SCORM Steps Up
A new release offers exciting new enhancements

BY ROBBY ROBSON

SCORM (shareable content object reference model) is becoming more complete and more useful. Produced and maintained by the Advanced Distributed Learning initiative (www.adlnet.org), version 1.3 lets users create the same type of adaptive learning they could produce before with computer-based training (CBT), but now they aren't tied to a particular system or content vendor. Now the entire process is far more scalable and extensible—that's a really big deal!

To be fair, the latest enhancements to SCORM still need some road testing, and it will take some time to produce a significant amount of content using it. For now, it's good to reiterate what SCORM is and why these latest developments are exciting.

The challenge
Computer-based education and training has been around for years, and it is easy (but not cheap) to create learning content that can track what a learner has done and react to a learner's progress. For example, if a learner does well on a pretest, the learner can skip the lesson.

In classic CBT systems, the content was designed as part of the environment that delivered it. The content relied on proprietary interactions for greeting the learner by name or making a decision based on a previous score. Content designed for one system could not be properly used by another system.

The e-learning industry wants to separate content from learning platforms to make content more portable. Content is a valuable asset that is expensive to produce and needs to be updated on its own schedule. If content is tightly coupled with a learning platform, one can't be changed without changing the other, which means that different versions of the same content must be produced for different products. Entire curricula must be redone to make small modifications. When this happens, time and money are wasted.

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An important goal of SCORM is to separate content from the systems that deliver it. The challenge is to make it so neither the content nor the delivery system relies on the other's special properties to create learning experiences that can adapt to the learner and that follow decent instructional design principles. The e-learning standards community is creating standard properties that can be used by all content and any learning platform. This work is incorporated into SCORM.

What does SCORM standardize?
SCORM takes the problem of creating content that you can play on any learning platform and splits it into several parts. Each part relies on specifications produced elsewhere that are then carefully documented by the Advanced Distributed Learning initiative for inclusion in SCORM. A description of the various parts follow:

Packaging. Once content and delivery systems are separated, the first priority is getting content to move among different systems. The specification used for this is appropriately called content packaging and is produced by the IMS Global Learning Consortium (www.imsglobal.org). Content packaging creates a container for shipping learning content from one place to another. The content package has two parts: a manifest that describes what's in the package and how it is organized, and a second part that contains the actual content or references its location. SCORM doesn't care how the content is produced as long as it can be delivered to or through a browser. The content could be HTML, Java, Flash, or any standard audio or multimedia format. It could also be a reference to a server that will deliver the content upon request.

Metadata. When sharing content among systems, there is also a need to share standard information that describes the nature and purpose of the content. This information can serve many ends, including cataloging, search and discovery, rights management, checking technical requirements, and ultimately matching the right content to the learner. Learning object metadata provides this information using a standard formalized by the Learning Technology Standards Committee (http://ltsc.ieee.org). See "Metadata Schmetadata," May 2002, p. 48 (www.elearningmag.com/elearning/article/articledetail.jsp?id=18574).

Communication. With content packaging and metadata alone, we create libraries of content that can be
searched, found, bought, sold, and delivered to learners. But the content would be "dumb" content that simply played in a browser. Learning content also has to communicate with the system that delivers it. For example, you need a system that reports assessment results, how long a learner has spent with the content, and whether a learner has successfully mastered a learning objective.

Communication is enabled in SCORM by a three-step process. SCORM-conformant content is designed so that immediately after it's loaded into a browser, it looks for a specific SCORM communication object that is supposed to be supplied by the learning system. If the object is there, the content hooks up to it and notifies the system that it is starting. As the content runs, it exchanges information with the system; when the content is finished, it signals the system that it is done. SCORM specifies the details of the communication object, the way in which content can use it, and the nature and format of information that may be communicated. These specificiations are derived from the Aviation Industry CBT committee (www.ai cc.org) and use JavaScript as the means by which content addresses the SCORM communication object.

**Sequencing.** Content that reports scores and learning activity still isn't complete because it doesn't provide the necessary behavior rules such as enabling the learner to skip ahead if he or she demonstrates competence in an area being studied. It also does not address the rather complex problem of instructing the learning system how to calculate an overall score from individual scores generated by individual pieces of content.

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None of these are issues if content comes as a single piece with all navigation, adaptivity, and calculations built into it, but SCORM enables the reuse and update of individual components. SCORM therefore envisions content as an aggregation of objects delivered to the learner in an order and manner controlled by a learning system. For example, SCORM-conformant content might be composed of separate objects: a pre-test, a lecture, a simulation, a further explanation, and post-test.
In SCORM, a learning system delivers an object, waits until it finishes, and then delivers what it determines to be the next object. It is the delivery system (and not the content) that must provide navigation and interpret navigation requests such as Next, Previous, and Exit. All such instructional intelligence must be specified in the content package and then implemented by the delivery system—which SCORM version 1.3 offers.

Using a draft specification called simple sequencing, just released by the IMS Global Learning Consortium, SCORM now includes a standardized method of instructing a learning system in what order to deliver objects in a content package.

Based on learner achievements, the navigation schemes include one in which the learner decides what is next and another in which the system decides. Content can be skipped, hidden, and chosen randomly. In addition, simple sequencing allows the designer to specify how scores and status are determined.

The status of SCORM
SCORM has some limitations. It allows browser-based content to communicate with a learning system but it does not support communication with other content. SCORM-conformant content is not yet designed to use specialized information about a learner or about his environment, but it can be designed to support a rich variety of instructional strategies.

It is fair to say that SCORM has taken on the status of an industry standard, but different pieces of SCORM have attained different maturity levels. Metadata is the most mature, followed by packaging, communication, and sequencing. Products on the market now support earlier releases of SCORM (1.2 or 1.1), which do not include sequencing. If the process runs true to form, the sequencing specification will undergo testing and revision during the next four to six months and will begin to appear in production software toward the end of 2003. It may be best to wait for a stable specification before investing large sums in SCORM 1.3 content development, but it makes a lot of sense to begin investigating and acquiring the necessary expertise now.

Robby Robson is president of Eduworks Corporation (www.eduworks.com), a consulting company specializing in e-learning products and standards. He also chairs the IEEE Learning Technology Standards Committee. He can be reached at rrobson@eduworks.com. Please send comments to managing editor Laracella Sheridan at lsheridan@elearningmag.com.