

6 xAPI-Taking E-learning Outside of the Web Browser

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6.1 Abstract

A new eLearning specification, the Experience Application Programming (xAPI) Interface, was released recently which enhances traditional SCORM-based standards considerably. Features and issues of this specification are explained. xAPI-enabled learning scenarios, allowing for tracking and storing learning activities, which may result from real world experiences no longer limited to browser-based activities, are illustrated.

6.2 Introduction

E-learning, from the learners' point of view, basically means sitting in front of a computer screen and mostly using a web browser. Though this allows a variety of interactions and experiences it nonetheless leaves the learner cut off from the "real" world. Many learning experiences occur outside of the traditional Learning Management System (LMS) and web browser (see Fig.1). In order to allow tracking of learning activities and experiences, including both, formal courses and also informal learning scenarios, the widely used but too limited e-learning interoperability standard SCORM (Sharable Content Object Reference Model) had to be expanded [1]. SCORM was initially developed to make courseware interoperable between LMSs and reusable by different organizations and authors. What is wrong with SCORM is that it is complicated, that all learning activities must be launched from an LMS, that content must reside on the same web server as the LMS, SCORM is not designed to handle mobile learning neither learning from game-based applications nor from social learning scenarios. In a nut shell, until recently, with the SCORM standard in place, content had to run in a browser.



Fig. 1: Two learning scenarios - within the browser versus real world scenarios.

6.3 The Experience API

In 2010 the ADL (Advanced Distributed Learning) initiative, a US government program, began investigating new standardized experience tracking capabilities [2]. In 2013, the Experience API (xAPI) was released. From a technical point of view, xAPI requires an architecture consisting of specific web-service Application Programming Interfaces (API), a Learning Record Store (LRS), and typically an LMS and a Personal Data Locker (see below). An LRS can be equipped with reporting and analytic tools (see Fig.2).

xAPI is a learning technology specification that makes it possible to collect data about a learner's learning experiences independent from a web browser [3]. xAPI focuses on data not on content. The data comprise of the actors (learners) and their (learning) activities. These data may go beyond traditional data like test scores, page views, or mouse clicks. xAPI intends to provide all types of learning activity data that can be analyzed and correlated to performance metrics.

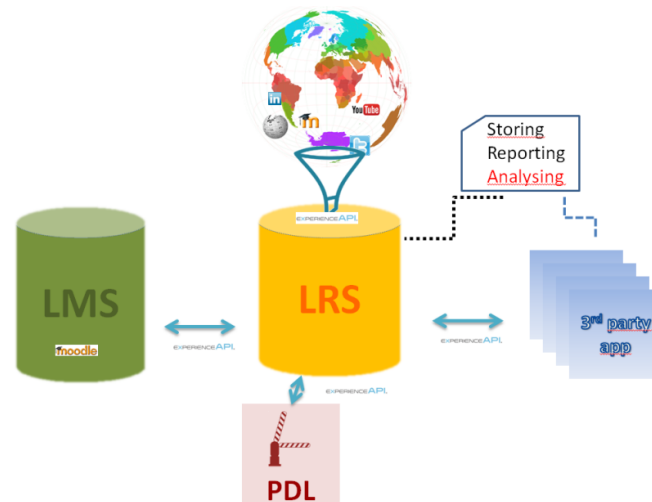


Fig. 2: xAPI-enabled architecture consisting of the Learning Record Store (LRS), Learning Management System (LMS), Personal Data Locker (PDL) and 3rd party applications.

People learn in many places, like in school, at home, in the work place, or while travelling using different devices and tools like laptops, smartphones, books, paper and pencils, by different activities like reading, listening, discussing, searching, measuring, approving, playing, thinking and so on. xAPI-supported environments are capable of recording all those activities and delivering quantifiable, verifiable, and shareable data. When activities are to be recorded statements are sent to a Learning Record Store. The statements are in the form of "Noun, Verb, Object". The simple grammar is in the form of: "I did this". This simple structure using nouns, verbs and objects allows for tracking almost any activity and is both, human and machine readable. Any xAPI-enabled device (smartphone, e-book reader, VR headset, smart watch, beacons, camera, ...) can sent statements such as "I read an article with an eBook", "I completed a MOOC", "I mastered a game", "I passed a test", "I watched a movie clip", "I performed in a mobile app", "I posted in a blog", "I interacted with my supervisor", "I attended a conference", "I completed safety training", and much else. xAPI is designed to be flexible, so it does not require any particular verbs. One could make up one's own verbs or one can refer to a list of verbs provided by ADL [4].

Those recorded learning activities do not have to reside in one single LRS but LRSs can share data with one another, so the learners' experiences can follow the learner from one organization to another or stay secured within a "personal-data-locker"-restricted LRS.

The combination of life-long learning, e-learning and xAPI-enabled learning inevitably generates an enormous amount of data. Naturally, the question of privacy has to be raised whenever it comes to big data and learning. Privacy concerns and mostly inconsistent and thus impracticable data protection regulations do not seem to support the idea of tracking and storing all of a learner's activities, all the more when they occur in the real world outside of the web browser. A Personal Data Locker (PDL) provides a solution to privacy concerns [5]. Instead of directly recording statements to an LRS, data are recorded to a PDL which is controlled by the learner. The learner decides which statements are stored and delivered to the LRS. The PDL thus provides a vital extension helping to assign data sovereignty to the learner rather than to institutions. Still, there are a lot of conceptual issues and questions left, such as Who owns the data? Who can see it? Who can manipulate/delete/copy it? Who benefits?

Educational institutions may benefit from the learning analytics and reporting features provided by the LRS thus optimizing courses and contents. But the focus is on the learners. Learners can generate data allowing for the creation of adaptive learning environments and the optimization of their individual learning processes. The wealth of learning experiences in a student's life can be made more meaningful and quantifiable on the fly.

6.4 Conclusions

The claim raised by xAPI is high – not less than the ability to track real-world performances. The ability to communicate learners' activities in a flexible way is certainly a step in the right direction. xAPI could turn out as a key component of next training and learning architectures. The volume of data being written to LRSs can become really big. This is why xAPI is also depending on solving the problem of big data analytics, which however will not happen tomorrow. A major stumbling block for widespread use is the lack of practicable data protection regulations. From an ethical point of view dehumanization could overshadow the benefits of automatization. As of today, the jury is still out whether xAPI is able to improve one's overall learning experience in a substantial manner.

6.5 References

- [1] <https://www.adlnet.gov/scorm/> [Dec 2016]
- [2] <https://www.adlnet.gov/adl-research/performance-tracking-analysis/experience-api/xapi-background-history/> [Dec 2016]
- [3] <http://tincanapi.com/layer-2-record-any-learning-experience-informal-learning/> [Dec 2016]
- [4] <http://xapi.vocab.pub/datasets/adl/> [Dec 2016]
- [5] <http://www.wise-qatar.org/edhub/data-sovereignty-big-data-e-learning-under-control> [Dec 2016]