

# Competency Portability

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## **Abstract**

The history of LET standards shows that it is best to focus on a single interoperability problem. The problem for the first decade of LET was content portability. This is really a business problem, and from the perspective of decision makers, this problem has been solved. The next problem of similar scope is *competency portability*, where competency is used in a very general sense. This is need for accountability, training effectiveness, and to eliminate the need for enterprises to pay for the same services twice. In the educational arena, this is an aspect of two very old problems: articulation of courses across institutions and transfer of learning from one course to another. The author recommends that SCORM 2.0 efforts be focused on competency portability. There are numerous relevant standardization efforts underway that relate to competency portability at the data model level, but something else may be needed at the protocol level. An effort of this type will require outreach to many non-LET players, and LETSI is uniquely positioned to do this.

## The “New World Order” Problem

LET standards bodies have exhibited a strong predilection towards comprehensive sets of standards that enable a new generation of online learning functionality. Circa 2000, these included standards for metadata, architecture, content interoperability, competencies, graphics, assessments, learner records, and even for the vocabulary and terms used in the standards themselves. This is illustrated by Figure 1, a screenshot of the IEEE LTSC Web page from October, 1999, showing a total of 20 working and study groups. The breadth and scope of IMS GLC specifications and ISO/IEC JTC1 SC36 at the present time are similar. The ISO/IEC group has by my count over 30 projects and published standards, while the IMS GLC boasts 19 specifications, not including variations and versions. I call this the “new world order” problem. Every LET standards body seems disposed to using standards to define a complete new world order.



The screenshot shows the IEEE LTSC website interface. On the left is a vertical navigation menu with the IEEE logo and links for Announcements, Groups, Meetings, Documents, Slides, Links, Participate, and Search. Below this is the IEEE Computer Society Standards Activity Board. The main content area has a yellow background and features the IEEE Lear logo. It includes a mission statement, a section for Working and Study Groups, and a list of 20 groups categorized into General, Learner-Related, Content-Related, Data and Metadata, and Management Systems and Applications.

**IEEE Lear**

The mission of IEEE LTSC working groups is to develop technical Standards, Recommended Practice implementations of education and training components and systems. LTSC has been chartered by the

**Working and Study Groups**

- ◆ General
  - ◇ [P1484.1 Architecture and Reference Model WG](#)
  - ◇ [P1484.3 Glossary WG](#)
- ◆ Learner-Related
  - ◇ [P1484.2 Learner Model WG](#)
  - ◇ [P1484.4 Task Model WG](#)
  - ◇ [P1484.13 Student Identifiers WG](#)
  - ◇ [P1484.5 User Interfaces \(Study Group\)](#)
  - ◇ [P1484.19 Quality System for Technology-Based Life-Long Learning \(Study Group\)](#)
  - ◇ [P1484.20 Competency Definitions \(Study Group\)](#)
- ◆ Content-Related
  - ◇ [P1484.10 CBT Interchange Language WG](#)
  - ◇ [P1484.6 Course Sequencing WG](#)
  - ◇ [P1484.17 Content Packaging WG](#)
- ◆ Data and Metadata
  - ◇ [P1484.12 Learning Objects Metadata WG](#)
  - ◇ [P1484.9 Localization \(Study Group\)](#)
  - ◇ [P1484.14 Semantics and Exchange Bindings WG](#)
  - ◇ [P1484.15 Data Interchange Protocols WG](#)
  - ◇ [P1484.16 HTTP Bindings WG](#)
- ◆ Management Systems and Applications
  - ◇ [P1484.11 Computer Managed Instruction WG](#)
  - ◇ [P1484.18 Platform and Media Profiles WG](#)
  - ◇ [P1484.7 Tool/Agent Communication WG](#)
  - ◇ [P1484.8 Enterprise Interfaces \(Study Group\)](#)

Figure 1: IEEE LTSC Web Working Groups, October 1999

Whereas each of a large set of standards may have its applications, I believe history has shown that this approach is not a successful way to drive the next generation of LET systems interoperability. Here is that history as I see it:

- The IMS GLC has always had an installed user base of academic course management systems and universities that implement them. However, the course management systems use very few of the many IMS specification, and the ones used focus is on content portability.
- SCORM arguably addresses several areas of interoperability, but with rare exceptions I do not believe that metadata is used in any significant way. Neither is Sequencing and Navigation. Although both of these components are key enablers for adaptive, discoverable, competency-driven learning, they are treated add-ons compared to basic content interoperability.
- The IEEE LTSC standards that are really used are those incorporated into SCORM.
- I see little evidence that the ISO/IEC JTC1 SC36 standards will have a significant practical effect.
- The AICC, which has the advantage of focusing on a single industry, was enormously successful with its CMI specifications that solved the content interoperability problem. Beyond that, their efforts have not been as widely implemented.

The lack of adoption of anything but a core set of content interoperability standards is not surprising. Even under the best of circumstances it is hard to solve multiple interoperability problems at once, and if they *all* have to be solved to have a working system, failure is likely. In LET there is another problem. Every LET standard has implicit assumptions about the where, when, how, and for what purpose learning takes place. Assumptions about business and distribution models are also hidden in LET standards. In LET, the assumptions behind different standards are often radically different.<sup>1</sup> Even if on the surface two standards are compatible, it is often the case that the compatibility is only skin deep.

To summarize, creating a comprehensive set of standards that define multiple aspects of LET systems interoperability may be worthwhile intellectually will not have a large impact. Therefore

### **SCORM 2.0 SHOULD FOCUS ON ONE AND ONLY ONE INTEROPERABILITY PROBLEM**

This does not mean that SCORM 2.0 should not contain multiple standards. Often multiple standards are needed to solve a single problem, exactly as is the case with the SCORM runtime environment. But it means that SCORM 2.0 will solve nothing if it tries to solve more than one thing. The obvious question is: What problem should SCORM 2.0 address, and why?

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<sup>1</sup> An illustrative example of this diversity can be seen by reading the position papers submitted to a SIM-SCORM interoperability project was started by two IEEE Computer Society standards committees, see [http://www.ieeeltsc.org/working-groups/wg11CMI/cmi-sim/Feb2006Positions/SIM\\_Papers\\_24-01-06.zip](http://www.ieeeltsc.org/working-groups/wg11CMI/cmi-sim/Feb2006Positions/SIM_Papers_24-01-06.zip)

## Content Portability

In the mid to late 1990's, the basic problem faced by the LET industry was content portability. Content developed by one tool could not be used by a different one. This is often viewed as a technical problem but it is really a business problem. According to industry analysts,

- The lion's share of the LET market is content development and content hosting
- Content interoperability has been a clear barrier to growth in this market
- The cost of custom content has been dropping

When content is tied to a particular delivery system customers are locked in to a single vendor. They must go back to that vendor to have content updated and maintained, and because of this the vendor can charge higher prices. This is the problem that SCORM has solved.

Note that I said "solved." From a technical perspective, content interoperability still remains a problem. There are numerous complaints about SCORM not guaranteeing that content will play properly. But the owners of lines of business and training budgets don't see these. They no longer worry whether content procured from a developer will work in their LMS. It always does.

As mentioned, the cost of custom content has been dropping sharply. Some of this drop is due to globalization, but content portability has a lot to do with it. In economic terms, content portability loosened the grip that learning management systems had on content, and in doing so enabled a competitive supply chain to develop.

## Competency Portability

If SCORM has solved the problem of interoperability, what remains to do? Of course, the answer is "lots." Most of us see an exciting future for learning enabled by social networking, Web services, the semantic Web, simulations, games and much more. Who would turn down a chance to train on the Holodeck if they had it, or to sit in a seminar with world experts at a moment's notice?

But when I listen to the beat of decision makers in higher education and the corporate world alike, I hear a lot about accountability, learning impact, and return on investment. All of these point to a need for something we have never had: *competency portability*. The business driver in the LET community is demonstrating and measuring the effect of learning, education and training, not finding better ways to do it. Decision makers are not questioning whether their employees are learning. They are questioning how the learning is affecting performance and, more challengingly, how their organization can make use of the training it has bought. In education, this is a larger scale version of the transfer problem (students learn concepts in one context and then cannot apply them in another) as well as the age-old problem of articulating courses among institutions.

Note: I am using the word "competency" in a very general and purposely vague way. In my usage, competency encompasses everything from skills and knowledge to learning objectives and outcomes, and competency portability includes portability of the *results* that relate to competency.

## The Impact of Competency Portability

In the 1990's content was owned by corporate learning management systems. Prior to the Web, these systems managed resources such as classrooms and video tapes, so it is no surprise that the LMS (as it is known today) took on the task of managing and delivering online content. This was a logical and practical choice. E-learning could not wait for content portability, and there was no impetus for content portability without e-learning.

We now face a similar situation with competencies.

In today's world, the goals and outcomes of learning are owned by learning management systems. They are separately owned by Human Resource systems and Talent Management Systems, and separately owned again by content developers who are tasked with creating education or training that addresses specific objectives. We need a way for data to flow seamlessly among these systems.

The consequences of *not* having competency portability are many. Here are just a few:

- **Impact on learning:** There is no reason to develop competency-based, adaptive learning strategies if the only source of information about a learner's competency is the content itself. Since competencies are localized to learners and course in the current SCORM paradigm, this is exactly the situation as it is today.
- **Impact on staffing:** Without a simple way to tie training to staffing and Human Resource Management systems, companies are paying multiple times for the same services. Calling an LMS a Talent Management or Human Capital Development system is an attempt to lock customers into functionality that belongs elsewhere and control data that is needed elsewhere. It may be good for business in the short term, but it is bad for the industry.
- **Impact on training:** Learning Management Systems measure outcomes and perform skill gap analyses. Many roll these up into Business Intelligence reports. But the competencies they use are localized to the system. Keeping these updated is a costly process, and the content delivered by the systems is only matched to the competencies by approximation. This approach is not likely to produce much valid data on training effectiveness.
- **Impact on education:** In education, competency portability is an old problem – that of articulating courses among multiple institutions. At a deeper level, it is also the transfer problem. Students learn a concept in one context (e.g. in a math class) and do not recognize the same concept in another context (e.g. in a physics class). In the U.S. students often attend multiple institutions, sometimes simultaneously. That alone should point to need for what I am calling competency portability. If we add challenges such as tracking the results of life-long education and validating degrees from for-profit universities, I believe that competency portability may be far more important than content portability for our educational systems.<sup>2</sup>

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<sup>2</sup> Content portability is a pre-requisite for competency portability so I am not suggesting that we have done things in the wrong order. It may also be the case that content portability has not really been achieved in the academic content supply chain, and that Common Cartridge is the latest attempt to address that problem.

- **Impact on Content:** Content is still the biggest part of the LET industry. The ability to develop content independently of a delivery system is wonderful, but for that to work at anything but the most basic level, the content development process and the delivery system need to track the same competencies. I do not believe we can ever move much beyond so-called page turners without that simple ability.

Many of the above are largely invisible to executives and decision makers. But they will be more than sufficiently motivated by the prospect of managing training on the basis of its effectiveness, tying training and education to staffing and HR, and not being required to pay for the same services twice.

## Standardization Efforts

If SCORM 2.0 is going to address the problem of competency portability, what existing solutions might help? In fact, this is not a new area. The late Claude Ostyn developed some proposed standards that address part of this problem, the SIM-SCORM standards group has addressed it, CEN/ISSS has looked at portability of records, the academic e-portfolio and learner information specifications address related issues, and it would not surprise me if even more is available from other communities of practice. I admit to not having done the research to find out.

With that noted, the problem I see is that all of the above mentioned standards efforts address data models and high level data exchange. In today's world, we also need lower level service-oriented protocols to make things work. The success of CMI is that it is not only a data model but an API, and I believe the same is needed for competency portability. Since many of the systems involved are not part of the LET constellation, this is a tall order, not because there are no candidate standards (there probably are) but because it involves so many communities and enterprise technologies. This is where LETSI comes in. I believe that LETSI will have enough reach within and outside of the LET community to make a project like this feasible.

## Conclusion

For those who skip the paper and go right to the conclusions, here they are:

- It would be a mistake to do more than one new thing with SCORM 2.0
- That thing should be competency portability. This is the next big problem that addresses business, educational and training issues.
- Many good things will happen if we can come up with the right standards.
- Many relevant standardization efforts are under way.
- An effort to address competency portability will touch on non-LET communities and non-LET enterprise systems. LETSI is ideally suited for making this happen.