

## Towards an Open Digital Ecosystem for Learning: A Joint IEEE-LETSI-SALTIS Workshop

There's trouble ahead for elearning. While technological advances, cost pressures, and innovative products and business models have brought elearning into the mainstream, stakeholders share a growing feeling of frustration:

- Students and lifelong learners do not get the engaging and personalized experience they expect online. Investment in the quality of elearning materials does not approach the effort put into online games, for instance.
- Vendors of enterprise systems face a mushrooming demand to add feature-after-feature into their products (wikis, social, mobile, games, etc.). The resulting monolithic systems are less and less interoperable – locking out innovative products and processes.
- Publishers face increasing difficulty in deploying content to multiple platforms, especially when that content incorporates advanced designs.
- Teachers and instructional designers face teaching constraints imposed by their institution's systems and are unable to incorporate resources they find on their own.

Today's elearning software standards actually limit content providers' ability to develop more compelling and individualized courseware. These standards allow learning materials to run on all systems, but to do so, they naturally limit the complexity of this "portable content." The standards also severely limit the amount of data about a learner (history, preferences, proficiency) that is available to a learning activity, ruling out content with any intelligence. Bottom line: students are bored; teachers are unable to use what they have; innovators can't find customers; and investors see a decades-long string of failed startups. Meanwhile, innovative researchers and innovative teachers continue to demonstrate the effectiveness of new approaches that have no hope of reaching the market.

The solution is a plug-and-play, modular architecture – an open elearning ecosystem – that will allow new products to securely exchange data with the installed systems and with each other using standard internet protocols. Websites, mobile apps, and enterprise systems will be able to conveniently exchange information about students, learning objectives, materials, teachers, schools, entitlements (contracts with publishers), and so on. This type of solution will reduce costs for platform providers and give teachers and learners the robust applications they need.

### A Common Language

A joint effort by the Foundation for Learning, Education, and Training Systems Interoperability (LETSI), the IEEE's Learning Technology Standards Committee (LTSC), and the UK's Suppliers Association for Learning Technology Interoperability in Schools (SALTIS) is developing a set of data standards that will facilitate data interoperability



among a wide range of online learning activities and management tools (apps) for learners, teachers and administrators.

The plan is as follows:

1. Define a data model definition language (DMD) based on a shared set of core principles and primitive concepts, gleaned from theory, best practices, and existing standards efforts, but carefully constructed to capture important nuances. The DMD is designed to support a family of coherent, extensible data models. Extensibility is needed to accommodate variations across learning and training communities and to allow experimentation with innovative systems that require additional data. The “core plus extensions” technology is designed to minimize the impact of market variations on vendors who are serving multiple market sectors (K12, higher ed, corporate training, ...).
2. Use the DMD to define how systems expose their learning-related data structures to other systems. Current work focuses on a few of the dozen or so data models that will be needed, with the expectation that other organizations will extend these models and develop additional ones.

LAD Unified descriptions of **learning activities** that may either be hosted remotely, e.g. at a publisher’s website, or packaged for import into an institutional learning management system. Multiple processes may use the LAD data over the course of the activity’s lifetime to acquire, modify, organize, schedule, assign, monitor, and recommend.

CMI Learner **performance** data, along the lines of the IEEE CMI standard, but extended to, for example, allow more information to flow back to the teacher than just elapsed time and quiz scores.

CaaS Data to manage **entitlements**, at either the student or institutional level, including contracts with publishers, OER accounts, and so on.

People Including **models of the learners’** objectives, preferences, background, prior experience, and proficiency as well as models of teachers and others.

Status Representing the purpose, parameters, attempts, and **learners’ status** in a particular online learning activity.

3. Define a communications mechanism, along the lines of LETSI’s Runtime Web Services specification, using conventional web services technology to allow secure queries of, and posting to, these data models across systems.

### **Working Meeting Planned**

Over the next couple of months, the underlying DMD language will be finalized. A workshop is planned for the September time frame to finalize the descriptions of some of the key data models in terms of the DMD, and to plan a prototyping phase aimed at testing the models. A kickoff meeting for implementers is planned for the end of the year.