Supporting Teaching and Learning in SCORM 2.0

Dr. Jacqueline Haynes, Intelligent Automation, Inc.

Abstract

In this brief paper I argue that the basic features of SCORM 2.0, at a minimum, should support the types of learning activities that research suggests contributes to highly effective learning experiences. The original visionaries and implementers of SCORM selected a somewhat minimalist approach to building the SCORM technology and community that has served its purpose well. However, SCORM 2.0 will serve its expanded community well only if it embraces and addresses advances in technology, identification of needs among different communities of practice, and an approach that can be supported based on a strong business case.

The majority of SCORM content produced to date: (1) is for a single learner; (2) linear; (3) text-heavy; (4) does not incorporate highly interactive learning methods; (5) is not designed for blended learning (i.e., used within the context of supporting or supplementing teacher-directed instruction); (6 is not individualized; (7) is not adaptive; and (8) is not guided by meaningful learner assessment. The "light" nature of SCORM has not resulted in the ease of content reusability anticipated nor in the ease of interoperability which would provide the real vendor-independence desired and cost savings through content re-use promoted. If this "light" treatment must be sacrificed in the service of supporting more complex and effective instructional methods, then I say it's what the LETSI community must do. I propose that SCORM 2.0 be a "light" modular SOA infrastructure that assumes supports and enables the use of multiple, interoperable web services for the features needed to provide learning experiences that are effective, meaningful and up to date. In this environment, an LMS will be a service that cooperates with other web services that support learning

SCORM 2.0 should enable and facilitate (but not necessarily include in its specification) features such as team/collaborative learning and training, performance support systems, adaptive instruction, multimedia, simulations and games, blended learning solutions (requiring state persistence), and multiple forms of assessment. In addition, modular definition of the services' interface will enable 'open links' to integrate emerging technologies such as online social networks, Web 2.0, etc. should be provided such that SCORM 2.0 can be updated and expanded along with the rapidly developing technologies that can serve the e-learning community.

Problem Definition

Where are the 'smarts' in SCORM? A consistent discussion that has taken place throughout my association with the ADL/SCORM community is the right size for a SCO. However, in fact, this is the

wrong question. What has really been the question all along is "where does the decision-making takes place that controls the learning experience: Is it in the SCO or the LMS service?" If it is in the SCO, then the SCO must be quite large and hold all of the logic necessary to provide a meaningful learning experience within the SCO, such that once the status of the SCO is registered as 'completed' in the LMS service, one can assume that the content of the SCO has been mastered and its related objectives met. This might equate a SCO with a complete *learning activity*. If the pedagogical decision-making 'smarts' is in the LMS, then each SCO should contain only a well-defined piece of content; the LMS then gathers learner data and controls the sequence of SCO' presented to a learner until he/she has mastered the required knowledge and/or skills. Given this scenario, the toolset available to the LMS is entirely inadequate to develop the logic to guide instruction among SCOs and 'know' when the content has been mastered. Under almost any use case, unless one can assume content mastery simply by exposure, knowing that an individual 'completed' a SCO is not useful. I suggest that it is akin to giving out a textbook and assuming that the material has been learned if the answer to "Did you read it?" is "Yes."

Use Cases

Below are three examples below that represent different places on the continuum of learning method implementation in SCORM 2.0.

Use Case 1: There are many learning experiences where a simple, linear approach, such as that supported by SCORM 1.2 or 2004, is appropriate. There are many examples of research showing little if any improvement in learning results from more complex methods. Furthermore, there are contexts where financial and technical limitations require simplicity. SCORM 2.0 should not complicate the ISD's ability to create linear, didactic instruction for a single learner using basic content authoring tools. In this Use Case, the additional required to current SCORM to improve instruction is the ability to use assessment data to select appropriate starting/ending points for a learner, thereby gaining efficiency in the learning process (which also improves motivation).

Use Case 2: Adaptive learning, which includes many features of ITS and ITS-like learning systems, requires SCORM 2.0 to support inter- and intra-SCO assessment, with real-time computation used to guide the student's learning experience through a domain that may be well-defined or not. Many would argue that a real ITS implementation should support natural language interactions, particularly those initiated by the learner. Clearly in this case there are services that need to be provided alongside the LMS service or the SCO for NLP, for building a dynamic representation of the student's mental model, or for conducting complex assessment that may have open-ended responses. While SCORM 2.0 would not include those features within the SCORM specification itself, it seems desirable for the architecture to enable the LMS service, the SCO, or another service to interact with a service providing one or more of these features, communicating through standard methods and interfaces.

Use Case 3: A course for team training is required which includes: pre- and post-assessment that measures both knowledge and performance of individuals and the team, well-sequenced didactic instruction, interactive instruction (for components of the domain) which may be sequenced between different components of the didactic instruction, individual practice, team practice, and AAR. The cross-

domain issue in SCORM 1.2 and 2004 should certainly be solved to support this model. In addition, the ability to assess the performance of a team (through performance in the simulation), to store team data associated with individual team members and the team as a 'learning entity', and the basic issues of integration of simulations into SCORM-based instruction should be enabled. The individual/team records can be resolved by modularity in the definition of the LMS, while other services, once again appear to be the solution to other capabilities required in this model.

Proposed Solution

So where should be 'smarts' be in SCORM? I suggest that different teaching and learning paradigms be provided as 'services' that an instructional designer can select, which are then instantiated with content in the SCO's. The 'learning paradigm service' can include assessment , sequencing and navigation among the SCO's, make real time (adaptive learning) decisions based on current performance and report beginning and ending status to the LMS. The LMS, interacting with the service, launches the SCO's as directed by the learning paradigm service. Another component of this architecture would be the protocols for communication with other services to enable features (as desired) such as NLP, simulation, student mental model building, or various types of AAR.