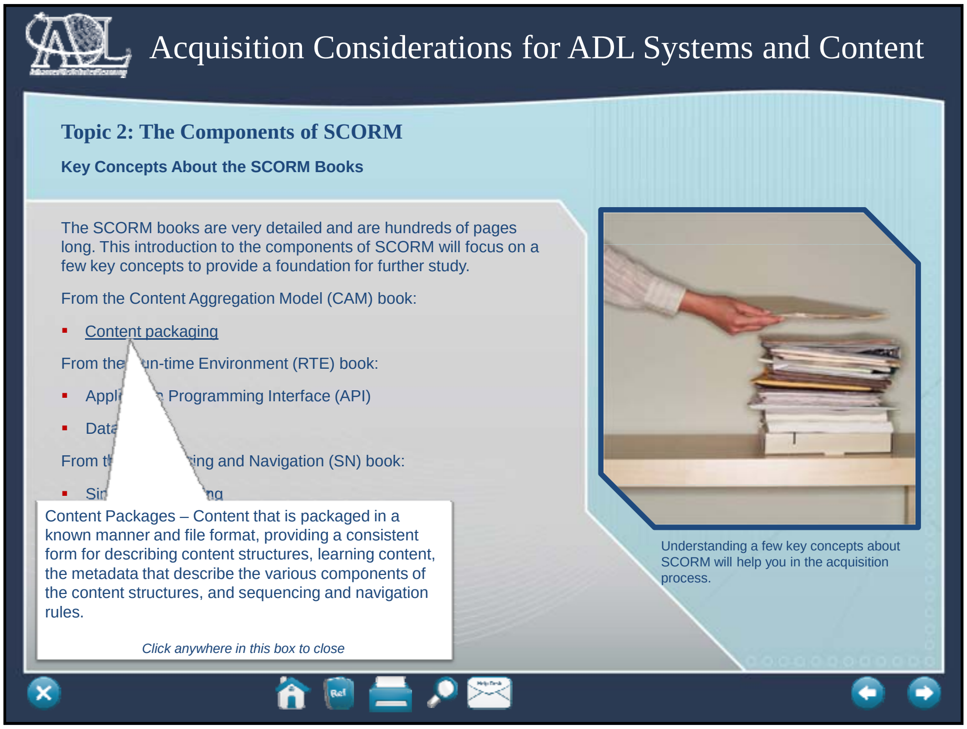
Sequencing and Navigation

The Sequencing and Navigation (SN) book contains the technical specifications that enable SCORM-conformant content to adapt to a specific learner's needs or performance.

Some examples:

- An advanced learner could test out of basic information they already knew to reach the information they need more quickly.
- A struggling learner might be presented with the material in a new way to fill-in gaps in their knowledge.
- Certain choices might only be available after a passing quiz or completing prerequisite tasks.

SCORM Sequencing and Navigation book cover.



Acquisition Considerations for ADL Systems and Content

Topic 2: The Components of SCORM

Key Concepts About the SCORM Books

The SCORM books are very detailed and are hundreds of pages long. This introduction to the components of SCORM will focus on a few key concepts to provide a foundation for further study.

From the Content Aggregation Model (CAM) book:

- Content packaging

From the un-time Environment (RTE) book:

- Appli Programming Interface (API)
- Data

From th ing and Navigation (SN) book:

- Sir ng

Content Packages – Content that is packaged in a known manner and file format, providing a consistent form for describing content structures, learning content, the metadata that describe the various components of the content structures, and sequencing and navigation rules.

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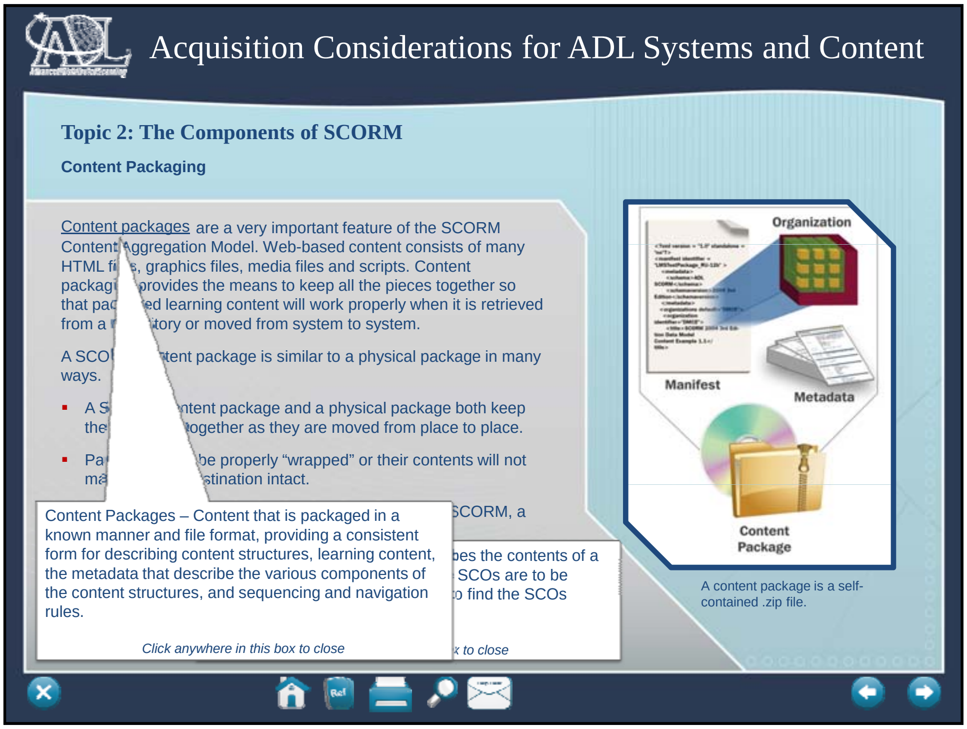
Understanding a few key concepts about SCORM will help you in the acquisition process.



Acquisition Considerations for ADL Systems and Content

Topic 2: The Components of SCORM

Content Packaging

Content packages are a very important feature of the SCORM Content Aggregation Model. Web-based content consists of many HTML fi s, graphics files, media files and scripts. Content packagi provides the means to keep all the pieces together so that pac ed learning content will work properly when it is retrieved from a tory or moved from system to system.

A SCO tent package is similar to a physical package in many ways.

- A S ntent package and a physical package both keep the together as they are moved from place to place.
- Pa be properly “wrapped” or their contents will not ma stination intact.

SCORM, a

Content Packages – Content that is packaged in a known manner and file format, providing a consistent form for describing content structures, learning content, the metadata that describe the various components of the content structures, and sequencing and navigation rules.

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SCOs are to be
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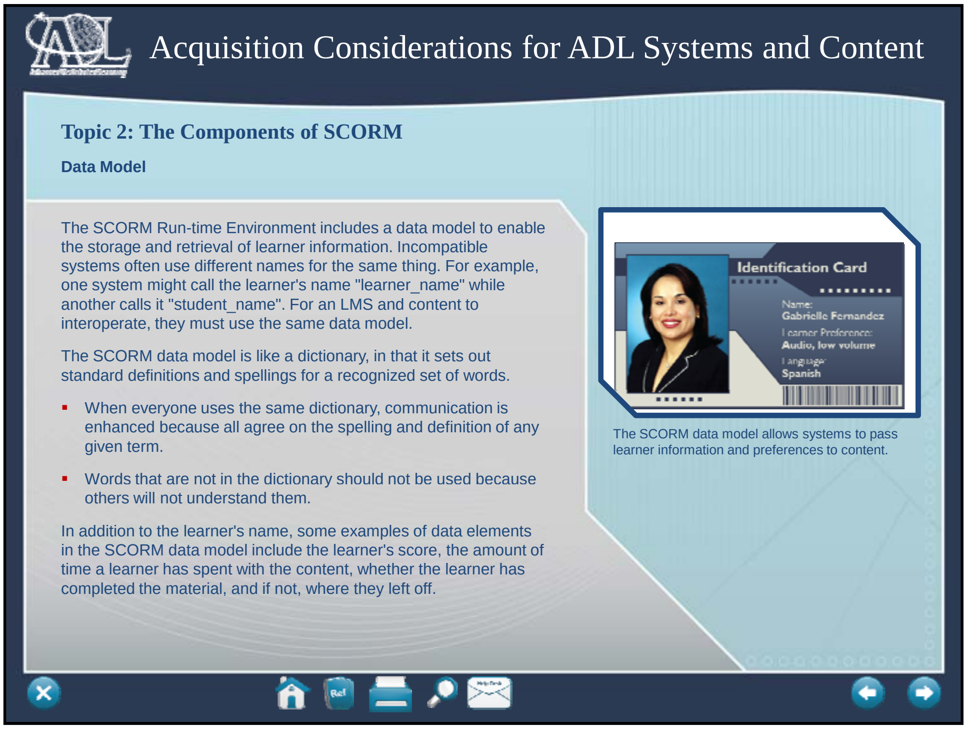
A content package is a self-contained .zip file.



Acquisition Considerations for ADL Systems and Content

Topic 2: The Components of SCORM

Data Model

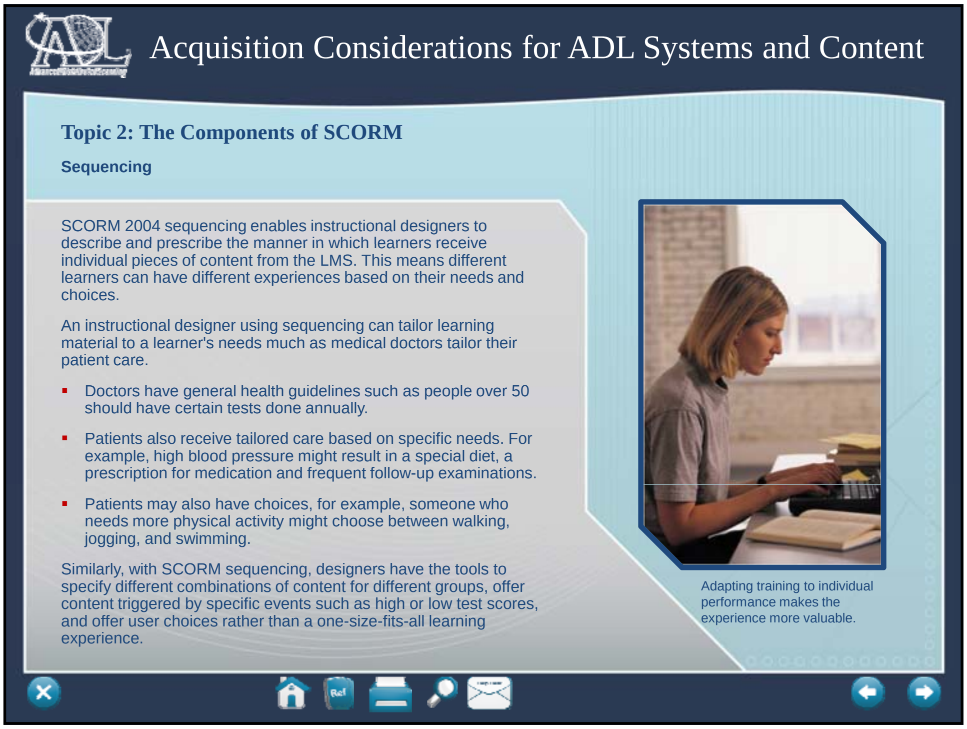
The SCORM Run-time Environment includes a data model to enable the storage and retrieval of learner information. Incompatible systems often use different names for the same thing. For example, one system might call the learner's name "learner_name" while another calls it "student_name". For an LMS and content to interoperate, they must use the same data model.

The SCORM data model is like a dictionary, in that it sets out standard definitions and spellings for a recognized set of words.

- When everyone uses the same dictionary, communication is enhanced because all agree on the spelling and definition of any given term.
- Words that are not in the dictionary should not be used because others will not understand them.

In addition to the learner's name, some examples of data elements in the SCORM data model include the learner's score, the amount of time a learner has spent with the content, whether the learner has completed the material, and if not, where they left off.

The SCORM data model allows systems to pass learner information and preferences to content.



Acquisition Considerations for ADL Systems and Content

Topic 2: The Components of SCORM

Sequencing

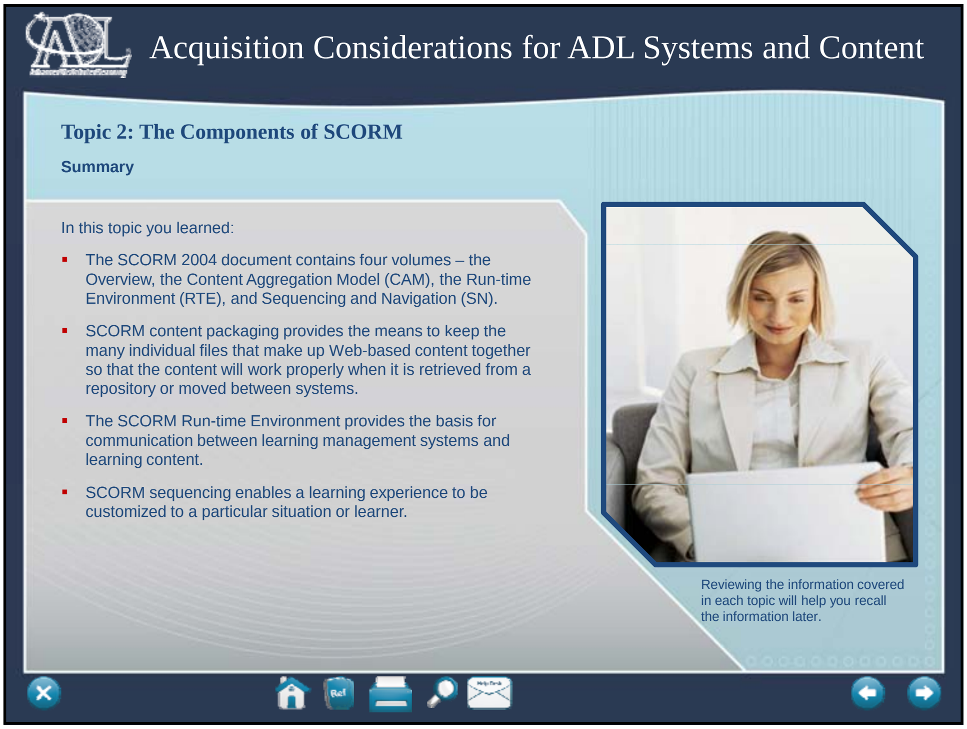
SCORM 2004 sequencing enables instructional designers to describe and prescribe the manner in which learners receive individual pieces of content from the LMS. This means different learners can have different experiences based on their needs and choices.

An instructional designer using sequencing can tailor learning material to a learner's needs much as medical doctors tailor their patient care.

- Doctors have general health guidelines such as people over 50 should have certain tests done annually.
- Patients also receive tailored care based on specific needs. For example, high blood pressure might result in a special diet, a prescription for medication and frequent follow-up examinations.
- Patients may also have choices, for example, someone who needs more physical activity might choose between walking, jogging, and swimming.

Similarly, with SCORM sequencing, designers have the tools to specify different combinations of content for different groups, offer content triggered by specific events such as high or low test scores, and offer user choices rather than a one-size-fits-all learning experience.

Adapting training to individual performance makes the experience more valuable.



Acquisition Considerations for ADL Systems and Content

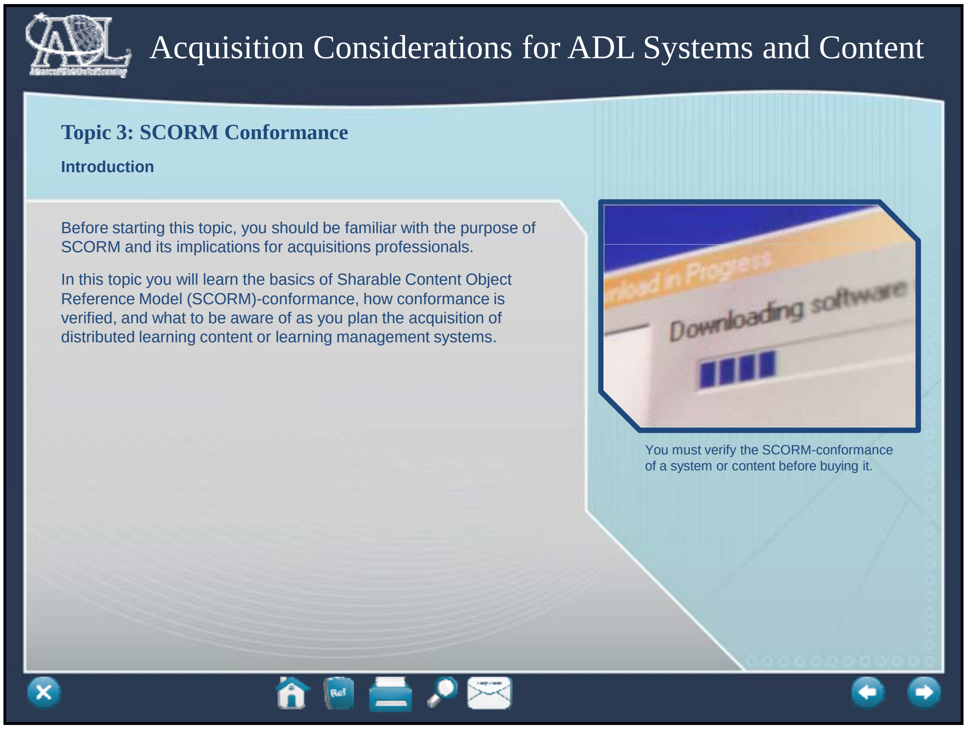
Topic 2: The Components of SCORM

Summary

In this topic you learned:

- The SCORM 2004 document contains four volumes – the Overview, the Content Aggregation Model (CAM), the Run-time Environment (RTE), and Sequencing and Navigation (SN).
- SCORM content packaging provides the means to keep the many individual files that make up Web-based content together so that the content will work properly when it is retrieved from a repository or moved between systems.
- The SCORM Run-time Environment provides the basis for communication between learning management systems and learning content.
- SCORM sequencing enables a learning experience to be customized to a particular situation or learner.

Reviewing the information covered in each topic will help you recall the information later.



Acquisition Considerations for ADL Systems and Content

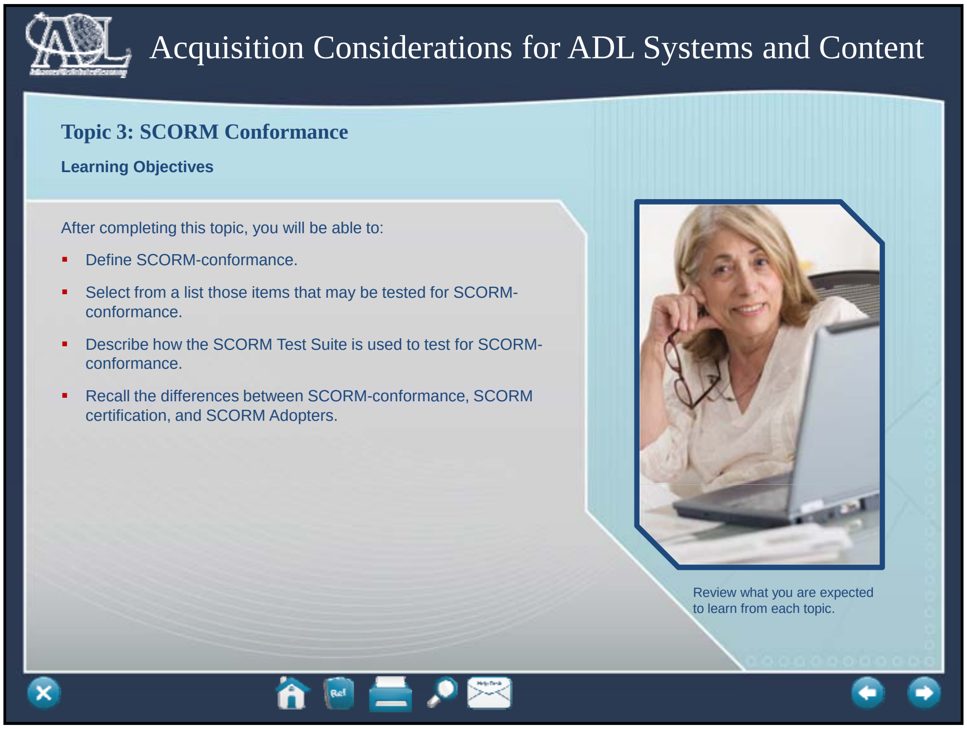
Topic 3: SCORM Conformance

Introduction

Before starting this topic, you should be familiar with the purpose of SCORM and its implications for acquisitions professionals.

In this topic you will learn the basics of Sharable Content Object Reference Model (SCORM)-conformance, how conformance is verified, and what to be aware of as you plan the acquisition of distributed learning content or learning management systems.

You must verify the SCORM-conformance of a system or content before buying it.



Acquisition Considerations for ADL Systems and Content

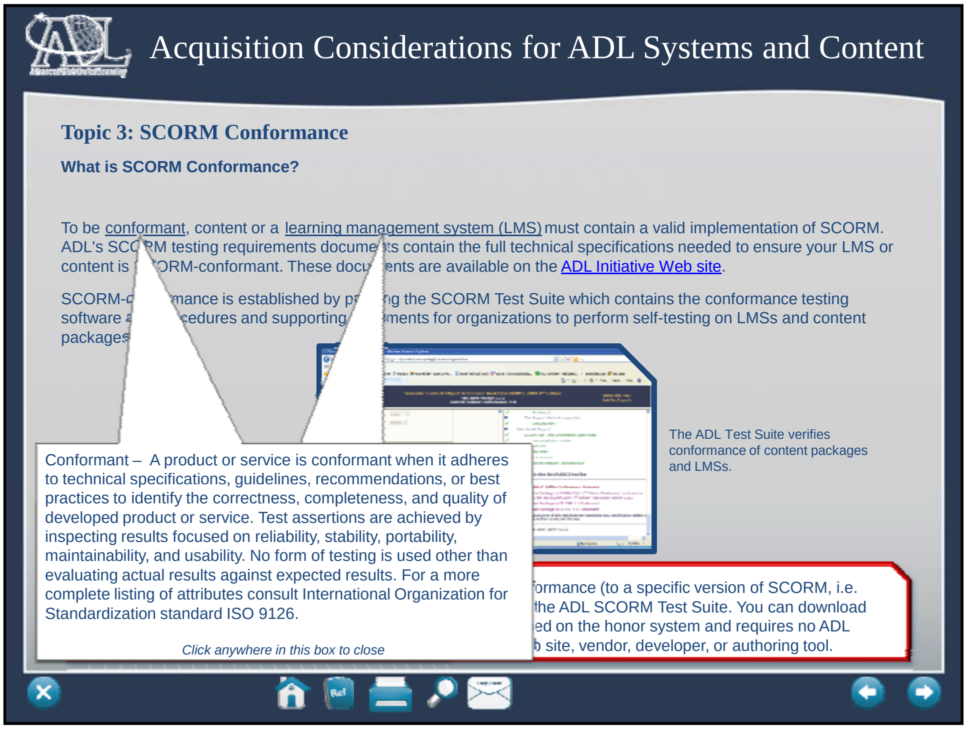
Topic 3: SCORM Conformance

Learning Objectives

After completing this topic, you will be able to:

- Define SCORM-conformance.
- Select from a list those items that may be tested for SCORM-conformance.
- Describe how the SCORM Test Suite is used to test for SCORM-conformance.
- Recall the differences between SCORM-conformance, SCORM certification, and SCORM Adopters.

Review what you are expected to learn from each topic.



Acquisition Considerations for ADL Systems and Content

Topic 3: SCORM Conformance

What is SCORM Conformance?

To be conformant, content or a learning management system (LMS) must contain a valid implementation of SCORM. ADL's SCO RM testing requirements docume ts contain the full technical specifications needed to ensure your LMS or content is ORM-conformant. These docu ents are available on the ADL Initiative Web site.

SCORM-c mance is established by p g the SCORM Test Suite which contains the conformance testing software a cedures and supporting ments for organizations to perform self-testing on LMSs and content packages

The ADL Test Suite verifies conformance of content packages and LMSs.

Conformant – A product or service is conformant when it adheres to technical specifications, guidelines, recommendations, or best practices to identify the correctness, completeness, and quality of developed product or service. Test assertions are achieved by inspecting results focused on reliability, stability, portability, maintainability, and usability. No form of testing is used other than evaluating actual results against expected results. For a more complete listing of attributes consult International Organization for Standardization standard ISO 9126.

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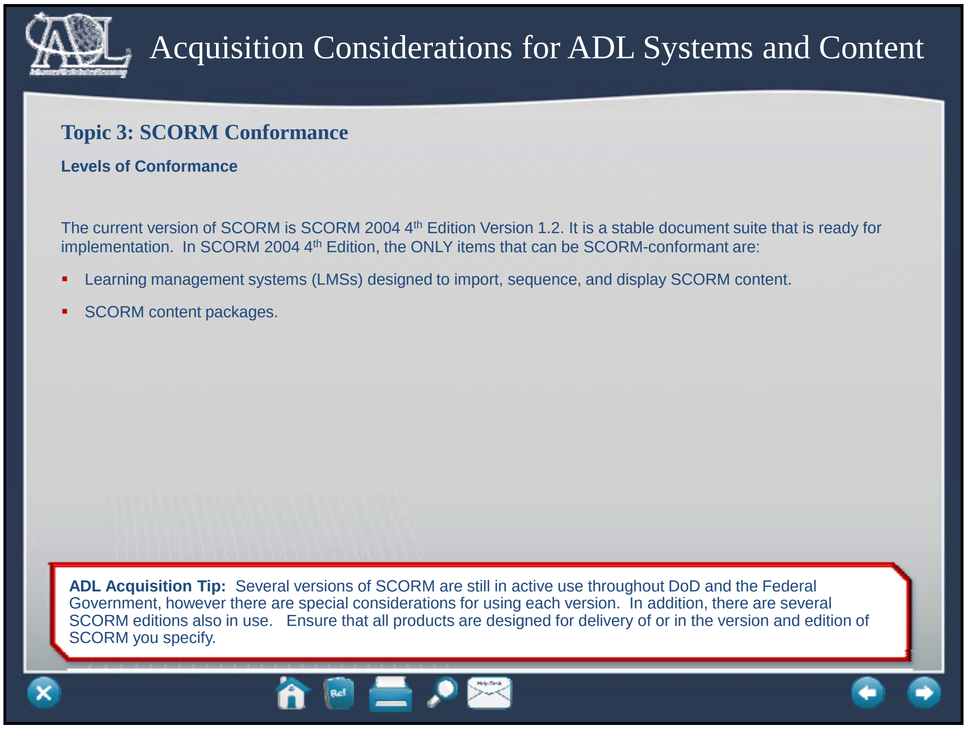
formance (to a specific version of SCORM, i.e. the ADL SCORM Test Suite. You can download ed on the honor system and requires no ADL b site, vendor, developer, or authoring tool.



Acquisition Considerations for ADL Systems and Content

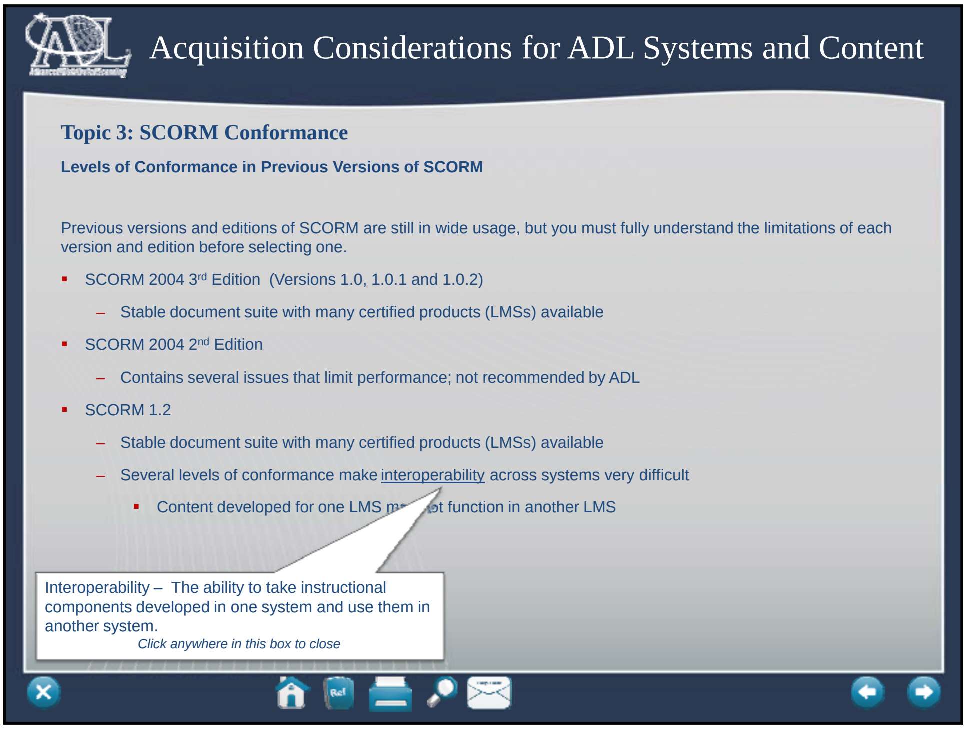
Topic 3: SCORM Conformance

Levels of Conformance

The current version of SCORM is SCORM 2004 4th Edition Version 1.2. It is a stable document suite that is ready for implementation. In SCORM 2004 4th Edition, the ONLY items that can be SCORM-conformant are:

- Learning management systems (LMSs) designed to import, sequence, and display SCORM content.
- SCORM content packages.

ADL Acquisition Tip: Several versions of SCORM are still in active use throughout DoD and the Federal Government, however there are special considerations for using each version. In addition, there are several SCORM editions also in use. Ensure that all products are designed for delivery of or in the version and edition of SCORM you specify.



Acquisition Considerations for ADL Systems and Content

Topic 3: SCORM Conformance

Levels of Conformance in Previous Versions of SCORM

Previous versions and editions of SCORM are still in wide usage, but you must fully understand the limitations of each version and edition before selecting one.

- SCORM 2004 3rd Edition (Versions 1.0, 1.0.1 and 1.0.2)
  - Stable document suite with many certified products (LMSs) available
- SCORM 2004 2nd Edition
  - Contains several issues that limit performance; not recommended by ADL
- SCORM 1.2
  - Stable document suite with many certified products (LMSs) available
  - Several levels of conformance make interoperability across systems very difficult
    - Content developed for one LMS m ot function in another LMS

Interoperability – The ability to take instructional components developed in one system and use them in another system.

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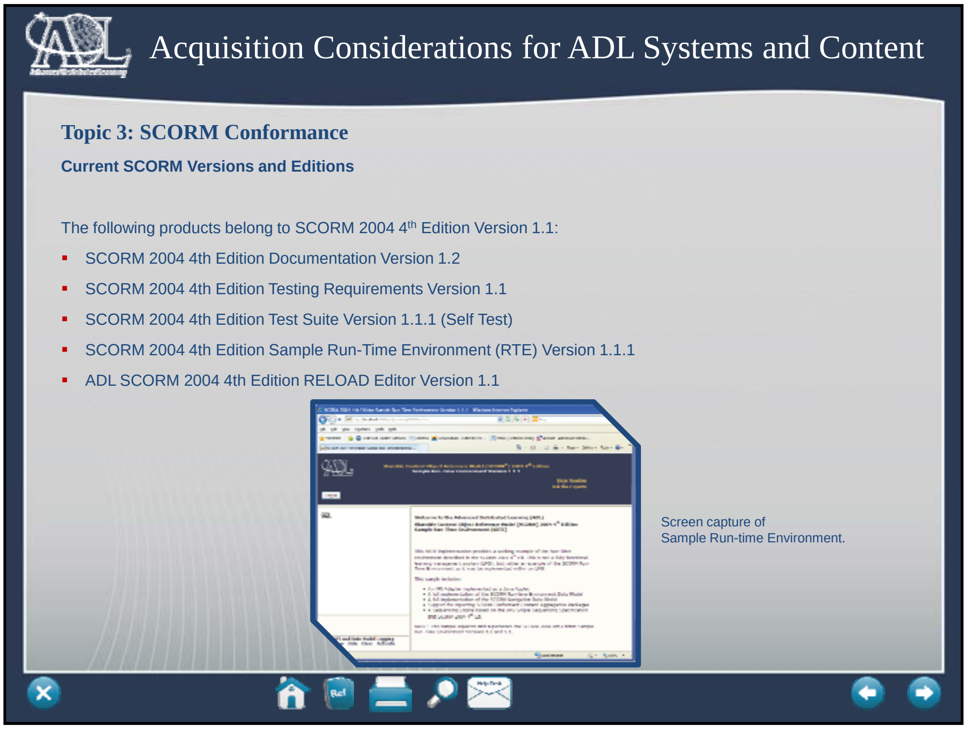


Acquisition Considerations for ADL Systems and Content

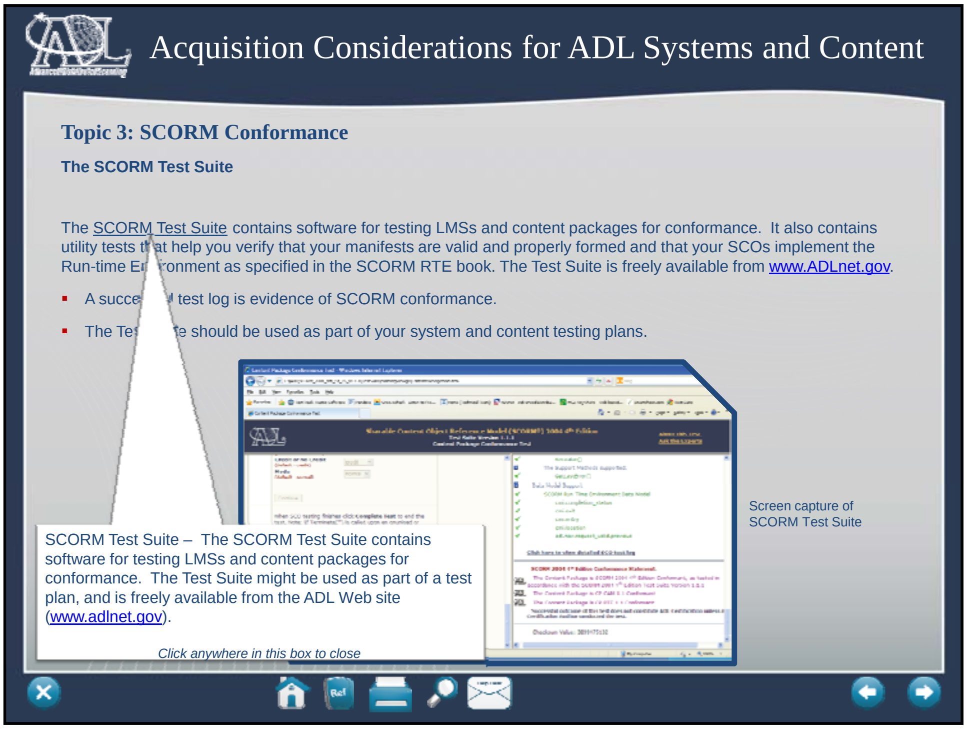
Topic 3: SCORM Conformance

Current SCORM Versions and Editions

The following products belong to SCORM 2004 4th Edition Version 1.1:

- SCORM 2004 4th Edition Documentation Version 1.2
- SCORM 2004 4th Edition Testing Requirements Version 1.1
- SCORM 2004 4th Edition Test Suite Version 1.1.1 (Self Test)
- SCORM 2004 4th Edition Sample Run-Time Environment (RTE) Version 1.1.1
- ADL SCORM 2004 4th Edition RELOAD Editor Version 1.1

Screen capture of
Sample Run-time Environment.



Acquisition Considerations for ADL Systems and Content

Topic 3: SCORM Conformance

The SCORM Test Suite

The SCORM Test Suite contains software for testing LMSs and content packages for conformance. It also contains utility tests t at help you verify that your manifests are valid and properly formed and that your SCOs implement the Run-time E ronment as specified in the SCORM RTE book. The Test Suite is freely available from www.ADLnet.gov.

- A succe l test log is evidence of SCORM conformance.
- The Te e should be used as part of your system and content testing plans.

Screen capture of
SCORM Test Suite

SCORM Test Suite – The SCORM Test Suite contains software for testing LMSs and content packages for conformance. The Test Suite might be used as part of a test plan, and is freely available from the ADL Web site (www.adlnet.gov).

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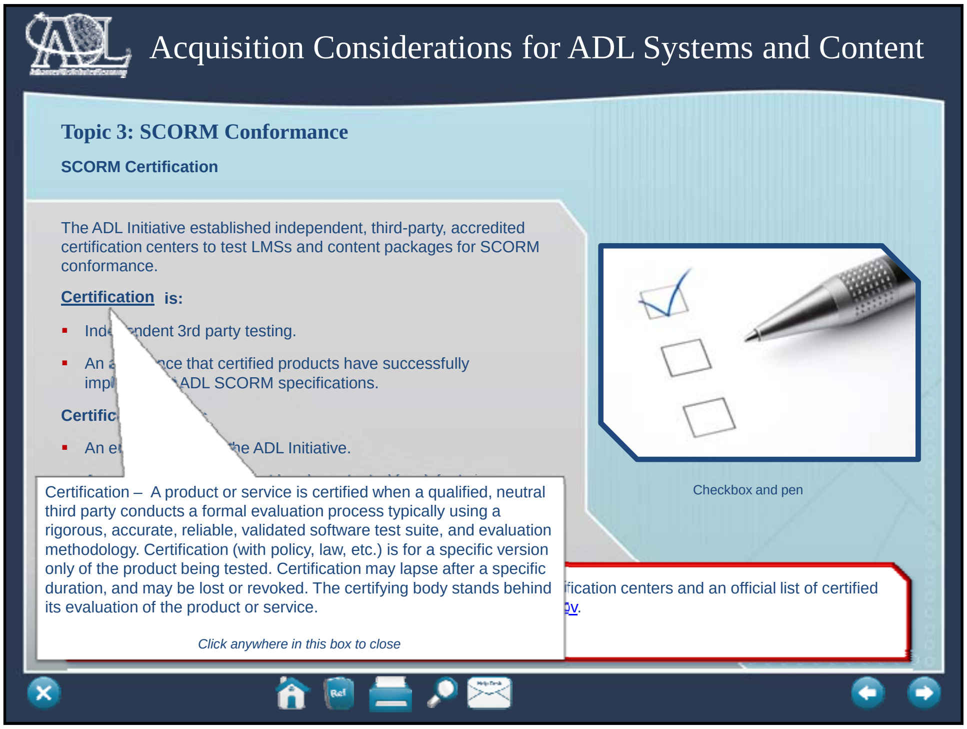

Acquisition Considerations for ADL Systems and Content

Topic 3: SCORM Conformance

SCORM Certification

The ADL Initiative established independent, third-party, accredited certification centers to test LMSs and content packages for SCORM conformance.

Certification is:

- Inde ndent 3rd party testing.
- An a nce that certified products have successfully impl ADL SCORM specifications.

Certific

- An e he ADL Initiative.

Checkbox and pen

Certification – A product or service is certified when a qualified, neutral third party conducts a formal evaluation process typically using a rigorous, accurate, reliable, validated software test suite, and evaluation methodology. Certification (with policy, law, etc.) is for a specific version only of the product being tested. Certification may lapse after a specific duration, and may be lost or revoked. The certifying body stands behind its evaluation of the product or service.

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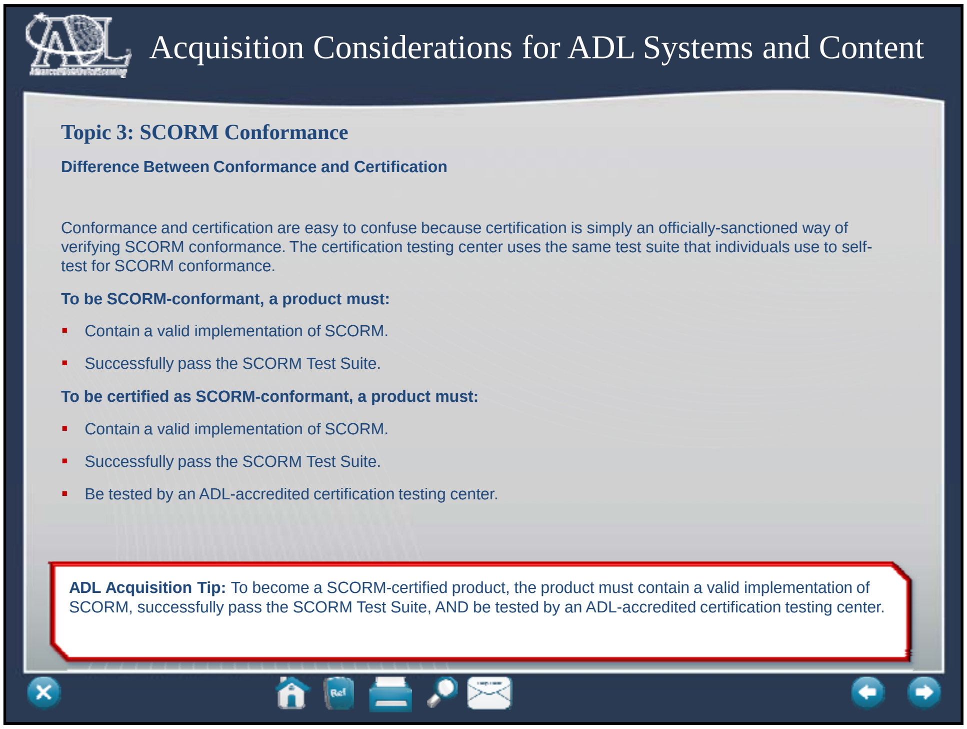
ification centers and an official list of certified ov.



Acquisition Considerations for ADL Systems and Content

Topic 3: SCORM Conformance

Difference Between Conformance and Certification

Conformance and certification are easy to confuse because certification is simply an officially-sanctioned way of verifying SCORM conformance. The certification testing center uses the same test suite that individuals use to self-test for SCORM conformance.

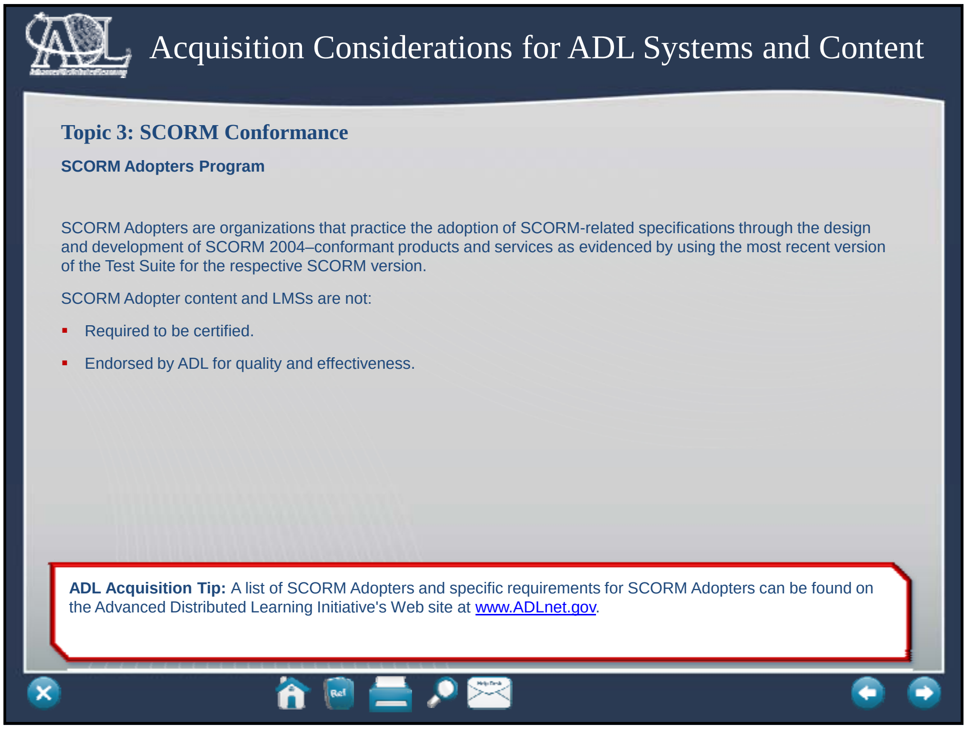
To be SCORM-conformant, a product must:

- Contain a valid implementation of SCORM.
- Successfully pass the SCORM Test Suite.

To be certified as SCORM-conformant, a product must:

- Contain a valid implementation of SCORM.
- Successfully pass the SCORM Test Suite.
- Be tested by an ADL-accredited certification testing center.

ADL Acquisition Tip: To become a SCORM-certified product, the product must contain a valid implementation of SCORM, successfully pass the SCORM Test Suite, AND be tested by an ADL-accredited certification testing center.



Acquisition Considerations for ADL Systems and Content

Topic 3: SCORM Conformance

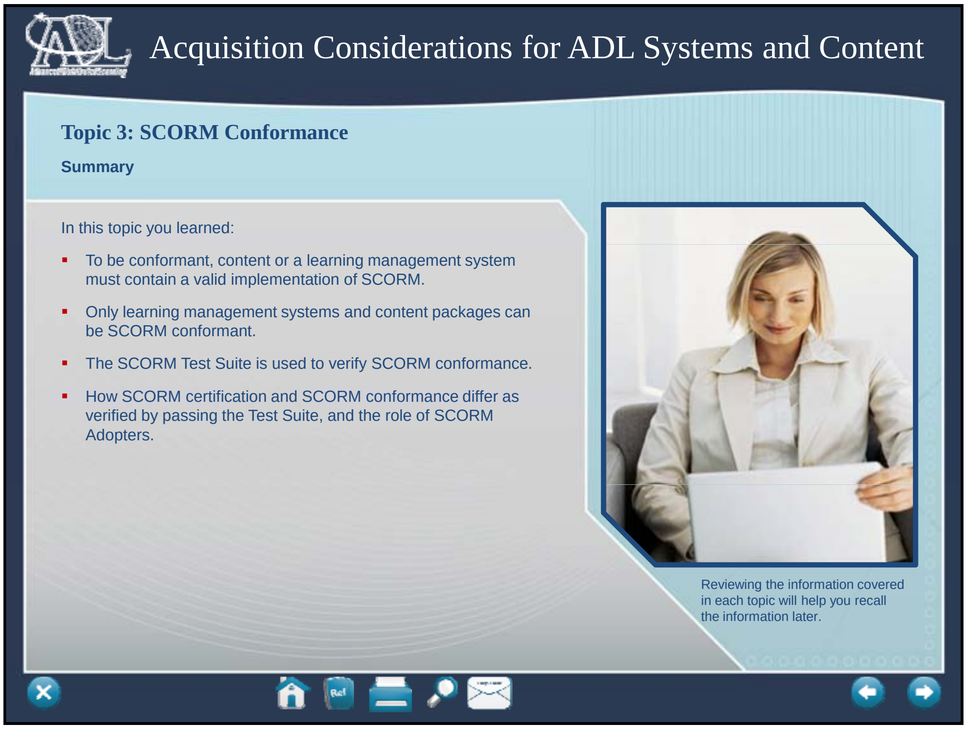
SCORM Adopters Program

SCORM Adopters are organizations that practice the adoption of SCORM-related specifications through the design and development of SCORM 2004–conformant products and services as evidenced by using the most recent version of the Test Suite for the respective SCORM version.

SCORM Adopter content and LMSs are not:

- Required to be certified.
- Endorsed by ADL for quality and effectiveness.

ADL Acquisition Tip: A list of SCORM Adopters and specific requirements for SCORM Adopters can be found on the Advanced Distributed Learning Initiative's Web site at www.ADLnet.gov.



Acquisition Considerations for ADL Systems and Content

Topic 3: SCORM Conformance

Summary

In this topic you learned:

- To be conformant, content or a learning management system must contain a valid implementation of SCORM.
- Only learning management systems and content packages can be SCORM conformant.
- The SCORM Test Suite is used to verify SCORM conformance.
- How SCORM certification and SCORM conformance differ as verified by passing the Test Suite, and the role of SCORM Adopters.

Reviewing the information covered in each topic will help you recall the information later.

Acquisition Considerations for ADL Systems and Content

Topic 4: Instructional Systems Design (ISD) and SCORM

Introduction

SCORM adds a new dynamic to the instructional system design (ISD) process. One of the goals of SCORM is to divide instructional content into smaller components known as sharable content objects (SCOs). This goal can create new challenges for both acquisition personnel and content developers.

This topic provides an overview of the ISD process and SCORM planning considerations, as well as special considerations for acquisition personnel during the process of acquiring SCORM-conformant content.

Refer t ed Distributed Learning (ADL) Web site for

Conformant – A product or service is conformant when it adheres to technical specifications, guidelines, recommendations, or best practices to identify the correctness, completeness, and quality of developed product or service. Test assertions are achieved by inspecting results focused on reliability, stability, portability, maintainability, and usability. No form of testing is used other than evaluating actual results against expected results. For a more complete listing of attributes consult International Organization for Standardization standard ISO 9126.

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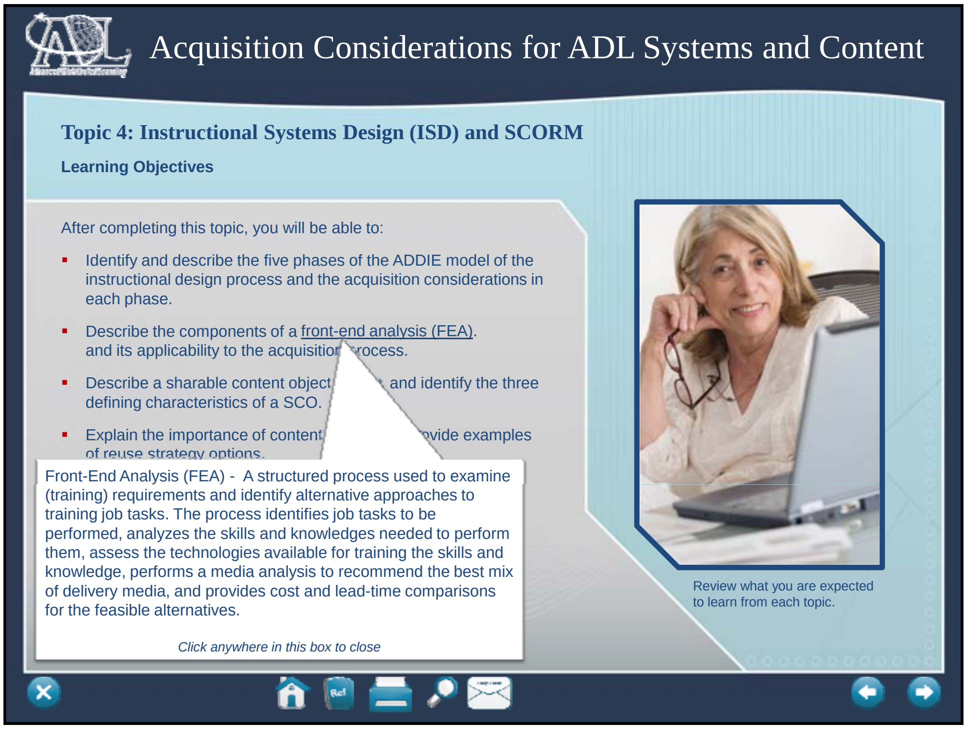
Designing SCORM content may present new challenges for your team.



Acquisition Considerations for ADL Systems and Content

Topic 4: Instructional Systems Design (ISD) and SCORM

Learning Objectives

After completing this topic, you will be able to:

- Identify and describe the five phases of the ADDIE model of the instructional design process and the acquisition considerations in each phase.
- Describe the components of a front-end analysis (FEA). and its applicability to the acquisitio rocess.
- Describe a sharable content object and identify the three defining characteristics of a SCO.
- Explain the importance of content ovide examples of reuse strategy options.

Front-End Analysis (FEA) - A structured process used to examine (training) requirements and identify alternative approaches to training job tasks. The process identifies job tasks to be performed, analyzes the skills and knowledges needed to perform them, assess the technologies available for training the skills and knowledge, performs a media analysis to recommend the best mix of delivery media, and provides cost and lead-time comparisons for the feasible alternatives.

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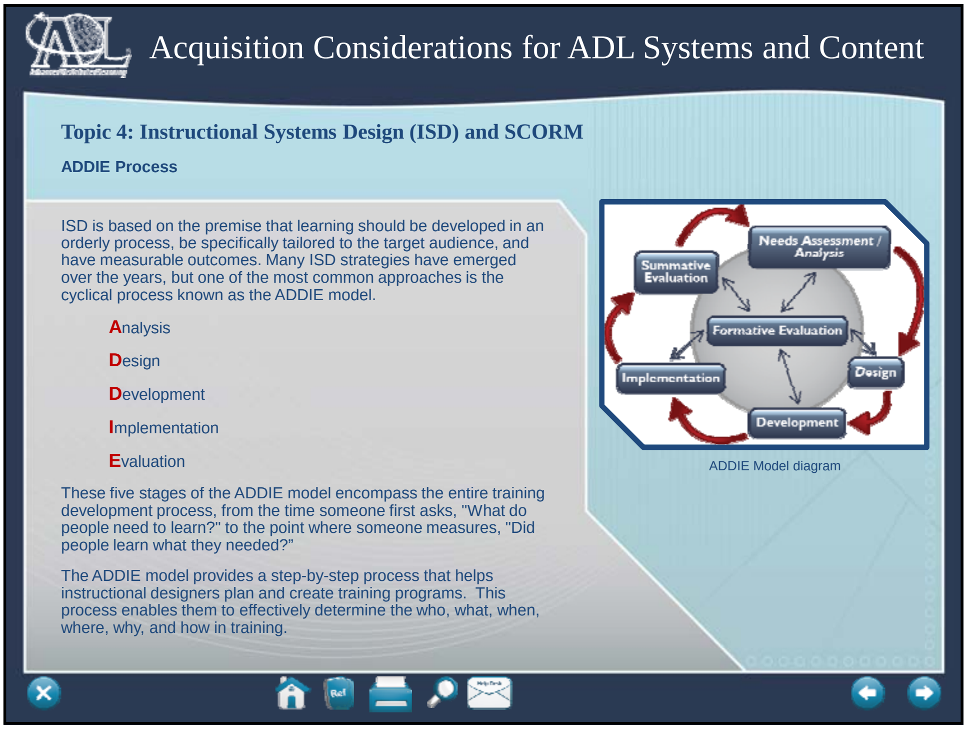
Review what you are expected to learn from each topic.



Acquisition Considerations for ADL Systems and Content

Topic 4: Instructional Systems Design (ISD) and SCORM

ADDIE Process

ISD is based on the premise that learning should be developed in an orderly process, be specifically tailored to the target audience, and have measurable outcomes. Many ISD strategies have emerged over the years, but one of the most common approaches is the cyclical process known as the ADDIE model.

Analysis

Design

Development

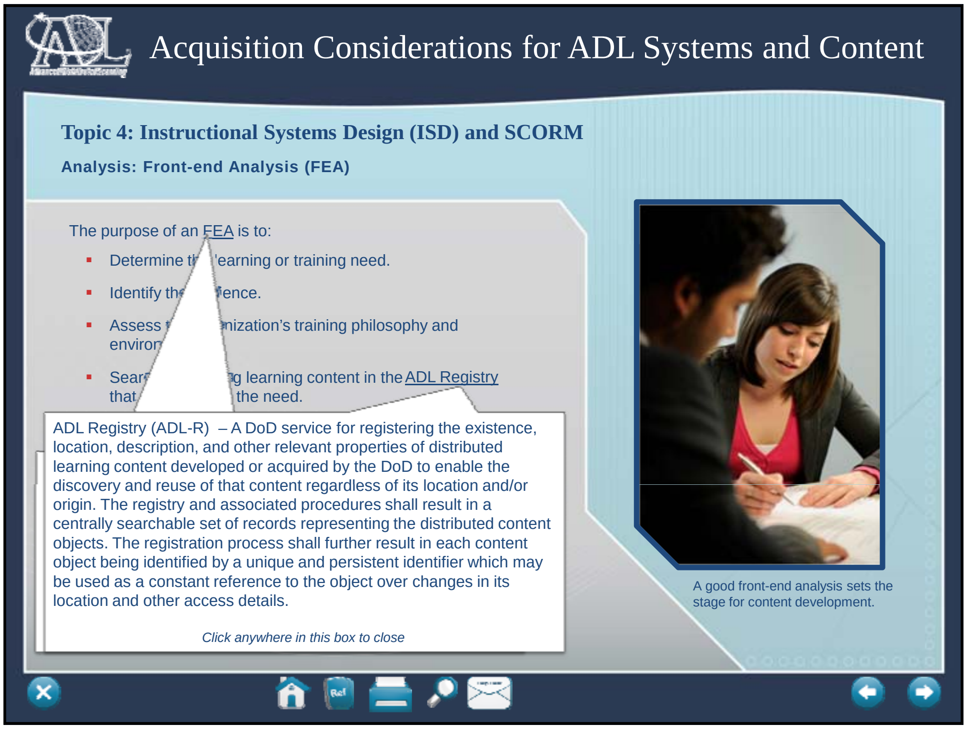
Implementation

Evaluation

These five stages of the ADDIE model encompass the entire training development process, from the time someone first asks, "What do people need to learn?" to the point where someone measures, "Did people learn what they needed?"

The ADDIE model provides a step-by-step process that helps instructional designers plan and create training programs. This process enables them to effectively determine the who, what, when, where, why, and how in training.

ADDIE Model diagram



Acquisition Considerations for ADL Systems and Content

Topic 4: Instructional Systems Design (ISD) and SCORM

Analysis: Front-end Analysis (FEA)

The purpose of an FEA is to:

- Determine th 'earning or training need.
- Identify th ence.
- Assess t nization's training philosophy and enviror
- Sear g learning content in the ADL Registry that the need.

ADL Registry (ADL-R) – A DoD service for registering the existence, location, description, and other relevant properties of distributed learning content developed or acquired by the DoD to enable the discovery and reuse of that content regardless of its location and/or origin. The registry and associated procedures shall result in a centrally searchable set of records representing the distributed content objects. The registration process shall further result in each content object being identified by a unique and persistent identifier which may be used as a constant reference to the object over changes in its location and other access details.

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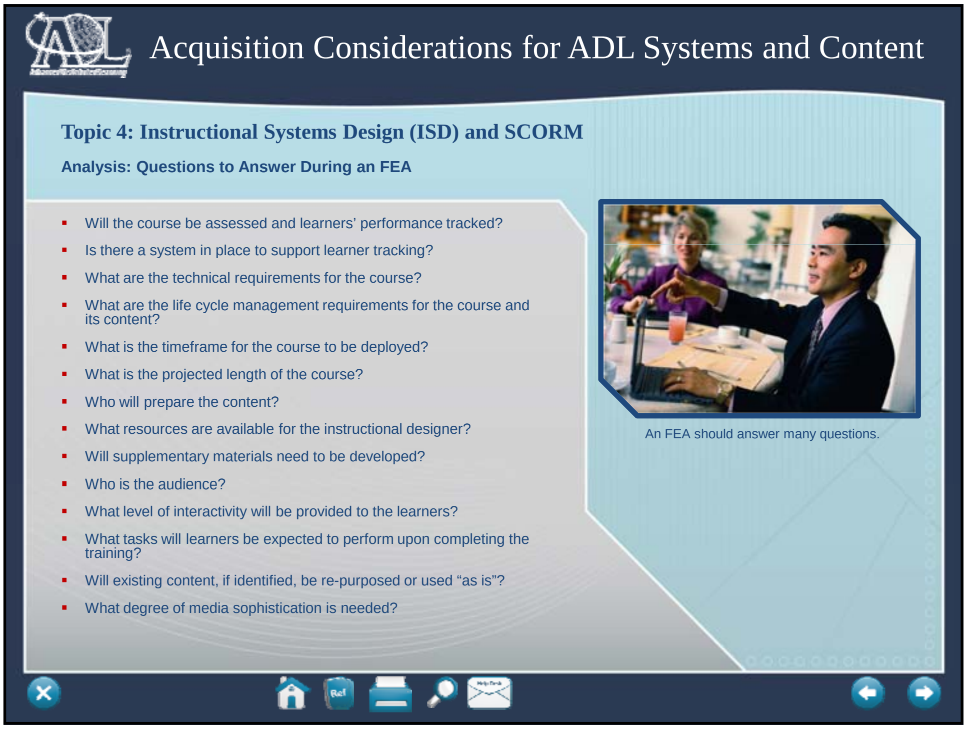
A good front-end analysis sets the stage for content development.



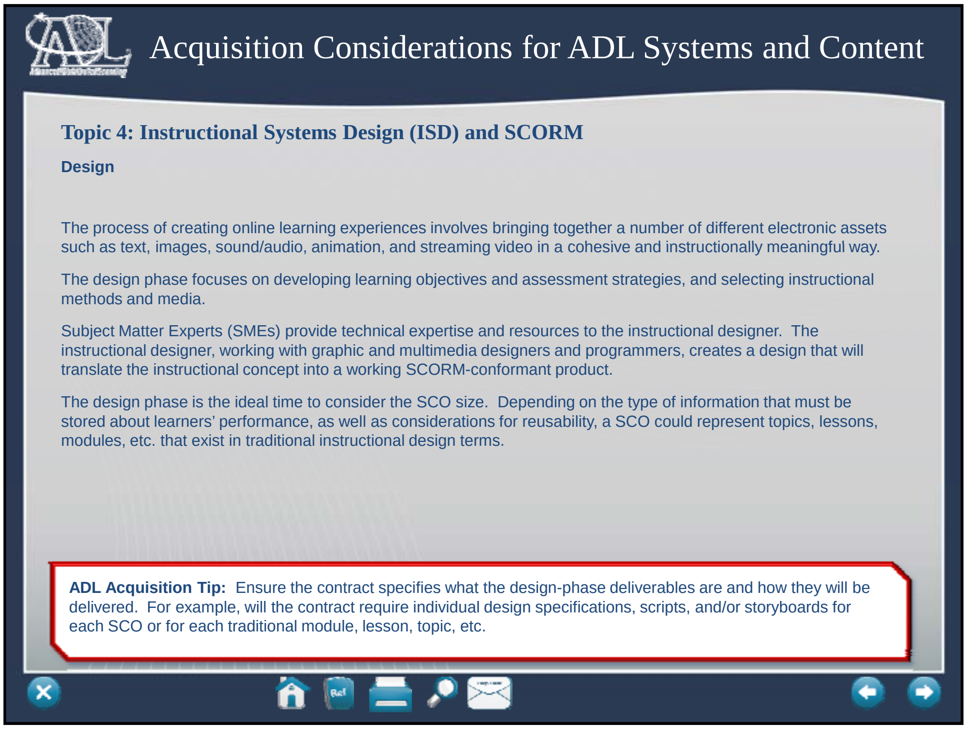
Acquisition Considerations for ADL Systems and Content

Topic 4: Instructional Systems Design (ISD) and SCORM

Analysis: Questions to Answer During an FEA

- Will the course be assessed and learners' performance tracked?
- Is there a system in place to support learner tracking?
- What are the technical requirements for the course?
- What are the life cycle management requirements for the course and its content?
- What is the timeframe for the course to be deployed?
- What is the projected length of the course?
- Who will prepare the content?
- What resources are available for the instructional designer?
- Will supplementary materials need to be developed?
- Who is the audience?
- What level of interactivity will be provided to the learners?
- What tasks will learners be expected to perform upon completing the training?
- Will existing content, if identified, be re-purposed or used "as is"?
- What degree of media sophistication is needed?

An FEA should answer many questions.



Acquisition Considerations for ADL Systems and Content

Topic 4: Instructional Systems Design (ISD) and SCORM

Design

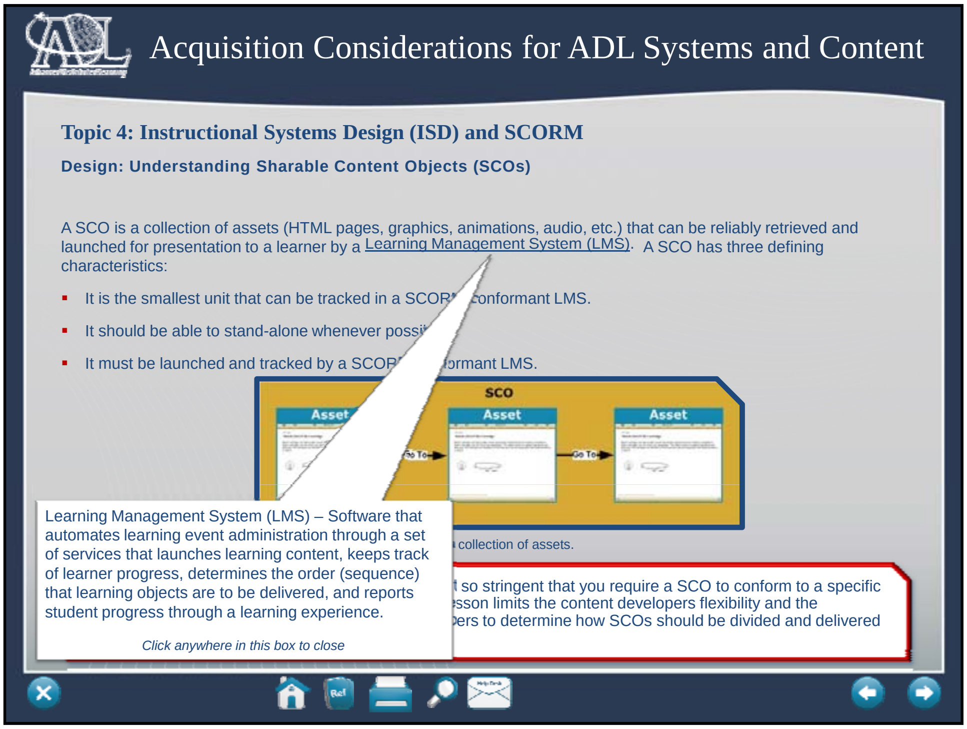
The process of creating online learning experiences involves bringing together a number of different electronic assets such as text, images, sound/audio, animation, and streaming video in a cohesive and instructionally meaningful way.

The design phase focuses on developing learning objectives and assessment strategies, and selecting instructional methods and media.

Subject Matter Experts (SMEs) provide technical expertise and resources to the instructional designer. The instructional designer, working with graphic and multimedia designers and programmers, creates a design that will translate the instructional concept into a working SCORM-conformant product.

The design phase is the ideal time to consider the SCO size. Depending on the type of information that must be stored about learners' performance, as well as considerations for reusability, a SCO could represent topics, lessons, modules, etc. that exist in traditional instructional design terms.

ADL Acquisition Tip: Ensure the contract specifies what the design-phase deliverables are and how they will be delivered. For example, will the contract require individual design specifications, scripts, and/or storyboards for each SCO or for each traditional module, lesson, topic, etc.



Acquisition Considerations for ADL Systems and Content

Topic 4: Instructional Systems Design (ISD) and SCORM

Design: Understanding Sharable Content Objects (SCOs)

A SCO is a collection of assets (HTML pages, graphics, animations, audio, etc.) that can be reliably retrieved and launched for presentation to a learner by a Learning Management System (LMS). A SCO has three defining characteristics:

- It is the smallest unit that can be tracked in a SCOR conformant LMS.
- It should be able to stand-alone whenever possi
- It must be launched and tracked by a SCOR ormant LMS.

collection of assets.

l so stringent that you require a SCO to conform to a specific sson limits the content developers flexibility and the ers to determine how SCOs should be divided and delivered

Learning Management System (LMS) – Software that automates learning event administration through a set of services that launches learning content, keeps track of learner progress, determines the order (sequence) that learning objects are to be delivered, and reports student progress through a learning experience.

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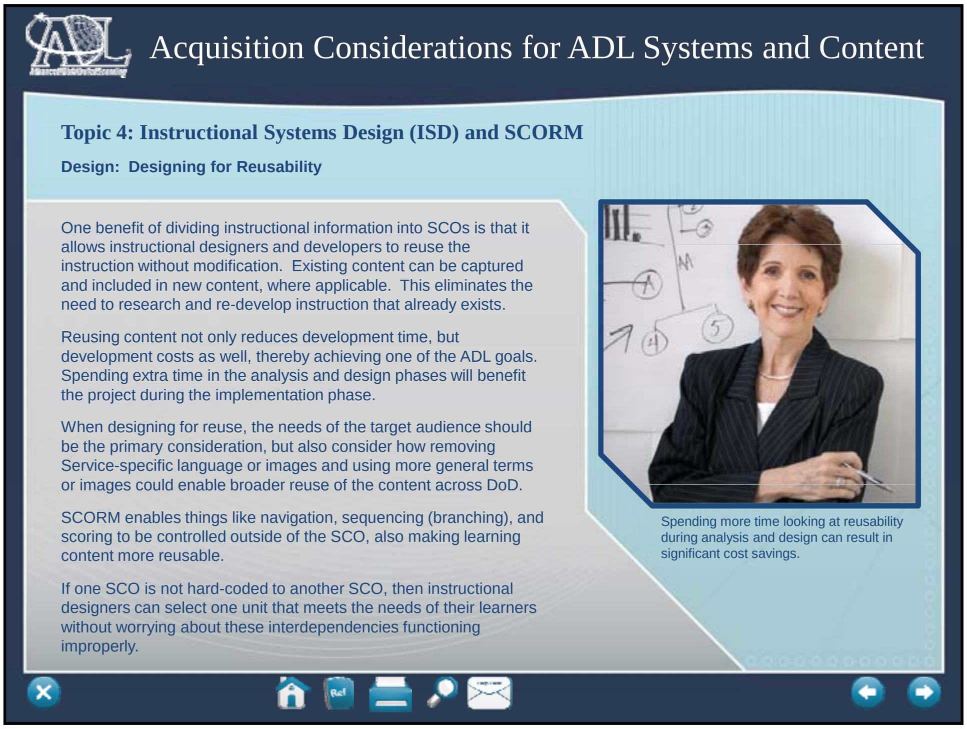


Acquisition Considerations for ADL Systems and Content

Topic 4: Instructional Systems Design (ISD) and SCORM

Design: Designing for Reusability

One benefit of dividing instructional information into SCOs is that it allows instructional designers and developers to reuse the instruction without modification. Existing content can be captured and included in new content, where applicable. This eliminates the need to research and re-develop instruction that already exists.

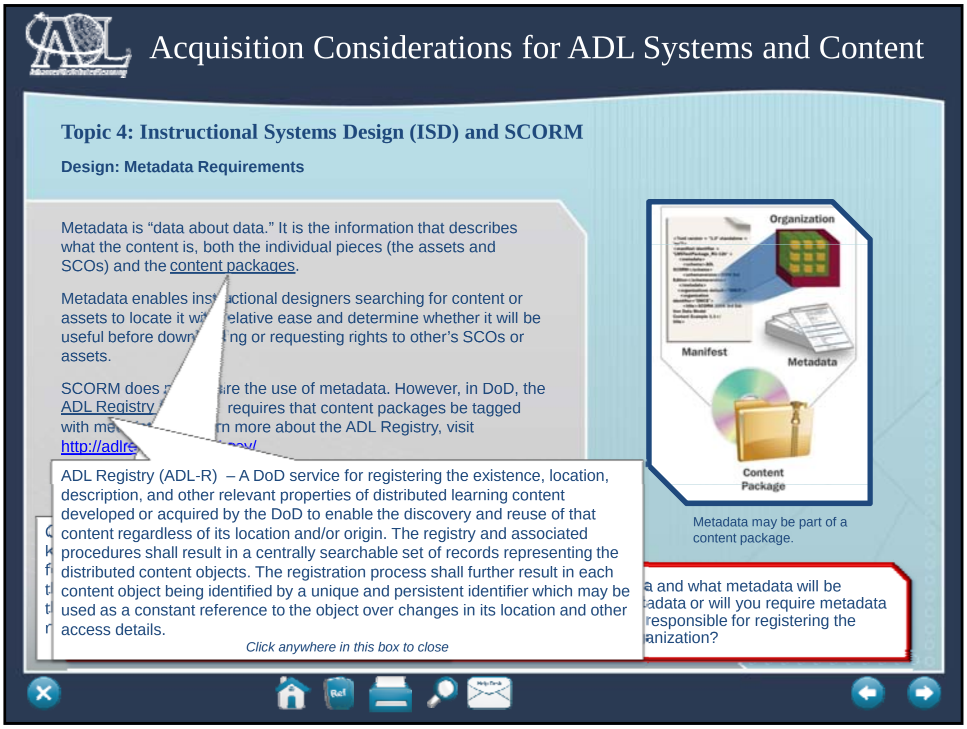
Reusing content not only reduces development time, but development costs as well, thereby achieving one of the ADL goals. Spending extra time in the analysis and design phases will benefit the project during the implementation phase.

When designing for reuse, the needs of the target audience should be the primary consideration, but also consider how removing Service-specific language or images and using more general terms or images could enable broader reuse of the content across DoD.

SCORM enables things like navigation, sequencing (branching), and scoring to be controlled outside of the SCO, also making learning content more reusable.

If one SCO is not hard-coded to another SCO, then instructional designers can select one unit that meets the needs of their learners without worrying about these interdependencies functioning improperly.

Spending more time looking at reusability during analysis and design can result in significant cost savings.



Acquisition Considerations for ADL Systems and Content

Topic 4: Instructional Systems Design (ISD) and SCORM

Design: Metadata Requirements

Metadata is “data about data.” It is the information that describes what the content is, both the individual pieces (the assets and SCOs) and the content packages.

Metadata enables inst ctional designers searching for content or assets to locate it wi elative ease and determine whether it will be useful before down ng or requesting rights to other’s SCOs or assets.

SCORM does re the use of metadata. However, in DoD, the ADL Registry requires that content packages be tagged with me n more about the ADL Registry, visit http://adlre gov/

ADL Registry (ADL-R) – A DoD service for registering the existence, location, description, and other relevant properties of distributed learning content developed or acquired by the DoD to enable the discovery and reuse of that content regardless of its location and/or origin. The registry and associated procedures shall result in a centrally searchable set of records representing the distributed content objects. The registration process shall further result in each content object being identified by a unique and persistent identifier which may be used as a constant reference to the object over changes in its location and other access details.

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Metadata may be part of a content package.

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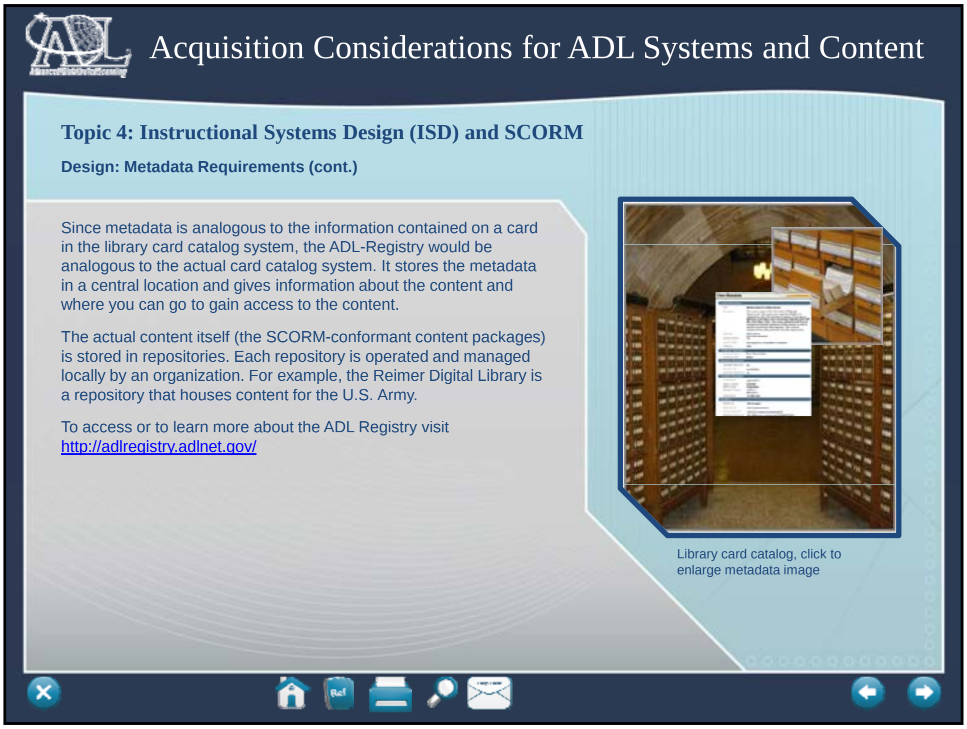


Acquisition Considerations for ADL Systems and Content

Topic 4: Instructional Systems Design (ISD) and SCORM

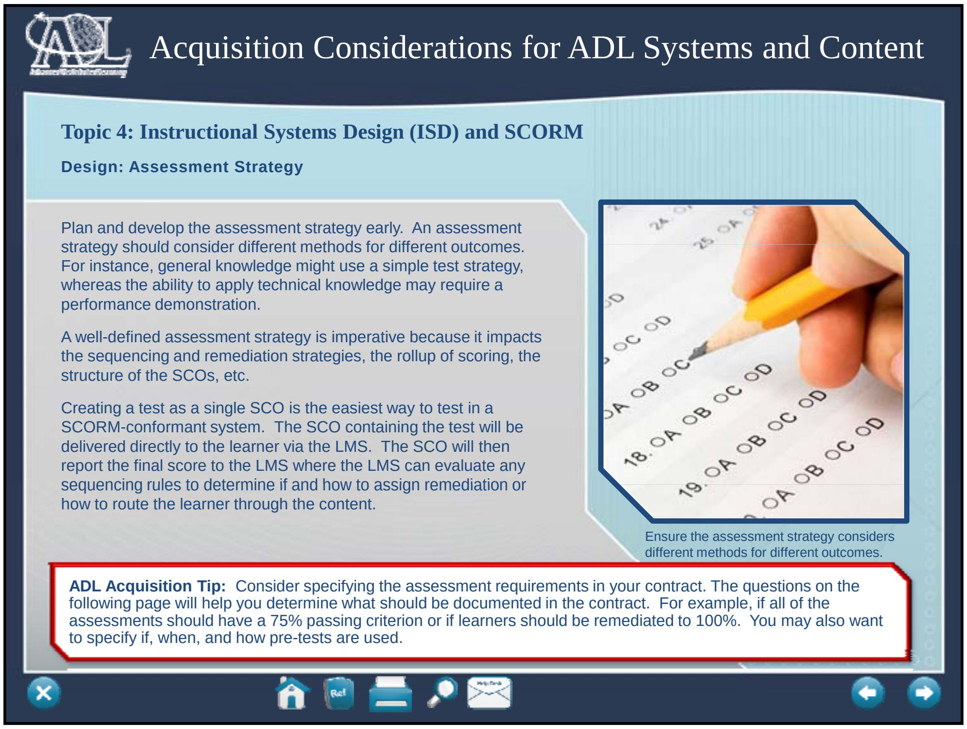
Design: Metadata Requirements (cont.)

Since metadata is analogous to the information contained on a card in the library card catalog system, the ADL-Registry would be analogous to the actual card catalog system. It stores the metadata in a central location and gives information about the content and where you can go to gain access to the content.

The actual content itself (the SCORM-conformant content packages) is stored in repositories. Each repository is operated and managed locally by an organization. For example, the Reimer Digital Library is a repository that houses content for the U.S. Army.

To access or to learn more about the ADL Registry visit http://adlregistry.adlnet.gov/

Library card catalog, click to enlarge metadata image



Acquisition Considerations for ADL Systems and Content

Topic 4: Instructional Systems Design (ISD) and SCORM

Design: Assessment Strategy

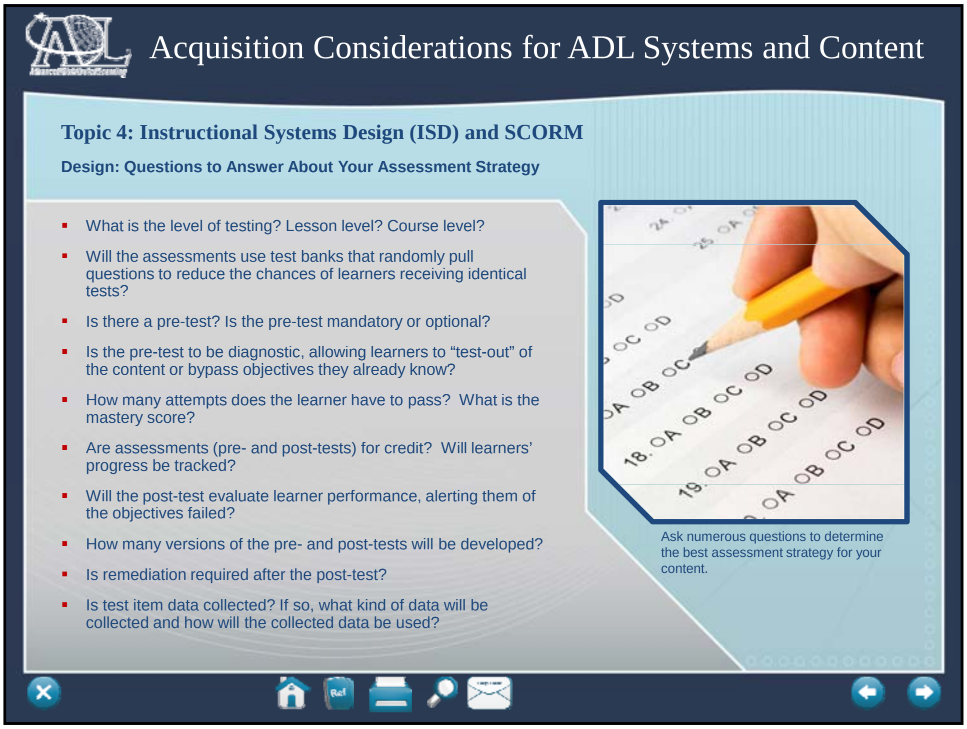
Plan and develop the assessment strategy early. An assessment strategy should consider different methods for different outcomes. For instance, general knowledge might use a simple test strategy, whereas the ability to apply technical knowledge may require a performance demonstration.

A well-defined assessment strategy is imperative because it impacts the sequencing and remediation strategies, the rollup of scoring, the structure of the SCOs, etc.

Creating a test as a single SCO is the easiest way to test in a SCORM-conformant system. The SCO containing the test will be delivered directly to the learner via the LMS. The SCO will then report the final score to the LMS where the LMS can evaluate any sequencing rules to determine if and how to assign remediation or how to route the learner through the content.

Ensure the assessment strategy considers different methods for different outcomes.

ADL Acquisition Tip: Consider specifying the assessment requirements in your contract. The questions on the following page will help you determine what should be documented in the contract. For example, if all of the assessments should have a 75% passing criterion or if learners should be remediated to 100%. You may also want to specify if, when, and how pre-tests are used.



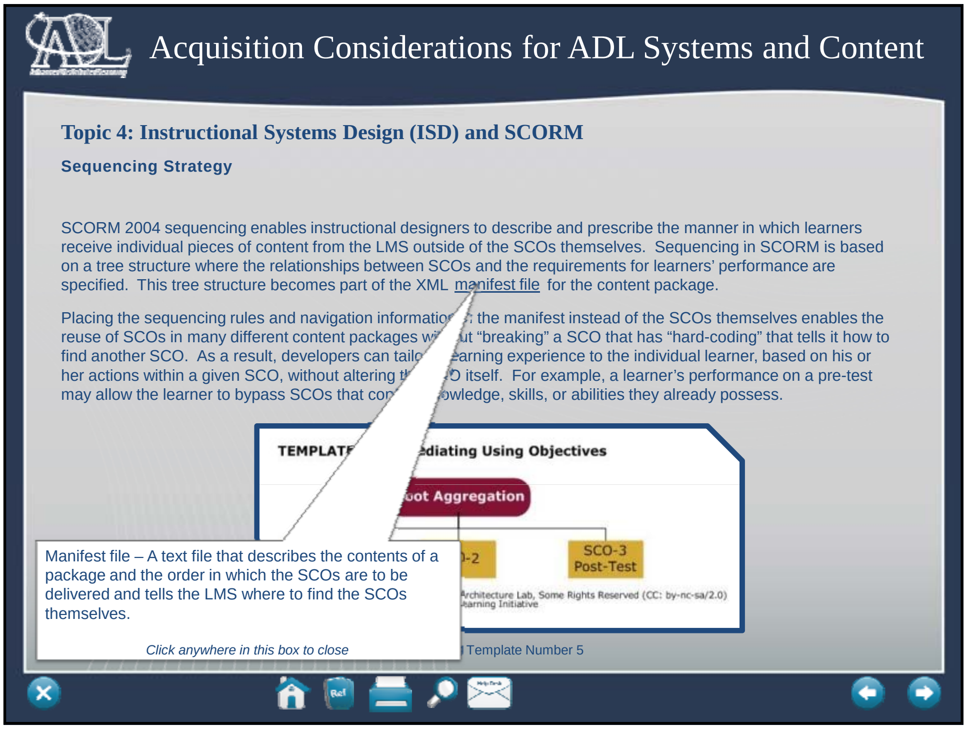
Acquisition Considerations for ADL Systems and Content

Topic 4: Instructional Systems Design (ISD) and SCORM

Design: Questions to Answer About Your Assessment Strategy

- What is the level of testing? Lesson level? Course level?
- Will the assessments use test banks that randomly pull questions to reduce the chances of learners receiving identical tests?
- Is there a pre-test? Is the pre-test mandatory or optional?
- Is the pre-test to be diagnostic, allowing learners to “test-out” of the content or bypass objectives they already know?
- How many attempts does the learner have to pass? What is the mastery score?
- Are assessments (pre- and post-tests) for credit? Will learners’ progress be tracked?
- Will the post-test evaluate learner performance, alerting them of the objectives failed?
- How many versions of the pre- and post-tests will be developed?
- Is remediation required after the post-test?
- Is test item data collected? If so, what kind of data will be collected and how will the collected data be used?

Ask numerous questions to determine the best assessment strategy for your content.



Acquisition Considerations for ADL Systems and Content

Topic 4: Instructional Systems Design (ISD) and SCORM

Sequencing Strategy

SCORM 2004 sequencing enables instructional designers to describe and prescribe the manner in which learners receive individual pieces of content from the LMS outside of the SCOs themselves. Sequencing in SCORM is based on a tree structure where the relationships between SCOs and the requirements for learners' performance are specified. This tree structure becomes part of the XML manifest file for the content package.

Placing the sequencing rules and navigation informatio the manifest instead of the SCOs themselves enables the reuse of SCOs in many different content packages wi ut “breaking” a SCO that has “hard-coding” that tells it how to find another SCO. As a result, developers can tailo earning experience to the individual learner, based on his or her actions within a given SCO, without altering th O itself. For example, a learner’s performance on a pre-test may allow the learner to bypass SCOs that con owledge, skills, or abilities they already possess.

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earning Initiative

Manifest file – A text file that describes the contents of a package and the order in which the SCOs are to be delivered and tells the LMS where to find the SCOs themselves.

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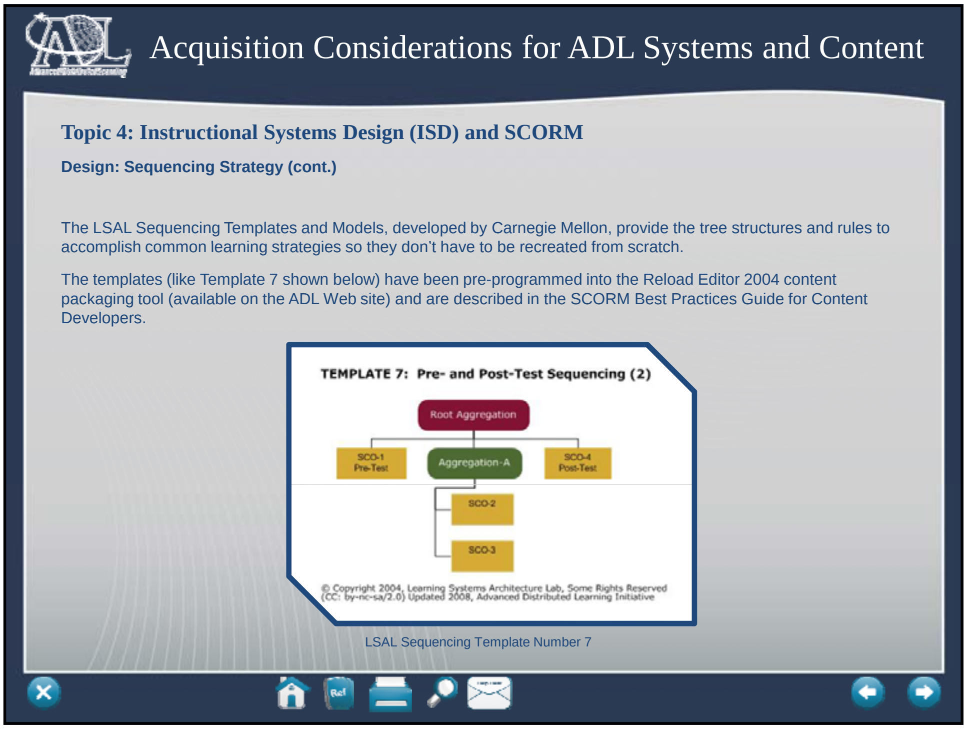
Template Number 5



Acquisition Considerations for ADL Systems and Content

Topic 4: Instructional Systems Design (ISD) and SCORM

Design: Sequencing Strategy (cont.)

The LSAL Sequencing Templates and Models, developed by Carnegie Mellon, provide the tree structures and rules to accomplish common learning strategies so they don't have to be recreated from scratch.

The templates (like Template 7 shown below) have been pre-programmed into the Reload Editor 2004 content packaging tool (available on the ADL Web site) and are described in the SCORM Best Practices Guide for Content Developers.

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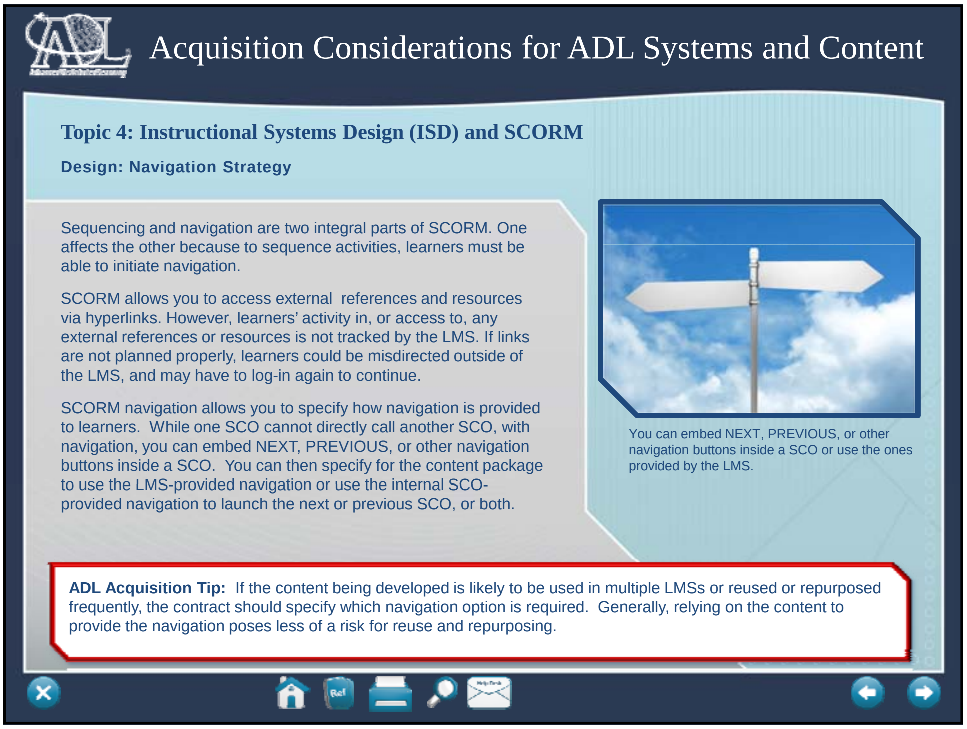
LSAL Sequencing Template Number 7



Acquisition Considerations for ADL Systems and Content

Topic 4: Instructional Systems Design (ISD) and SCORM

Design: Navigation Strategy

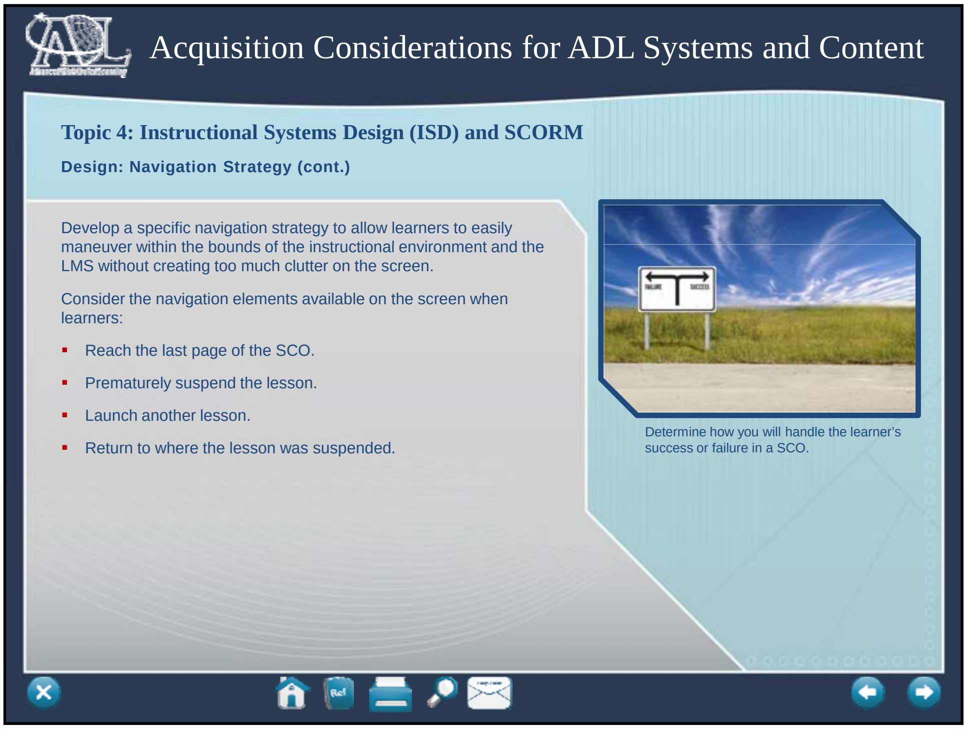
Sequencing and navigation are two integral parts of SCORM. One affects the other because to sequence activities, learners must be able to initiate navigation.

SCORM allows you to access external references and resources via hyperlinks. However, learners' activity in, or access to, any external references or resources is not tracked by the LMS. If links are not planned properly, learners could be misdirected outside of the LMS, and may have to log-in again to continue.

SCORM navigation allows you to specify how navigation is provided to learners. While one SCO cannot directly call another SCO, with navigation, you can embed NEXT, PREVIOUS, or other navigation buttons inside a SCO. You can then specify for the content package to use the LMS-provided navigation or use the internal SCO-provided navigation to launch the next or previous SCO, or both.

You can embed NEXT, PREVIOUS, or other navigation buttons inside a SCO or use the ones provided by the LMS.

ADL Acquisition Tip: If the content being developed is likely to be used in multiple LMSs or reused or repurposed frequently, the contract should specify which navigation option is required. Generally, relying on the content to provide the navigation poses less of a risk for reuse and repurposing.



Acquisition Considerations for ADL Systems and Content

Topic 4: Instructional Systems Design (ISD) and SCORM

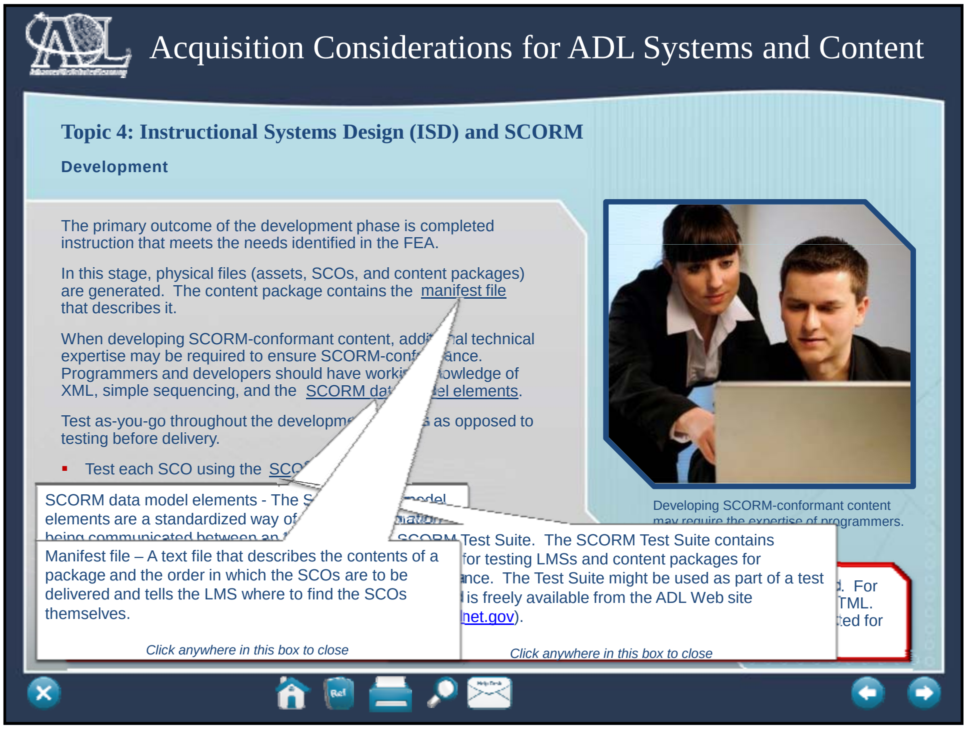
Design: Navigation Strategy (cont.)

Develop a specific navigation strategy to allow learners to easily maneuver within the bounds of the instructional environment and the LMS without creating too much clutter on the screen.

Consider the navigation elements available on the screen when learners:

- Reach the last page of the SCO.
- Prematurely suspend the lesson.
- Launch another lesson.
- Return to where the lesson was suspended.

Determine how you will handle the learner's success or failure in a SCO.



Acquisition Considerations for ADL Systems and Content

Topic 4: Instructional Systems Design (ISD) and SCORM

Development

The primary outcome of the development phase is completed instruction that meets the needs identified in the FEA.

In this stage, physical files (assets, SCOs, and content packages) are generated. The content package contains the manifest file that describes it.

When developing SCORM-conformant content, addi al technical expertise may be required to ensure SCORM-conf ance. Programmers and developers should have worki owledge of XML, simple sequencing, and the SCORM dat el elements.

Test as-you-go throughout the developme s as opposed to testing before delivery.

- Test each SCO using the SCO

SCORM data model elements - The S model elements are a standardized way of rmation being communicated between an

Manifest file – A text file that describes the contents of a package and the order in which the SCOs are to be delivered and tells the LMS where to find the SCOs themselves.

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SCORM Test Suite. The SCORM Test Suite contains for testing LMSs and content packages for ance. The Test Suite might be used as part of a test is freely available from the ADL Web site net.gov).

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Developing SCORM-conformant content may require the expertise of programmers.

Acquisition Considerations for ADL Systems and Content

Topic 4: Instructional Systems Design (ISD) and SCORM

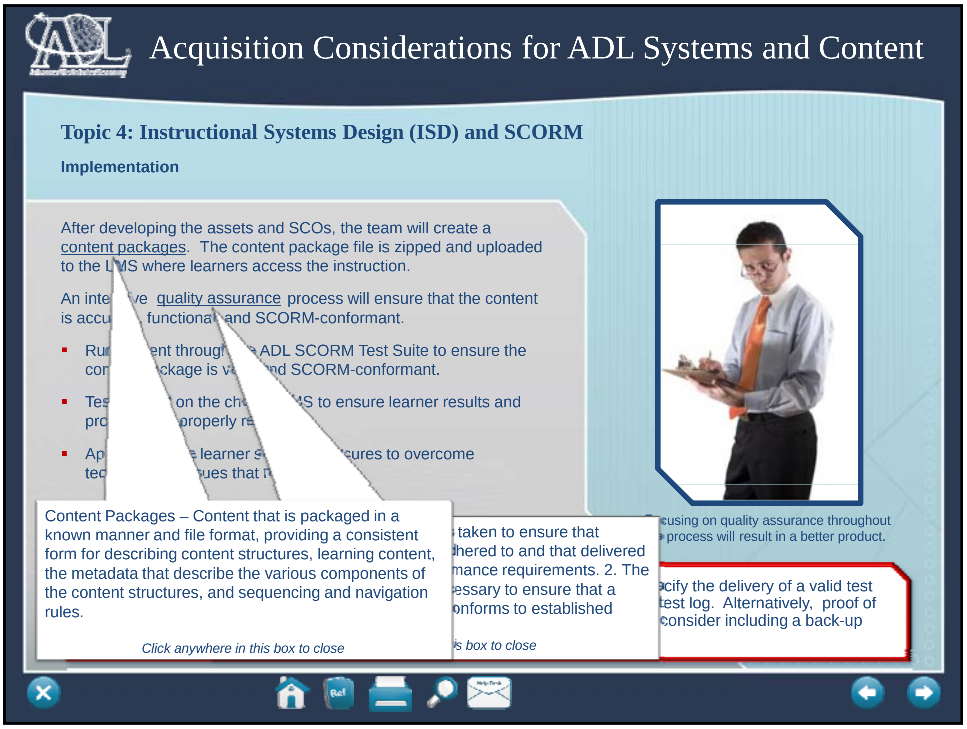
Development (cont.)

Although SCORM-conformant content typically requires additional time in the analysis and design phases of the ADDIE process, potential savings are realized in the development stage whenever content can be repurposed or reused.

To maximize reusability when developing new content, ensure that each SCO can stand alone and does not refer to another SCO. When needed, create transition statements such as “in the last lesson you learned…” as individual “throw-away” SCOs.

Since SCOs are usually designed to be technically independent of one another, content development can proceed incrementally. The actual schedule of events for the development effort depends on the size and complexity of the effort, the acquisition approach, and the project manager's management style.

Since each SCO is an independent entity, content development can proceed incrementally.



Acquisition Considerations for ADL Systems and Content

Topic 4: Instructional Systems Design (ISD) and SCORM

Implementation

After developing the assets and SCOs, the team will create a content packages. The content package file is zipped and uploaded to the L MS where learners access the instruction.

An inte ve quality assurance process will ensure that the content is accu functiona and SCORM-conformant.

- Ru ent throug ADL SCORM Test Suite to ensure the co ckage is v nd SCORM-conformant.
- Tes on the ch S to ensure learner results and pro properly r
- Ap learner s ures to overcome tec ues that r

Content Packages – Content that is packaged in a known manner and file format, providing a consistent form for describing content structures, learning content, the metadata that describe the various components of the content structures, and sequencing and navigation rules.

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taken to ensure that hered to and that delivered mance requirements. 2. The essary to ensure that a onforms to established

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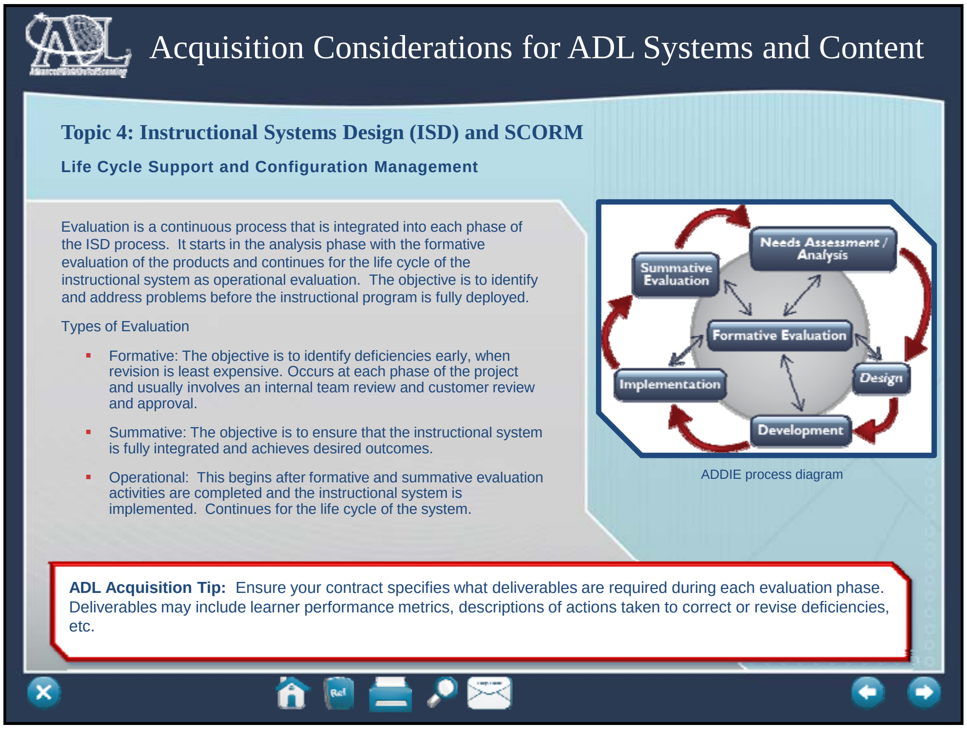
cusing on quality assurance throughout process will result in a better product.

cify the delivery of a valid test test log. Alternatively, proof of consider including a back-up



Acquisition Considerations for ADL Systems and Content

Topic 4: Instructional Systems Design (ISD) and SCORM

Life Cycle Support and Configuration Management

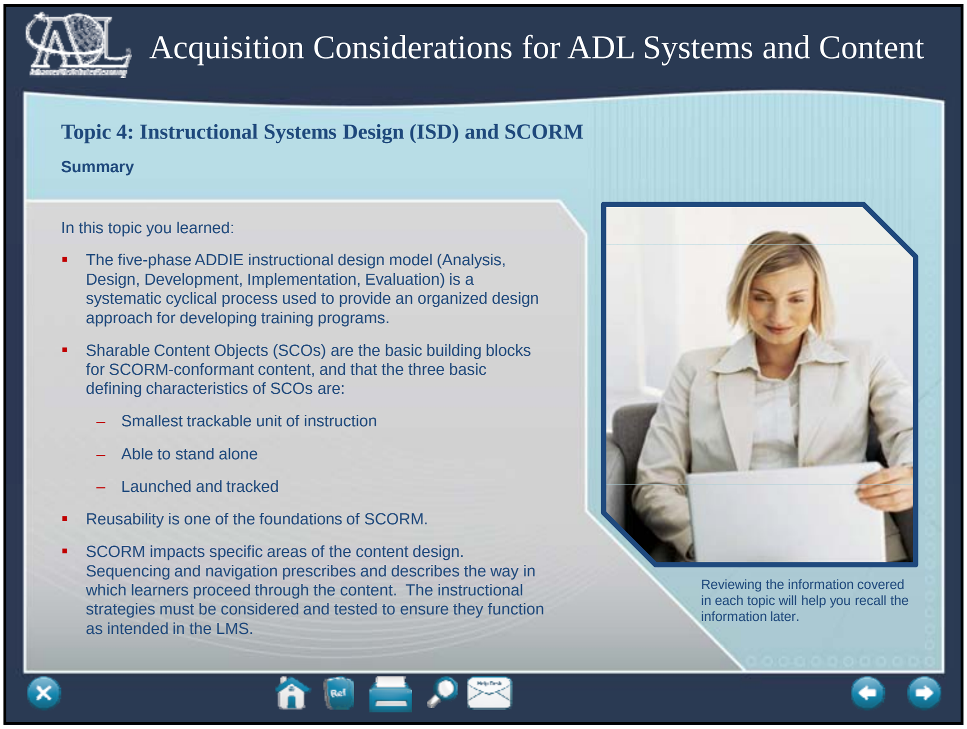
Evaluation is a continuous process that is integrated into each phase of the ISD process. It starts in the analysis phase with the formative evaluation of the products and continues for the life cycle of the instructional system as operational evaluation. The objective is to identify and address problems before the instructional program is fully deployed.

Types of Evaluation

- Formative: The objective is to identify deficiencies early, when revision is least expensive. Occurs at each phase of the project and usually involves an internal team review and customer review and approval.
- Summative: The objective is to ensure that the instructional system is fully integrated and achieves desired outcomes.
- Operational: This begins after formative and summative evaluation activities are completed and the instructional system is implemented. Continues for the life cycle of the system.

ADDIE process diagram

ADL Acquisition Tip: Ensure your contract specifies what deliverables are required during each evaluation phase. Deliverables may include learner performance metrics, descriptions of actions taken to correct or revise deficiencies, etc.



Acquisition Considerations for ADL Systems and Content

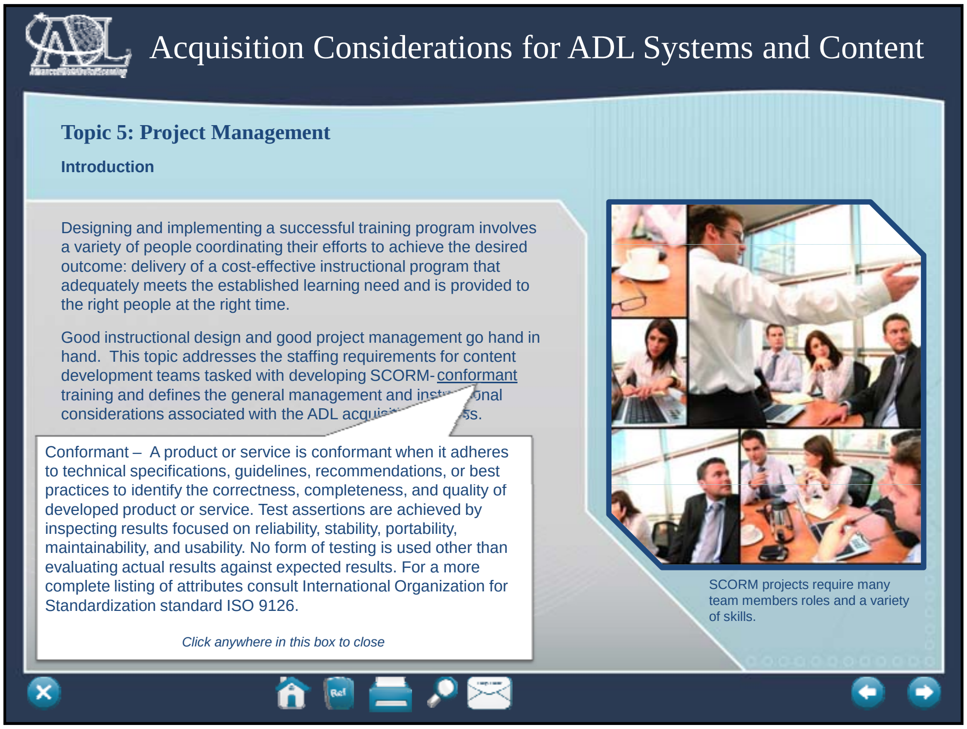
Topic 4: Instructional Systems Design (ISD) and SCORM

Summary

In this topic you learned:

- The five-phase ADDIE instructional design model (Analysis, Design, Development, Implementation, Evaluation) is a systematic cyclical process used to provide an organized design approach for developing training programs.
- Sharable Content Objects (SCOs) are the basic building blocks for SCORM-conformant content, and that the three basic defining characteristics of SCOs are:
  - Smallest trackable unit of instruction
  - Able to stand alone
  - Launched and tracked
- Reusability is one of the foundations of SCORM.
- SCORM impacts specific areas of the content design. Sequencing and navigation prescribes and describes the way in which learners proceed through the content. The instructional strategies must be considered and tested to ensure they function as intended in the LMS.

Reviewing the information covered in each topic will help you recall the information later.



Acquisition Considerations for ADL Systems and Content

Topic 5: Project Management

Introduction

Designing and implementing a successful training program involves a variety of people coordinating their efforts to achieve the desired outcome: delivery of a cost-effective instructional program that adequately meets the established learning need and is provided to the right people at the right time.

Good instructional design and good project management go hand in hand. This topic addresses the staffing requirements for content development teams tasked with developing SCORM-conformant training and defines the general management and inst onal considerations associated with the ADL acqui ss.

Conformant – A product or service is conformant when it adheres to technical specifications, guidelines, recommendations, or best practices to identify the correctness, completeness, and quality of developed product or service. Test assertions are achieved by inspecting results focused on reliability, stability, portability, maintainability, and usability. No form of testing is used other than evaluating actual results against expected results. For a more complete listing of attributes consult International Organization for Standardization standard ISO 9126.

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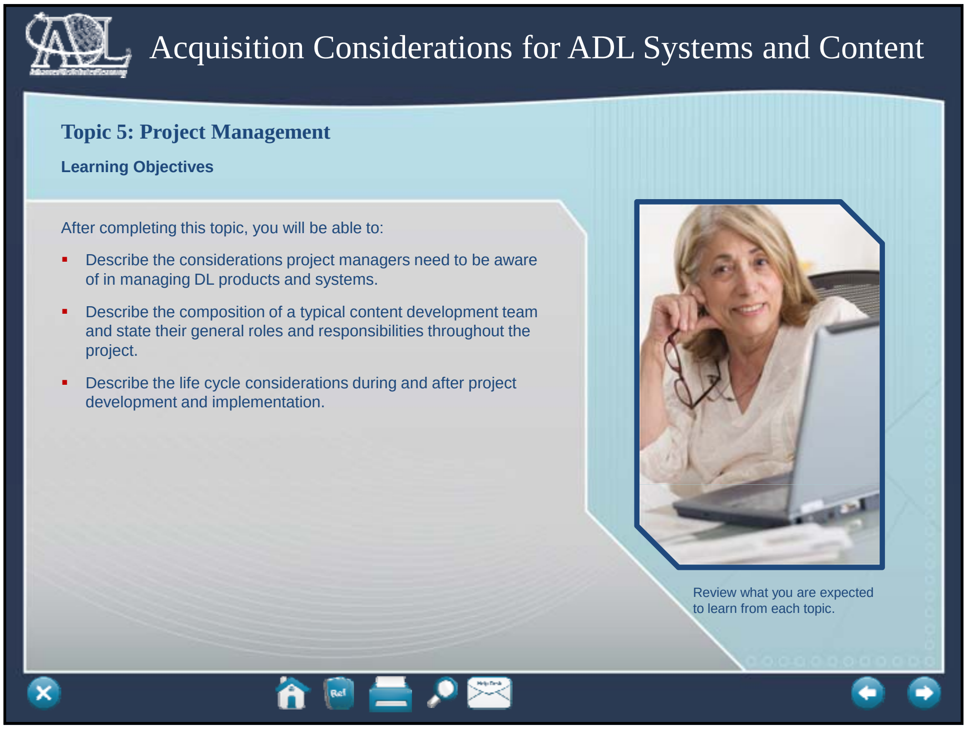
SCORM projects require many team members roles and a variety of skills.



Acquisition Considerations for ADL Systems and Content

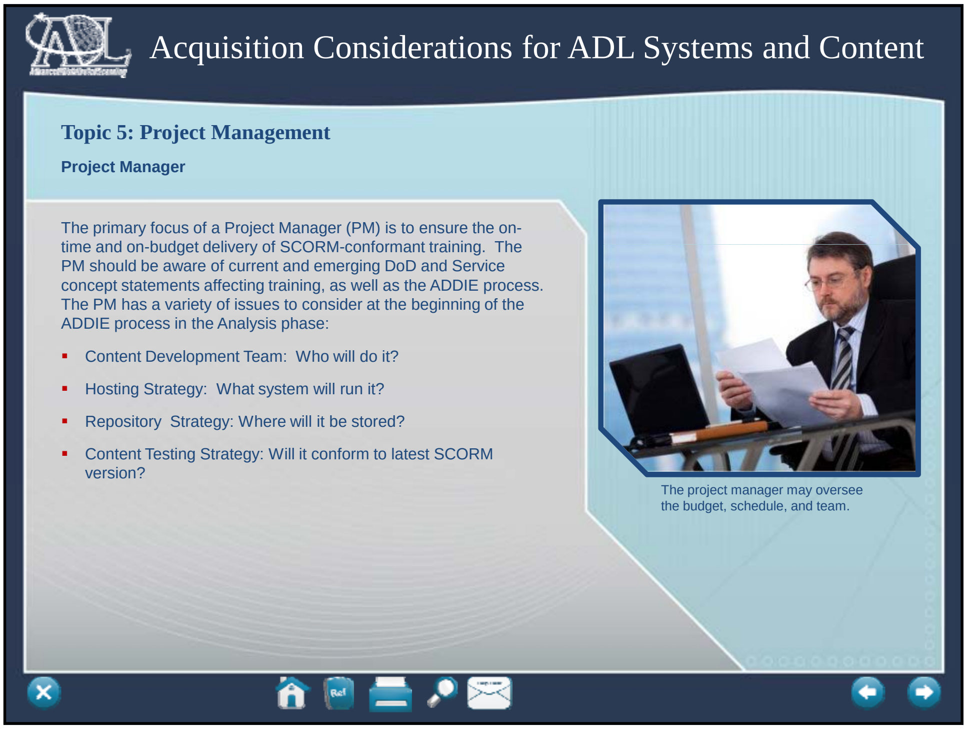
Topic 5: Project Management

Learning Objectives

After completing this topic, you will be able to:

- Describe the considerations project managers need to be aware of in managing DL products and systems.
- Describe the composition of a typical content development team and state their general roles and responsibilities throughout the project.
- Describe the life cycle considerations during and after project development and implementation.

Review what you are expected to learn from each topic.



Acquisition Considerations for ADL Systems and Content

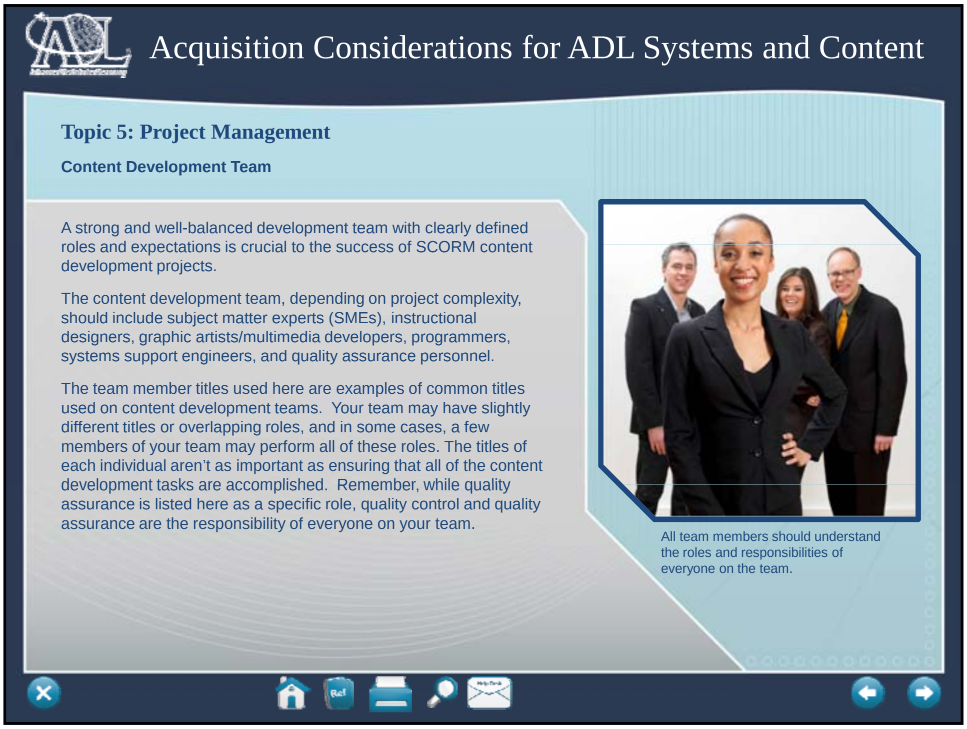
Topic 5: Project Management

Project Manager

The primary focus of a Project Manager (PM) is to ensure the on-time and on-budget delivery of SCORM-conformant training. The PM should be aware of current and emerging DoD and Service concept statements affecting training, as well as the ADDIE process. The PM has a variety of issues to consider at the beginning of the ADDIE process in the Analysis phase:

- Content Development Team: Who will do it?
- Hosting Strategy: What system will run it?
- Repository Strategy: Where will it be stored?
- Content Testing Strategy: Will it conform to latest SCORM version?

The project manager may oversee the budget, schedule, and team.



Acquisition Considerations for ADL Systems and Content

Topic 5: Project Management

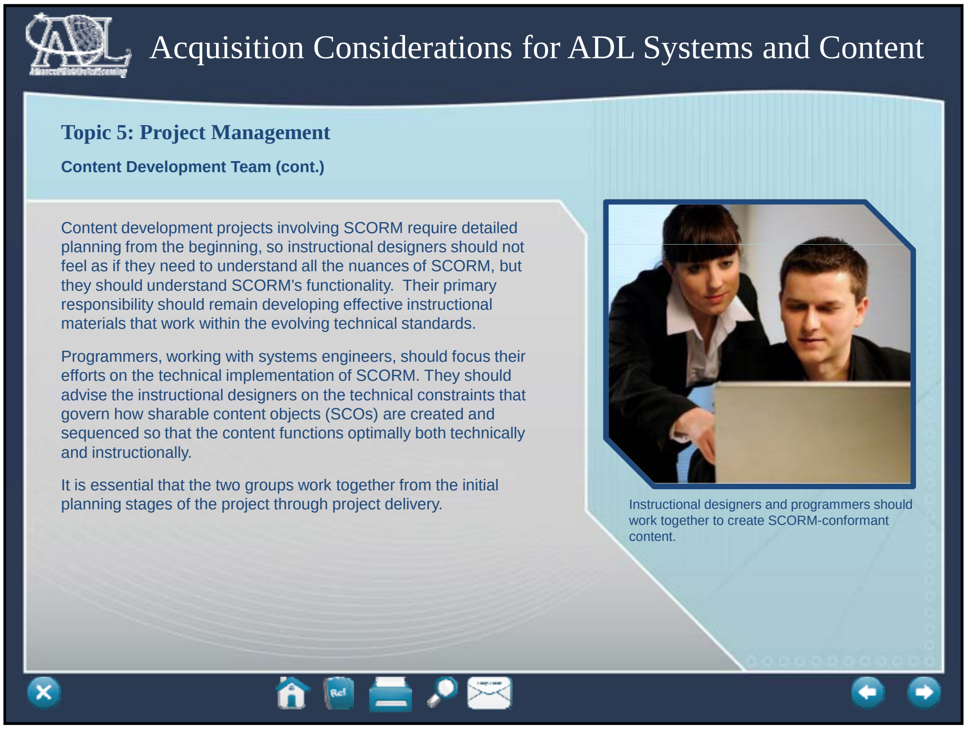
Content Development Team

A strong and well-balanced development team with clearly defined roles and expectations is crucial to the success of SCORM content development projects.

The content development team, depending on project complexity, should include subject matter experts (SMEs), instructional designers, graphic artists/multimedia developers, programmers, systems support engineers, and quality assurance personnel.

The team member titles used here are examples of common titles used on content development teams. Your team may have slightly different titles or overlapping roles, and in some cases, a few members of your team may perform all of these roles. The titles of each individual aren't as important as ensuring that all of the content development tasks are accomplished. Remember, while quality assurance is listed here as a specific role, quality control and quality assurance are the responsibility of everyone on your team.

All team members should understand the roles and responsibilities of everyone on the team.



Acquisition Considerations for ADL Systems and Content

Topic 5: Project Management

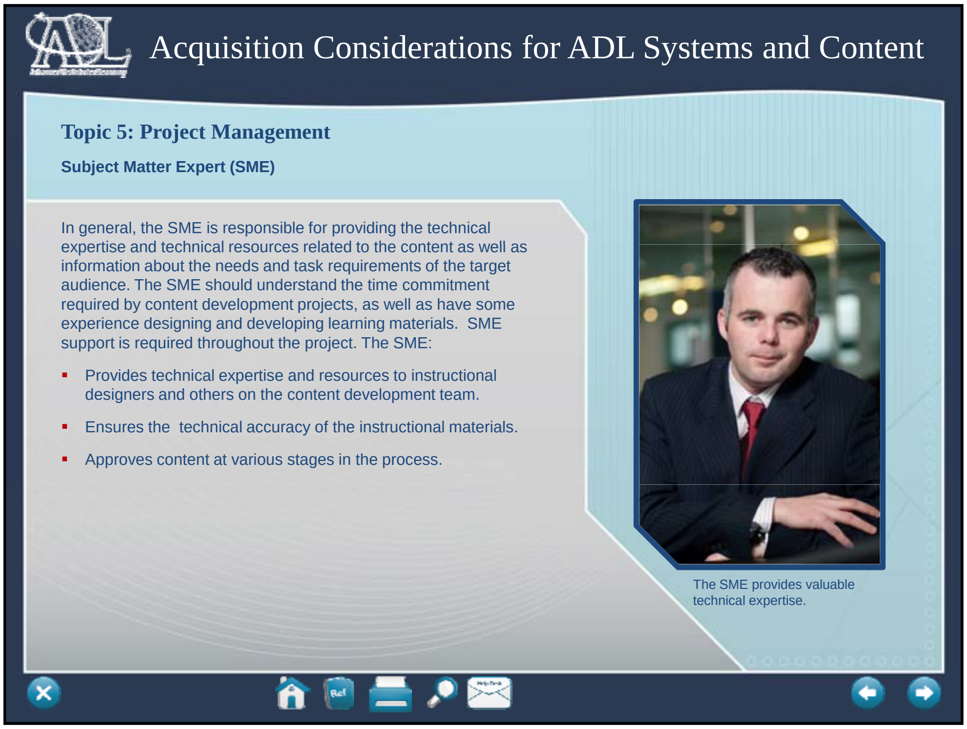
Content Development Team (cont.)

Content development projects involving SCORM require detailed planning from the beginning, so instructional designers should not feel as if they need to understand all the nuances of SCORM, but they should understand SCORM's functionality. Their primary responsibility should remain developing effective instructional materials that work within the evolving technical standards.

Programmers, working with systems engineers, should focus their efforts on the technical implementation of SCORM. They should advise the instructional designers on the technical constraints that govern how sharable content objects (SCOs) are created and sequenced so that the content functions optimally both technically and instructionally.

It is essential that the two groups work together from the initial planning stages of the project through project delivery.

Instructional designers and programmers should work together to create SCORM-conformant content.



Acquisition Considerations for ADL Systems and Content

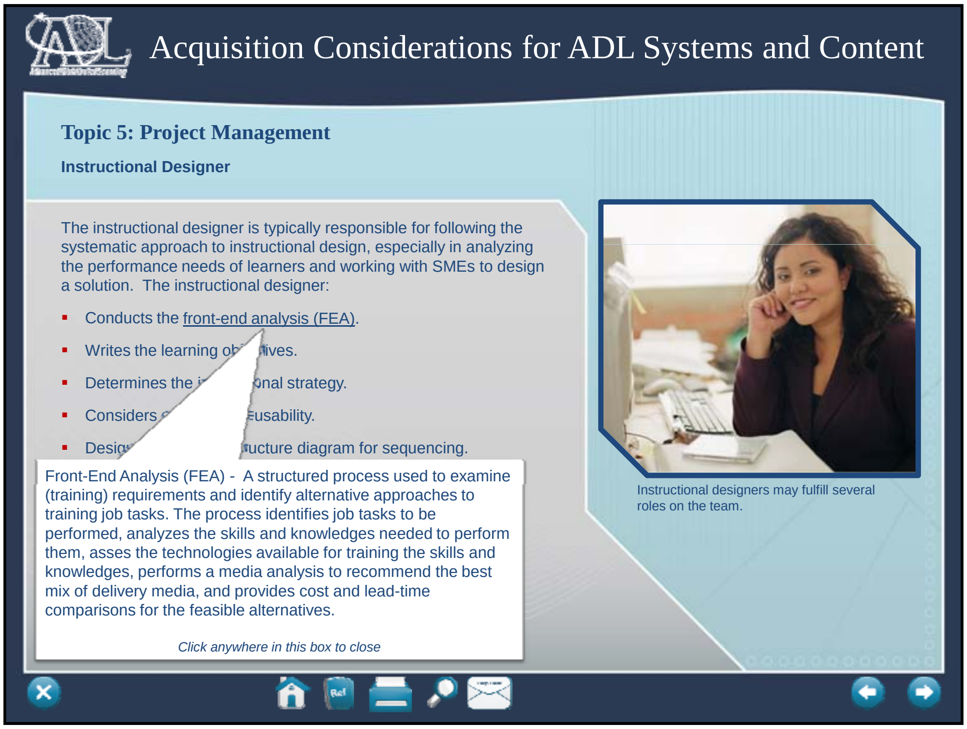
Topic 5: Project Management

Subject Matter Expert (SME)

In general, the SME is responsible for providing the technical expertise and technical resources related to the content as well as information about the needs and task requirements of the target audience. The SME should understand the time commitment required by content development projects, as well as have some experience designing and developing learning materials. SME support is required throughout the project. The SME:

- Provides technical expertise and resources to instructional designers and others on the content development team.
- Ensures the technical accuracy of the instructional materials.
- Approves content at various stages in the process.

The SME provides valuable technical expertise.



Acquisition Considerations for ADL Systems and Content

Topic 5: Project Management

Instructional Designer

The instructional designer is typically responsible for following the systematic approach to instructional design, especially in analyzing the performance needs of learners and working with SMEs to design a solution. The instructional designer:

- Conducts the front-end analysis (FEA).
- Writes the learning ob ives.
- Determines the i onal strategy.
- Considers usability.
- Desig ucture diagram for sequencing.

Front-End Analysis (FEA) - A structured process used to examine (training) requirements and identify alternative approaches to training job tasks. The process identifies job tasks to be performed, analyzes the skills and knowledges needed to perform them, asses the technologies available for training the skills and knowledges, performs a media analysis to recommend the best mix of delivery media, and provides cost and lead-time comparisons for the feasible alternatives.

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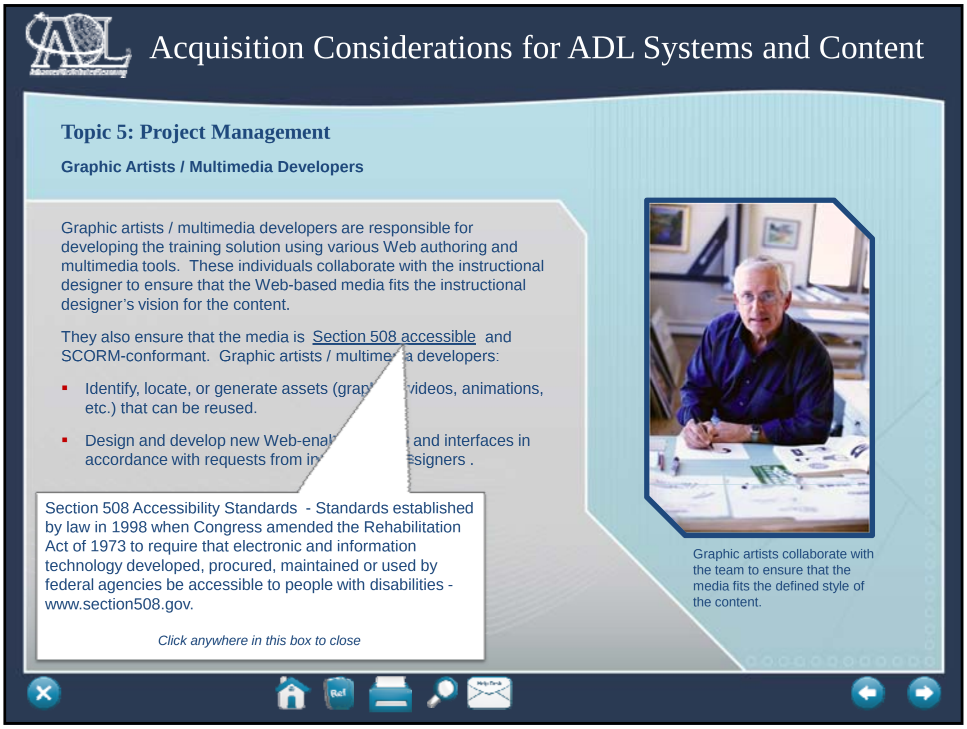
Instructional designers may fulfill several roles on the team.



Acquisition Considerations for ADL Systems and Content

Topic 5: Project Management

Graphic Artists / Multimedia Developers

Graphic artists / multimedia developers are responsible for developing the training solution using various Web authoring and multimedia tools. These individuals collaborate with the instructional designer to ensure that the Web-based media fits the instructional designer's vision for the content.

They also ensure that the media is Section 508 accessible and SCORM-conformant. Graphic artists / multime a developers:

- Identify, locate, or generate assets (grap videos, animations, etc.) that can be reused.
- Design and develop new Web-enal and interfaces in accordance with requests from in signers .

Section 508 Accessibility Standards - Standards established by law in 1998 when Congress amended the Rehabilitation Act of 1973 to require that electronic and information technology developed, procured, maintained or used by federal agencies be accessible to people with disabilities - www.section508.gov.

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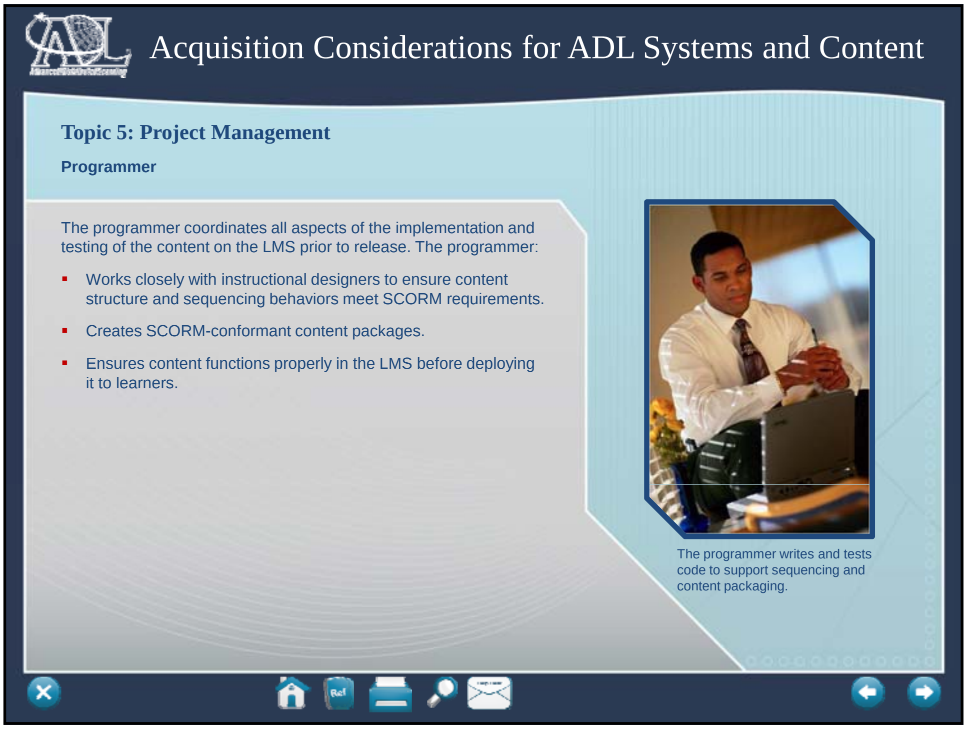
Graphic artists collaborate with the team to ensure that the media fits the defined style of the content.



Acquisition Considerations for ADL Systems and Content

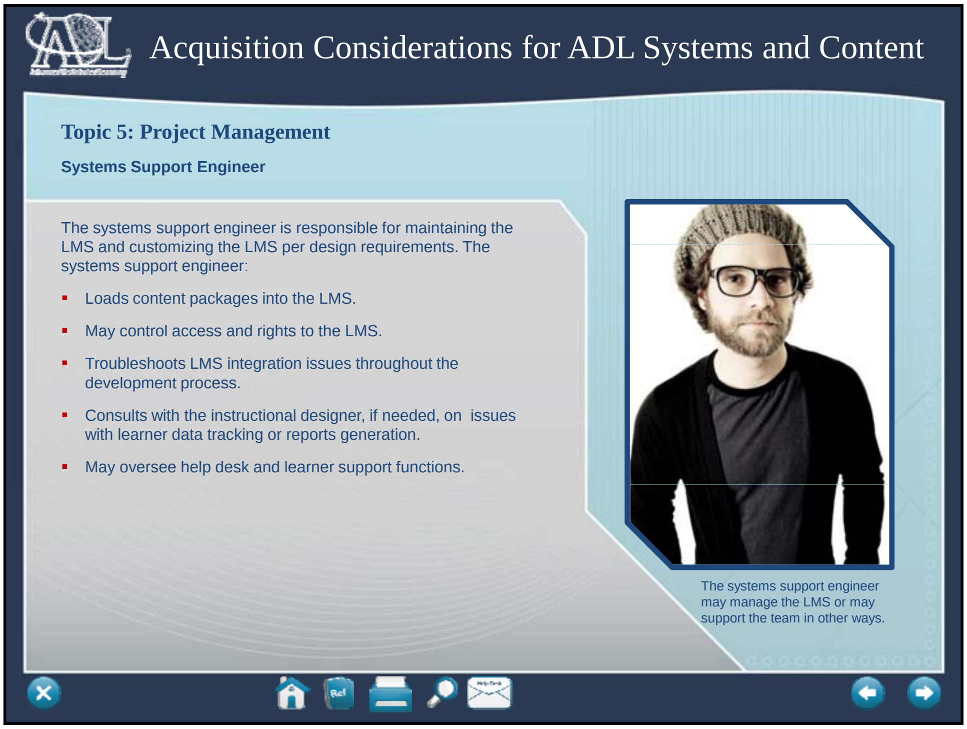
Topic 5: Project Management

Programmer

The programmer coordinates all aspects of the implementation and testing of the content on the LMS prior to release. The programmer:

- Works closely with instructional designers to ensure content structure and sequencing behaviors meet SCORM requirements.
- Creates SCORM-conformant content packages.
- Ensures content functions properly in the LMS before deploying it to learners.

The programmer writes and tests code to support sequencing and content packaging.



Acquisition Considerations for ADL Systems and Content

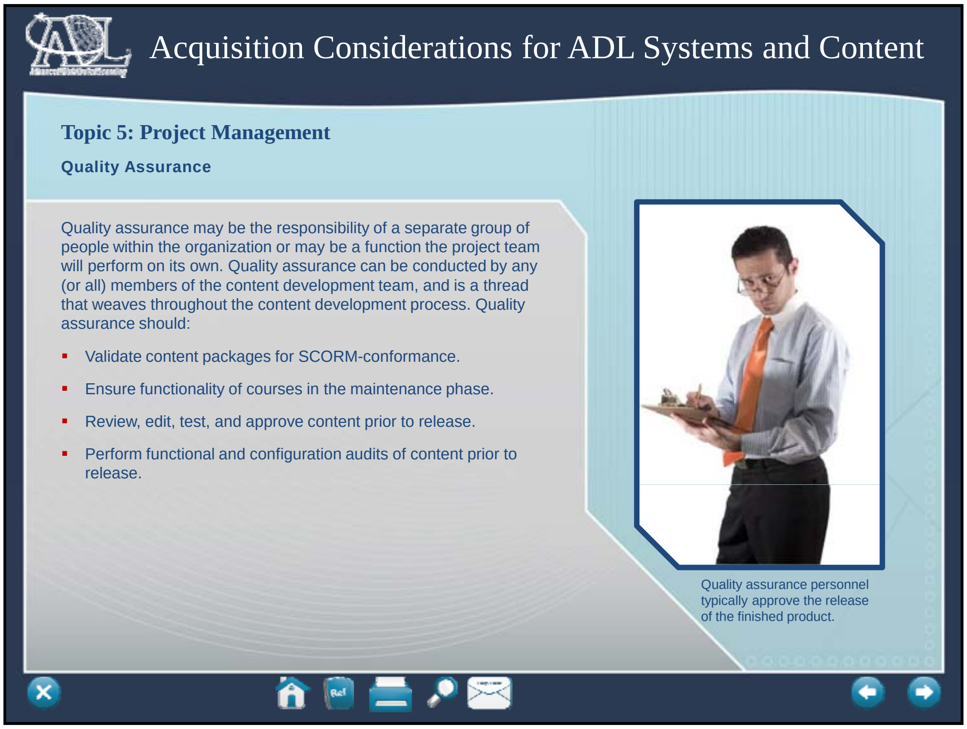
Topic 5: Project Management

Systems Support Engineer

The systems support engineer is responsible for maintaining the LMS and customizing the LMS per design requirements. The systems support engineer:

- Loads content packages into the LMS.
- May control access and rights to the LMS.
- Troubleshoots LMS integration issues throughout the development process.
- Consults with the instructional designer, if needed, on issues with learner data tracking or reports generation.
- May oversee help desk and learner support functions.

The systems support engineer may manage the LMS or may support the team in other ways.



Acquisition Considerations for ADL Systems and Content

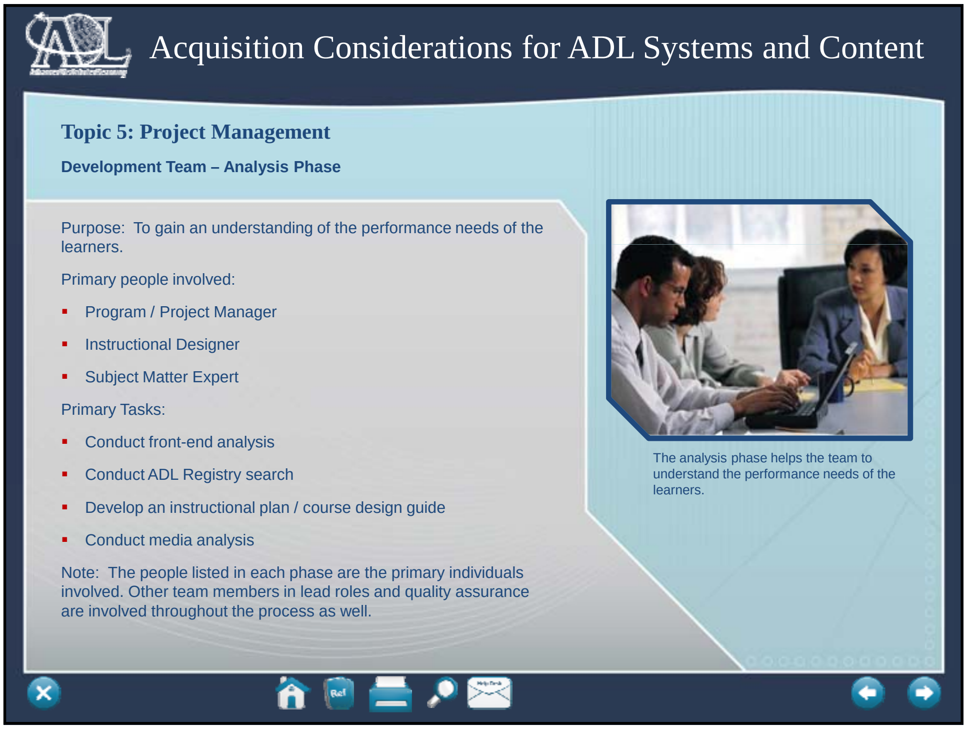
Topic 5: Project Management

Quality Assurance

Quality assurance may be the responsibility of a separate group of people within the organization or may be a function the project team will perform on its own. Quality assurance can be conducted by any (or all) members of the content development team, and is a thread that weaves throughout the content development process. Quality assurance should:

- Validate content packages for SCORM-conformance.
- Ensure functionality of courses in the maintenance phase.
- Review, edit, test, and approve content prior to release.
- Perform functional and configuration audits of content prior to release.

Quality assurance personnel typically approve the release of the finished product.



Acquisition Considerations for ADL Systems and Content

Topic 5: Project Management

Development Team – Analysis Phase

Purpose: To gain an understanding of the performance needs of the learners.

Primary people involved:

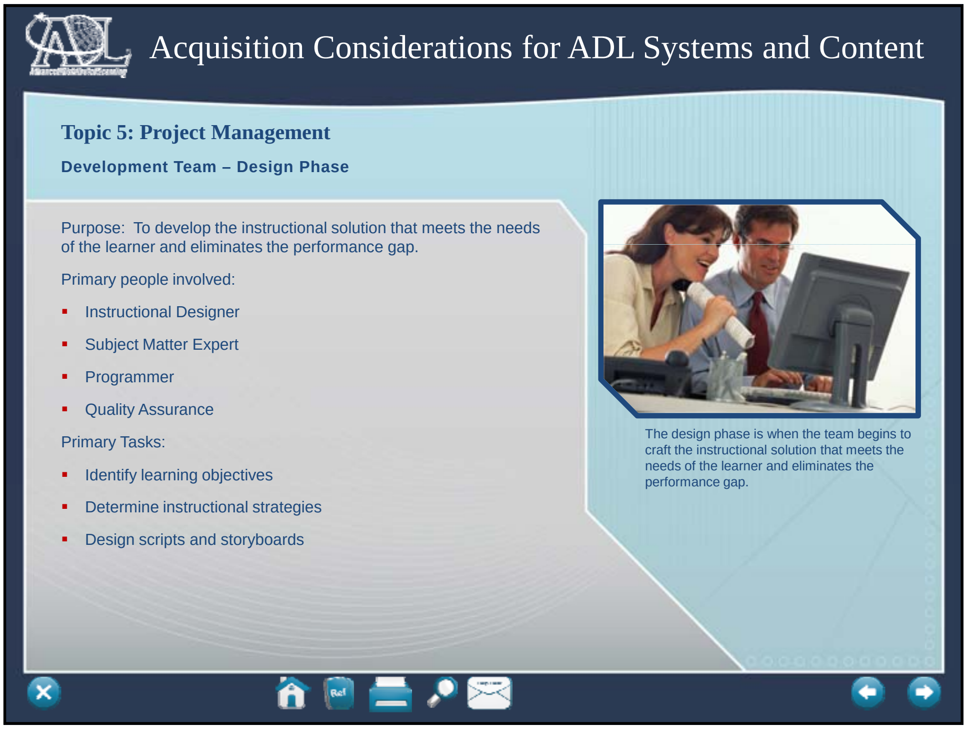
- Program / Project Manager
- Instructional Designer
- Subject Matter Expert

Primary Tasks:

- Conduct front-end analysis
- Conduct ADL Registry search
- Develop an instructional plan / course design guide
- Conduct media analysis

Note: The people listed in each phase are the primary individuals involved. Other team members in lead roles and quality assurance are involved throughout the process as well.

The analysis phase helps the team to understand the performance needs of the learners.



Acquisition Considerations for ADL Systems and Content

Topic 5: Project Management

Development Team – Design Phase

Purpose: To develop the instructional solution that meets the needs of the learner and eliminates the performance gap.

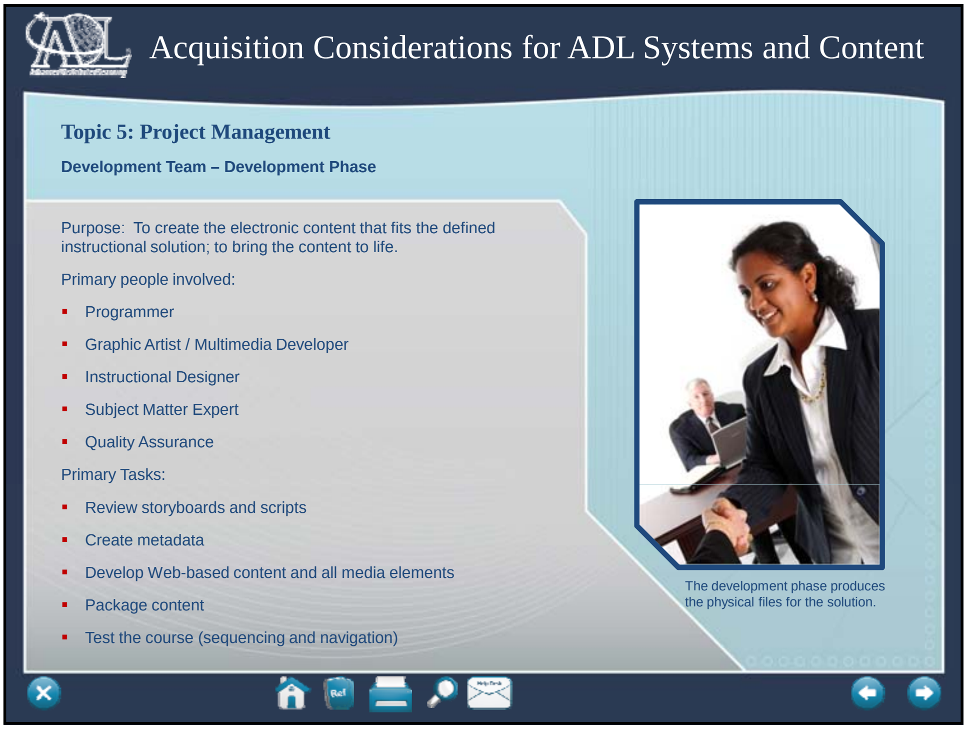
Primary people involved:

- Instructional Designer
- Subject Matter Expert
- Programmer
- Quality Assurance

Primary Tasks:

- Identify learning objectives
- Determine instructional strategies
- Design scripts and storyboards

The design phase is when the team begins to craft the instructional solution that meets the needs of the learner and eliminates the performance gap.



Acquisition Considerations for ADL Systems and Content

Topic 5: Project Management

Development Team – Development Phase

Purpose: To create the electronic content that fits the defined instructional solution; to bring the content to life.

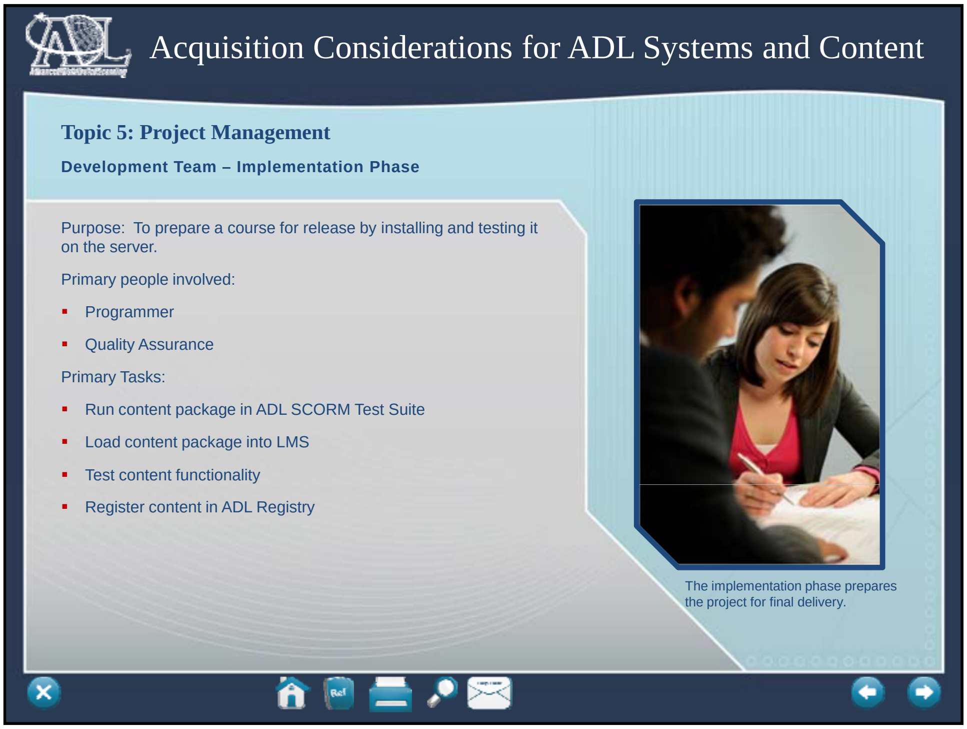
Primary people involved:

- Programmer
- Graphic Artist / Multimedia Developer
- Instructional Designer
- Subject Matter Expert
- Quality Assurance

Primary Tasks:

- Review storyboards and scripts
- Create metadata
- Develop Web-based content and all media elements
- Package content
- Test the course (sequencing and navigation)

The development phase produces the physical files for the solution.



Acquisition Considerations for ADL Systems and Content

Topic 5: Project Management

Development Team – Implementation Phase

Purpose: To prepare a course for release by installing and testing it on the server.

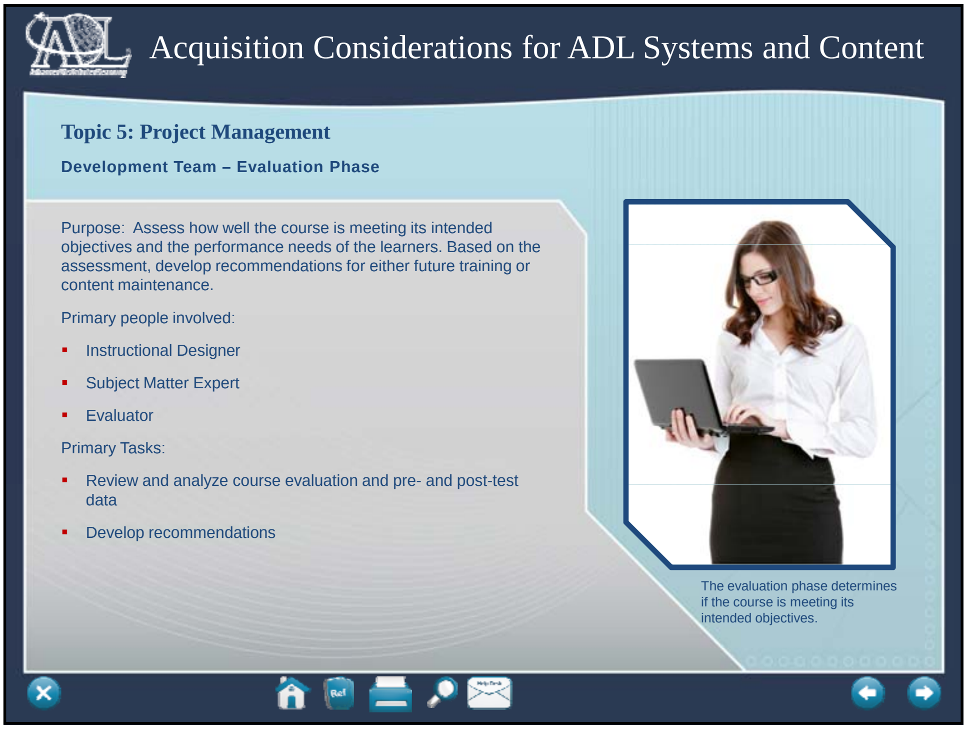
Primary people involved:

- Programmer
- Quality Assurance

Primary Tasks:

- Run content package in ADL SCORM Test Suite
- Load content package into LMS
- Test content functionality
- Register content in ADL Registry

The implementation phase prepares the project for final delivery.



Acquisition Considerations for ADL Systems and Content

Topic 5: Project Management

Development Team – Evaluation Phase

Purpose: Assess how well the course is meeting its intended objectives and the performance needs of the learners. Based on the assessment, develop recommendations for either future training or content maintenance.

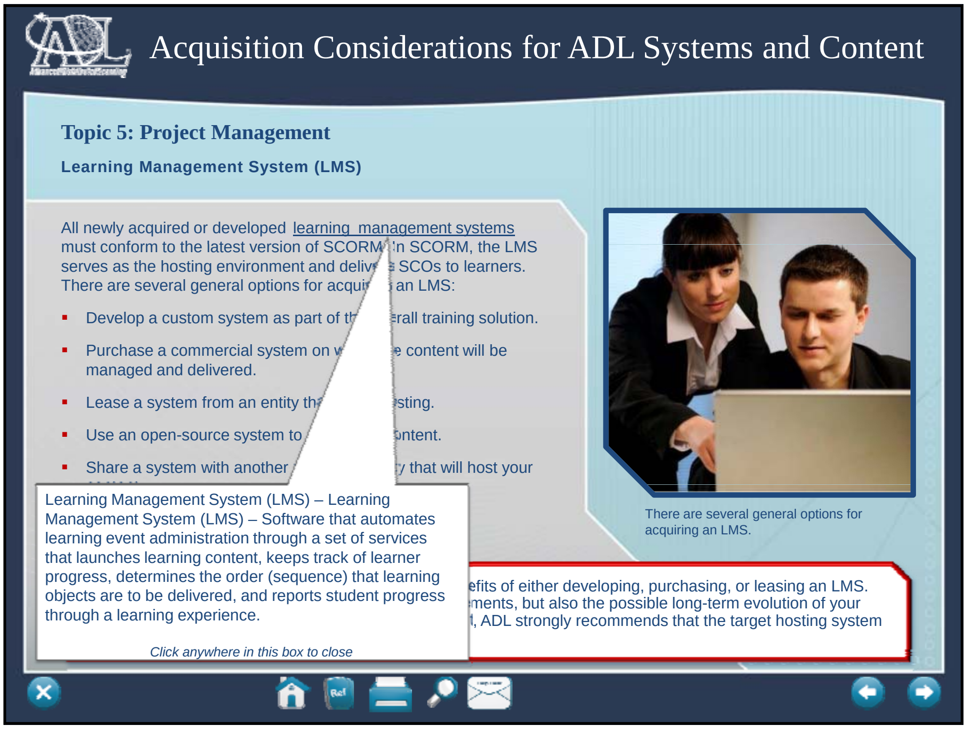
Primary people involved:

- Instructional Designer
- Subject Matter Expert
- Evaluator

Primary Tasks:

- Review and analyze course evaluation and pre- and post-test data
- Develop recommendations

The evaluation phase determines if the course is meeting its intended objectives.



Acquisition Considerations for ADL Systems and Content

Topic 5: Project Management

Learning Management System (LMS)

All newly acquired or developed learning management systems must conform to the latest version of SCORM In SCORM, the LMS serves as the hosting environment and deliv SCOs to learners. There are several general options for acqui an LMS:

- Develop a custom system as part of th erall training solution.
- Purchase a commercial system on w e content will be managed and delivered.
- Lease a system from an entity th sting.
- Use an open-source system to ontent.
- Share a system with another y that will host your

Learning Management System (LMS) – Learning Management System (LMS) – Software that automates learning event administration through a set of services that launches learning content, keeps track of learner progress, determines the order (sequence) that learning objects are to be delivered, and reports student progress through a learning experience.

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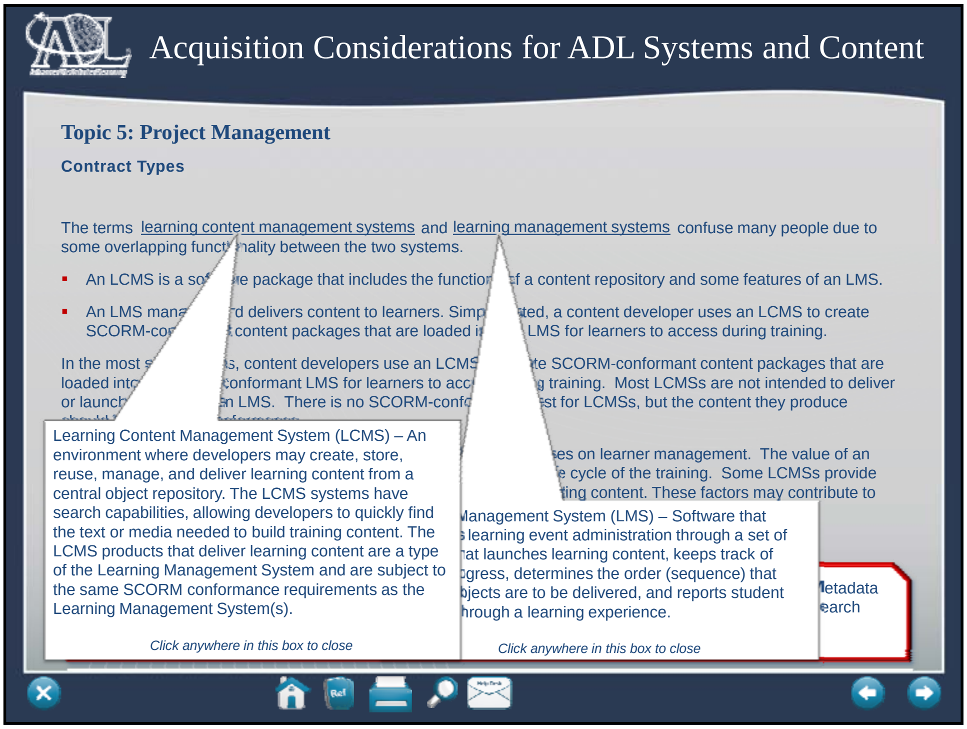
There are several general options for acquiring an LMS.

efits of either developing, purchasing, or leasing an LMS. ments, but also the possible long-term evolution of your , ADL strongly recommends that the target hosting system



Acquisition Considerations for ADL Systems and Content

Topic 5: Project Management

Contract Types

The terms learning content management systems and learning management systems confuse many people due to some overlapping funct nality between the two systems.

- An LCMS is a so ie package that includes the functior f a content repository and some features of an LMS.
- An LMS mana d delivers content to learners. Simp ted, a content developer uses an LCMS to create SCORM-co content packages that are loaded i LMS for learners to access during training.

In the most s s, content developers use an LCMS te SCORM-conformant content packages that are loaded int conformant LMS for learners to acc g training. Most LCMSs are not intended to deliver or launch n LMS. There is no SCORM-confo st for LCMSs, but the content they produce

ses on learner management. The value of an e cycle of the training. Some LCMSs provide ting content. These factors may contribute to

Learning Content Management System (LCMS) – An environment where developers may create, store, reuse, manage, and deliver learning content from a central object repository. The LCMS systems have search capabilities, allowing developers to quickly find the text or media needed to build training content. The LCMS products that deliver learning content are a type of the Learning Management System and are subject to the same SCORM conformance requirements as the Learning Management System(s).

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lanagement System (LMS) – Software that s learning event administration through a set of at launches learning content, keeps track of gress, determines the order (sequence) that bjects are to be delivered, and reports student hrough a learning experience.

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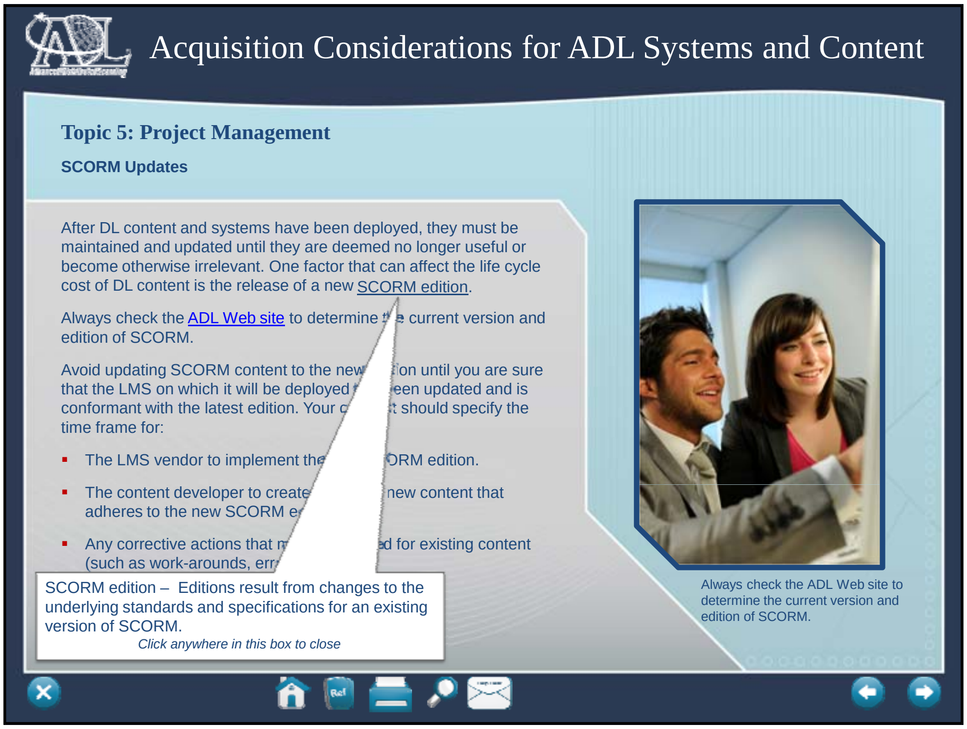

Acquisition Considerations for ADL Systems and Content

Topic 5: Project Management

SCORM Updates

After DL content and systems have been deployed, they must be maintained and updated until they are deemed no longer useful or become otherwise irrelevant. One factor that can affect the life cycle cost of DL content is the release of a new SCORM edition.

Always check the ADL Web site to determine e current version and edition of SCORM.

Avoid updating SCORM content to the new ion until you are sure that the LMS on which it will be deployed een updated and is conformant with the latest edition. Your c t should specify the time frame for:

- The LMS vendor to implement the ORM edition.
- The content developer to create new content that adheres to the new SCORM e
- Any corrective actions that n d for existing content (such as work-arounds, err

SCORM edition – Editions result from changes to the underlying standards and specifications for an existing version of SCORM.

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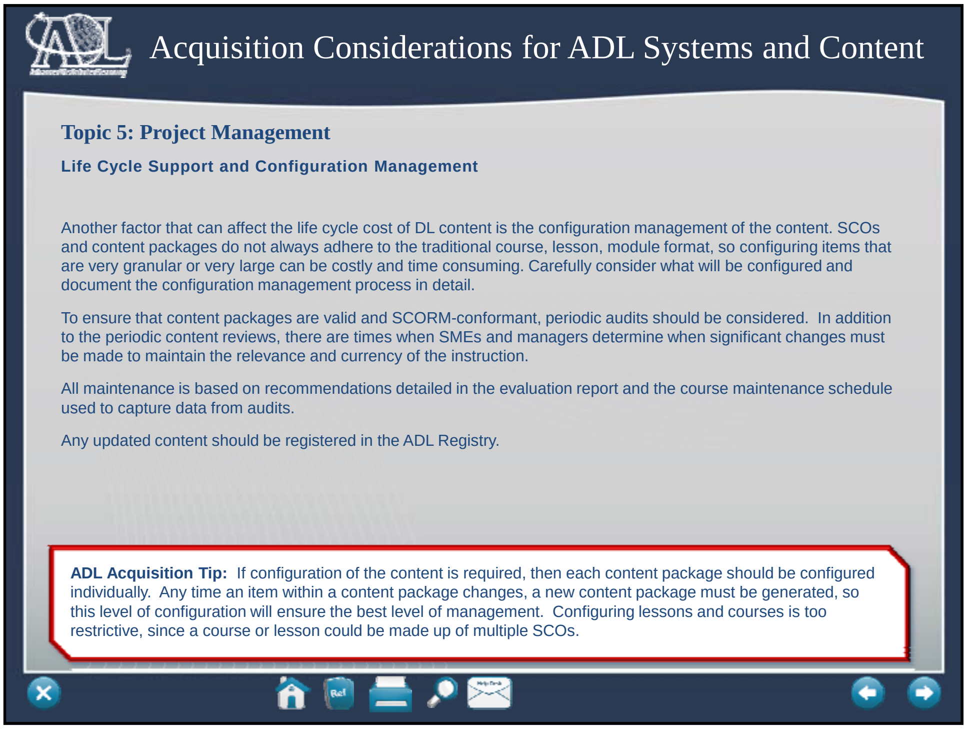
Always check the ADL Web site to determine the current version and edition of SCORM.



Acquisition Considerations for ADL Systems and Content

Topic 5: Project Management

Life Cycle Support and Configuration Management

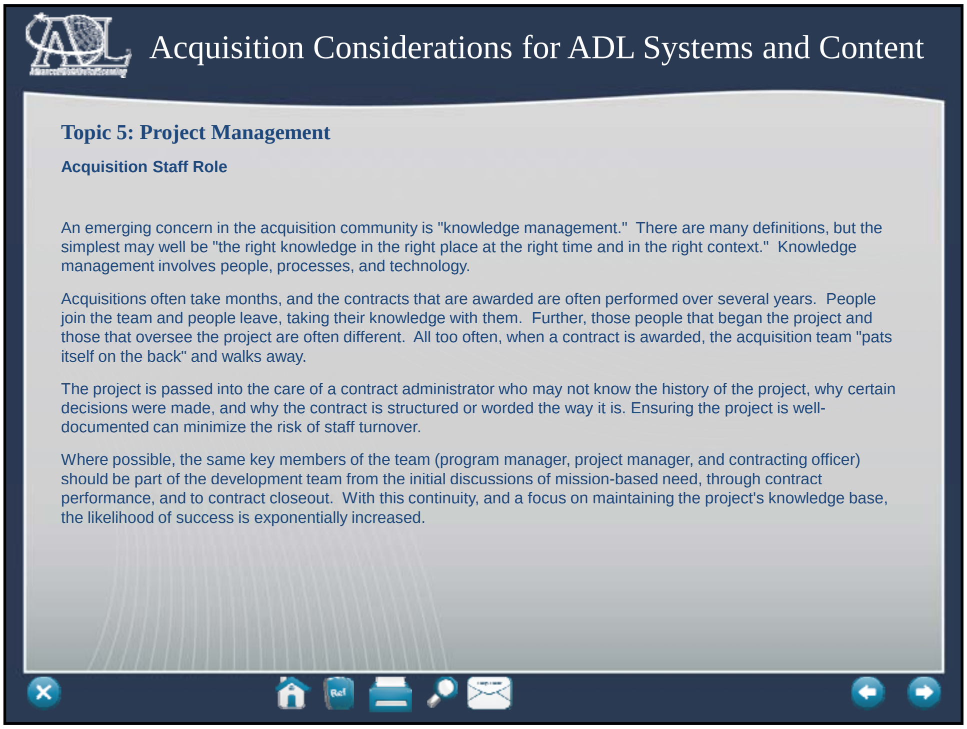
Another factor that can affect the life cycle cost of DL content is the configuration management of the content. SCOs and content packages do not always adhere to the traditional course, lesson, module format, so configuring items that are very granular or very large can be costly and time consuming. Carefully consider what will be configured and document the configuration management process in detail.

To ensure that content packages are valid and SCORM-conformant, periodic audits should be considered. In addition to the periodic content reviews, there are times when SMEs and managers determine when significant changes must be made to maintain the relevance and currency of the instruction.

All maintenance is based on recommendations detailed in the evaluation report and the course maintenance schedule used to capture data from audits.

Any updated content should be registered in the ADL Registry.

ADL Acquisition Tip: If configuration of the content is required, then each content package should be configured individually. Any time an item within a content package changes, a new content package must be generated, so this level of configuration will ensure the best level of management. Configuring lessons and courses is too restrictive, since a course or lesson could be made up of multiple SCOs.



Acquisition Considerations for ADL Systems and Content

Topic 5: Project Management

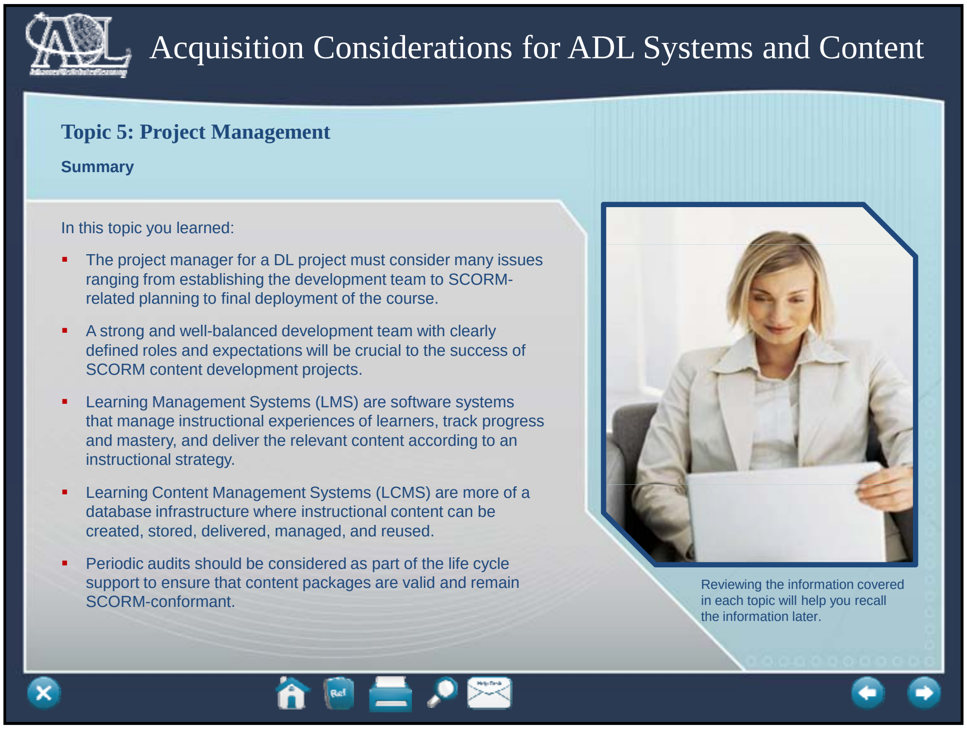
Acquisition Staff Role

An emerging concern in the acquisition community is "knowledge management." There are many definitions, but the simplest may well be "the right knowledge in the right place at the right time and in the right context." Knowledge management involves people, processes, and technology.

Acquisitions often take months, and the contracts that are awarded are often performed over several years. People join the team and people leave, taking their knowledge with them. Further, those people that began the project and those that oversee the project are often different. All too often, when a contract is awarded, the acquisition team "pats itself on the back" and walks away.

The project is passed into the care of a contract administrator who may not know the history of the project, why certain decisions were made, and why the contract is structured or worded the way it is. Ensuring the project is well-documented can minimize the risk of staff turnover.

Where possible, the same key members of the team (program manager, project manager, and contracting officer) should be part of the development team from the initial discussions of mission-based need, through contract performance, and to contract closeout. With this continuity, and a focus on maintaining the project's knowledge base, the likelihood of success is exponentially increased.



Acquisition Considerations for ADL Systems and Content

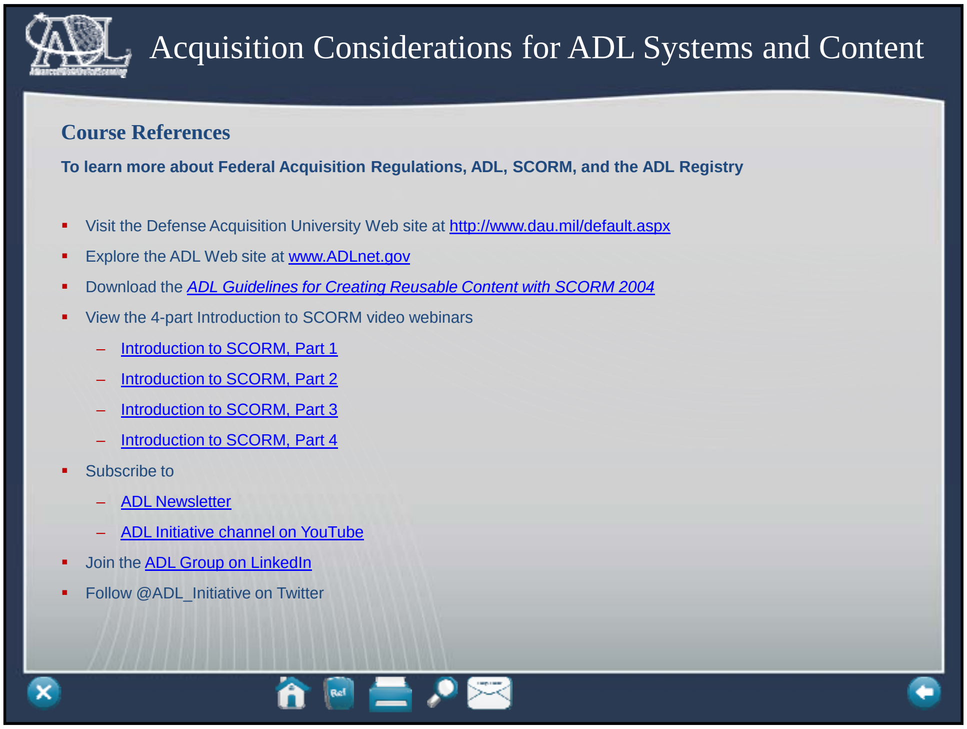
Topic 5: Project Management

Summary

In this topic you learned:

- The project manager for a DL project must consider many issues ranging from establishing the development team to SCORM-related planning to final deployment of the course.
- A strong and well-balanced development team with clearly defined roles and expectations will be crucial to the success of SCORM content development projects.
- Learning Management Systems (LMS) are software systems that manage instructional experiences of learners, track progress and mastery, and deliver the relevant content according to an instructional strategy.
- Learning Content Management Systems (LCMS) are more of a database infrastructure where instructional content can be created, stored, delivered, managed, and reused.
- Periodic audits should be considered as part of the life cycle support to ensure that content packages are valid and remain SCORM-conformant.

Reviewing the information covered in each topic will help you recall the information later.



Acquisition Considerations for ADL Systems and Content

Course References

To learn more about Federal Acquisition Regulations, ADL, SCORM, and the ADL Registry

- Visit the Defense Acquisition University Web site at http://www.dau.mil/default.aspx
- Explore the ADL Web site at www.ADLnet.gov
- Download the *ADL Guidelines for Creating Reusable Content with SCORM 2004*
- View the 4-part Introduction to SCORM video webinars
  - Introduction to SCORM, Part 1
  - Introduction to SCORM, Part 2
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