Mobile Learning and ADL's Experience API

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Introduction

The Advanced Distributed Learning (ADL) Initiative's Sharable Content Object Reference Model (SCORM®) has been a staple of online learning standards since 2001. The SCORM specification was created by ADL to address interoperability challenges that existed prior to the wide adoption of touchscreen mobile devices such as smartphones and tablets. A new interoperability standard is needed to support training opportunities on mobile devices. ADL's Experience API (xAPI) can now provide an option for mobile devices to support traditional online training scenarios as well as new types of informal learning opportunities.[1] However, a mobile SCORM capability involves more than simply ensuring technical compatibility with a new technology. It has new implications for instructional design as well as the potential to improve the overall learning experience.

Mobile learning is now a ubiquitous educational technology, one that introduces both exciting capabilities and complexity into the learning design process. However, there are very few guidelines for developing mobile learning. As a growing number of mobile innovations become available in the learning space, education and training technology thought leaders are now interested in how to effectively design programs for a variety of mobile learning scenarios. ADL is currently leading a project that will develop an instructional design framework along with guidelines and best practices to better support mobile learning design.

Mobile Learning

ADL believes that mobile learning should be viewed as a way to augment the learner through the use of ubiquitous technology and information, anytime and anywhere. Unlike other learning technologies, mobile learning is unique in that it can accommodate both formal and informal learning, in collaborative or individual learning modes. Many of the existing definitions of mobile learning in the education and training community are too learner-centric or too device-centric. However, ADL believes that both the learner and the device should be taken into consideration in order to provide a more flexible perspective on mobile learning. ADL currently describes mobile learning

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[1] ADL Tech Team, "Resources for 'Training and Learning Architecture' Webinar" (2013), ADL Web site; available at http://www.adlnet.gov/resources-for-training-and-learning-architecture-webinar.

as "Leveraging ubiquitous mobile technology for the adoption or augmentation of knowledge, behaviors, or skills through education, training, or performance support while the mobility of the learner may be independent of time, location, and space."[2] While mobile learning is not appropriate in all instances, we believe that it should be considered as a potential tool for any organization's learning and training support infrastructure.

Overview of the xAPI

While the SCORM was successful in meeting the high-level requirements to solve the challenges within Web-based training systems, it was created prior to the widespread use of other learning environments and platforms such as mobile devices, intelligent tutoring systems, virtual worlds, games, and other social networking tools that augment the performance of today's learner beyond formal training situations. Further, SCORM content was designed to be accessed and tracked via a learning management system (LMS). Mobile learning provides new opportunities to capture more than just a learner's assessment score or course completion status. Learners, as well as education and training practitioners, expect new types of learning data to be captured and used within the aforementioned learning environments, in order to provide a personalized learning experience. They expect to learn informally and collaboratively, and to be able to use social networks as part of the learning experience. Users expect that their learning experiences will earn them credit, regardless of whether the learning activities are browser-based or not; thus there is a new requirement to free learners from being tied to an LMS. The xAPI gives learners, instructional developers, and instructors the opportunity to track and access data that far exceeds the current capabilities afforded by the SCORM.

Learning Activity "Streams" and the Learning Record Store

The data from social networks such as Facebook or Twitter are delivered in the form of "streams" that can be widely applied and syndicated in many contexts. The xAPI is an integrated approach to generate and capture learning stream data and then organize the data into meaningful learning contexts. It is an interoperable way to encapsulate and exchange learning data through the use of a learning-based activity stream. These activity stream data include defined actors, verbs, and activities associated with the learning experience so that the data exchanged maintain contextual meaning.

A simple example of an activity stream that relates to traditional web-based learning is: "**I** (*actor*) **completed** (*verb*) **the Information Assurance course** (*activity*)." An example that reflects a modern informal learning scenario could be "**Jill** (*actor*) **posted** (*verb*) **to the Project Management course student forum** (*activity*)." It is expected that learning communities will develop standard options for each of the three elements

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to address their own domain-specific requirements (e.g., the medical community, government, higher education).

Another element of the xAPI is the Learning Record Store (LRS), which is the experience tracking and storage component of ADL's service-based approach and vision toward the Training and Learning Architecture (TLA). The platform-independent LRS design allows flexibility in that it may be a stand-alone service or a complementary component of a traditional LMS. A goal of the TLA is to ensure that past investments in SCORM can be maintained, while offering the benefits of platform neutrality, intermittent or disconnected network scenarios, and the capability to move learning out of the desktop browser.

The LRS will leverage additional services for content brokering, user profiles, and competency networks to build a customized suite of TLA services. In addition, the LRS allows authorized systems to retrieve previously recorded activity stream statements, which enables the development of advanced third-party reporting and data analytics tools. The xAPI also moves beyond the single-learner approach, allowing for team-based exercises, collaboration, and direct instructor intervention. This enables group learning, informal learning, and social learning – on any device or platform.

ADL's Mobile Training Implementation Framework (MoTIF) Project

The mobile platform presents both unique opportunities and constraints for the design of learning content. Generally, these possibilities and limitations are not accounted for in traditional instructional design models. Many education and training practitioners are creating new mobile content and converting existing e-learning courses without any consideration of alternative learning methods (e.g., performance support) or leveraging the capabilities of the mobile platform (e.g., cameras, sensors, GPS). They are simply shrinking distributed learning courses down to fit the smaller screen.[3]

This is similar to what happened when the Internet was first introduced to the general public. Principles from print-based desktop publishing were applied directly to Web design, with no adjustment for the unique constraints and capabilities of the new medium. Therefore, many usability issues ensued, and opportunities for interactive engagement were lost.

ADL's MoTIF project will explore new types of learning and design approaches that take advantage of the capabilities of the mobile platform. The project will produce both theories and practical interventions as its outcomes. The interventions will include such things as strategies, materials, products, and guidelines, but will also advance our knowledge about the characteristics of these interventions and the processes involved in designing and developing them. The specific types of outcomes that this project expects to produce include, but are not limited to, the following:

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[3] iFest Panel Discussion slides, "Mobile: Thinking Outside the Course" (2011); available at www.adlnet.gov/wp-content/uploads/2011/08/brown_haag_clark_gibbens_mobile_outside_course_iFest2011.pdf

- *Domain Theories*: theories about the context and outcomes within the instructional design domain and mobile learning paradigm

- *Design Framework*: a workflow process and examples that will serve as a set of design guidelines for determining a mobile learning solution or strategy

- *Design Methodologies*: guidelines for how to implement the framework and the expertise that is required.

MoTIF is currently in its first phase. ADL will include community involvement to ensure that the results of the effort have durability and traction in the global learning space.

Mobile Learning and the xAPI

ADL's MoTIF project is predicated on the current trend of people wanting to learn, explore, and interact with the world via mobile devices in new ways and more frequently than ever before. The xAPI enables opportunities for capturing the activities from diverse learning experiences. One of the primary goals of MoTIF is to focus on the unique capabilities of the mobile platform for learning and leverage features such as the mobile phone's camera. For instance, if a learning design was predicated on students taking pictures of examples and counterexamples of a particular phenomenon, and then sharing and discussing these with fellow students, the xAPI enables the many activities in this learning design to be recorded and tracked in an LRS. If a training stakeholder wanted to know which students shared pictures, he or she could easily set up an xAPI statement that asserted that "Student 1 (*actor*) uploaded (*verb*) a picture to the student sharing repository (*activity*)."

Focusing on new learning opportunities that are enabled by, and most appropriate for, the mobile platform is another goal of the MoTIF project. Performance support can be thought of as an alternative learning opportunity. Instructional designers familiar with the SCORM typically choose to create intentional or preplanned learning (such as training courses) or performance support. With performance support, there is no explicit intention for the learner to retain knowledge or skills; they are simply tools to be used for "just in time" help in performing a task at that particular moment.

Mobile performance support apps provide some excellent examples of mobile learning, because users can access them anytime, anywhere. This freedom from a "tethered" desktop computer obviously lends itself well to all types of performance support. Mobile performance support apps are usually not delivered within an LMS, and they are often used in disconnected mode, perhaps as a stand-alone mobile app. The xAPI allows performance support tools to be tracked. A mobile performance support tool simply needs to be instrumented with the xAPI protocol in order to write data to the LRS related to where, how, and when the tool is used. Stakeholders can analyze these data to determine design modifications that may be needed to improve the effectiveness of the mobile tool, as well as to refine job skills and knowledge requirements.

In addition to mobile performance support, new approaches to instruction have emerged on the mobile platform. MoTIF intends to focus on these as well. These new approaches embrace the notion that people are learning from teachers, by themselves,

and through collaboration in a community via social networks. The opportunity presented by this new paradigm is that the xAPI can track and capture learning artifacts in order to assess the learning, link the learner to experts or mentors, and provide recommendations based on granular learning data mined over time. In addition, the xAPI can capture a teacher's activity in his or her Personal Learning Networks in a formal or blended environment. All of this interaction and collaboration is greatly enabled by mobile devices.

Conclusion

The learning approaches enabled by the xAPI can influence the design process, but a rigorous design process should, in turn, lead instructional designers to consider these xAPI-enabled approaches. It is particularly true that performance support can influence, and is influenced by, the design process. Mobile learning opens the door to a wide variety of effective performance support solutions. The xAPI enables these solutions to be assessed for effectiveness and monitored for usage. The analysis phase of the instructional system design process should not simply deal with what is to be trained, but whether mobile performance support can enhance the solution.

Exposing data through the xAPI provides a means for interoperability but also allows for innovation of learning content, experiences, and systems that is not easily afforded in the current learning model. The combination of mobile learning and the xAPI represents a new and powerful synergy. The xAPI permits the extensive capabilities of the mobile platform to be used to create new kinds of learning experiences and a much wider adoption of mobile-based performance support.

To find out how you can participate in the MoTIF project, contact the ADL Mobile Team at adlmobile@adlnet.gov.

Bibliography

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