

# Stand Ready?

## Emerging e-learning standards in a pedagogical perspective.

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Even though the e-learning industry is a young one, it is said to be in need of common standards to ensure further growth. Today half a dozen organisations are working to create standards for the industry, and their main goal is to make the e-learning technology more flexible and user friendly. The standardisation issues have been given tremendous attention the last two years, and there exists quite a lot of optimism of standards impact on the future of e-learning.

As with all kinds of standardisation work, you have to let go of something. In order to reach the goal of flexibility, you must let go of the different variations that exist. So what must be "sacrificed" when standards get implemented? This article will look at why we need standards, and raise questions of possible consequences that today's upcoming standards could have in a pedagogical perspective if variation gets limited.

### Key specification players

*"To describe the e-learning standard arena as confusing and arcane would be an understatement (...)" Barron (2000:2).*

Standards for e-learning is not an easy field to understand, and you could hardly say that there is common consensus about standards today. Further, it is important to be aware that we actually don't have any standards for e-learning today. Instead there are organisations with common interests and arguments that develop specifications for e-learning (Singh 2000). Examples of such organisations are IMS, AICC, ADLNet, IEEE, CLEO, WC3, ISTO. The first four are the most prominent today. Lets have a short look at how they describe their interests.

#### IMS – Instructional Management Systems Project (<http://www.imsproject.org>)

IMS Global Learning Consortium, Inc. (IMS) is developing and promoting open specifications for facilitating online distributed learning activities such as locating and using educational content, tracking learner progress, reporting learner performance, and exchanging student records between administrative systems.

IMS has two key goals:

- Defining the technical specifications for interoperability of applications and services in distributed learning, and
- Supporting the incorporation of the IMS specifications into products and services worldwide. IMS endeavours to promote the widespread adoption of specifications that will allow distributed learning environments and content from multiple authors to work together (in technical parlance, "interoperate").

#### AICC – Aviation Industry CBT Committe (<http://www.aicc.org>)

The Aviation Industry CBT (Computer-Based Training) Committee (AICC) is an international association of technology-based training professionals. The AICC develops guidelines for the aviation industry in the development, delivery, and evaluation of CBT and related training technologies. The objectives of the AICC are as follows:

- Assist aeroplane operators in development of guidelines, which promote the economic and effective implementation of computer-based training (CBT).
- Develop guidelines to enable interoperability.
- Provide an open forum for the discussion of CBT (and other) training technologies.

ADLNet – Advanced Distributed Learning Initiative  
Shareable Courseware Object Reference Model (SCORM) (<http://www.adlnet.org>)

The US Department of Defense and the White House Office of Science and Technology Policy launched the Advanced Distributed Learning Initiative in 1997. The purpose of the ADL initiative is to ensure access to high-quality education and training materials that can be tailored to individual learner needs and made available whenever and wherever they are required.

ADL released SCORM (shareable content object reference model). SCORM is designed to meet the US Department of Defense's requirements for web-based learning content, supporting content reusability, accessibility, durability and interoperability.

SCORM gives specifications for representing course structures (in order to move courses from one server/LMS to another), specifications relating to the run-time environment, a content launch specification and a specification for creating meta-data records for courses, content and raw media elements.

IEEE - Institute of Electrical and Electronics Engineers

LTSC: Learning Technology Standards Committee (<http://www.ltsc.ieee.org>)

The mission of IEEE LTSC working groups is to develop technical Standards, Recommended Practices, and Guides for software components, tools, technologies and design methods that facilitate the development, deployment, maintenance and interoperation of computer implementations of education and training components and systems. LTSC has been chartered by the IEEE Computer Society Standards Activity Board. Many of the standards developed by LTSC will be advanced as international standards by ISO/IEC JTC1/SC36 – Information Technology for Learning, Education, and Training.

IEEE cover topics including learning object metadata, student profiles, course sequencing, computer managed instruction, competency definitions, localization, and content packaging.

## Technological standards for e-learning. Why?

*"E-learning standards are the vehicle that will bring flexibility to content and infrastructure solutions" (Singh 2000: 1).*

Standards for e-learning will give us new and improved ways of training and education in both an individual and organisational perspective (Wagner 2000). An important aspect of e-learning is that it depends upon technology for implementation. New and improved information technologies like databases, learning management systems (LMS), learning content management systems (LCMS), search engines etc. are giving new possibilities for storing, retrieving and reusing information objects across systems, time and geography. The standardisation initiatives focus on how to make e-learning even more flexible, through making the different new technologies more compatible with each other.

Even if different standardisation initiatives focus on different issues for standardisation, there is a common opinion about content portability, granularity and interoperability. In Singh's White Paper *"Demystifying eLearning Standards"* he explains these as:

**"Content portability** - When content has been separated from proprietary delivery systems, the organization can consolidate, organize and track their eLearning initiatives in the LMS of their choice. Because this is true for both third-

party custom content, corporations will have greater flexibility and lower switching costs.

**Granularity** - The new specifications supports the learning object methodology, allowing for smaller and more timely units of information. Learning objects adds "just enough" to "just-in-time" learning.

**Interoperability** - Application interoperability starts where different eLearning applications can share content and tracking data. But even more exciting, these specifications open up the possibility for different types of applications to swap and access content." (Singh 2000: 4).

For the young e-learning industry to develop further, industry standards that ensure this kind of flexibility must be developed, established and accepted.

## Effective learning solutions: LMS, e-learning and standards

The initiative for establishing standards comes mainly from specific needs within large organisations/enterprises that have tradition for using technology in learning/training, and that need effective learning solutions to meet their challenges. These organisations handles a large amount of training to a large number of employees, and they need to do it as efficient and manageable as possible.

The US Department for Defense and the aviation industry has taken the initiative in two of the most prominent standardisation workings today: SCORM and AICC. These organisations have a vision of using new technology to make learning and training more effective and tailored, both for the individual and the organisation. Further, they wish to stimulate the market in order to increase variation and quality in training and educational offerings. ADL writes this about the SCORM initiative:

"The Department of Defense (DoD) and the White House Office of Science and Technology Policy (OSTP) launched the Advanced Distributed Learning (ADL) initiative in November 1997. The purpose of the ADL initiative is to ensure access to high-quality education, training and decision aiding ("mentoring") materials that can be tailored to individual learner needs and made available whenever and wherever they are required.

This initiative is designed to accelerate large-scale development of dynamic and cost-effective learning software and to stimulate a vigorous market for these products in order to meet the education and training needs of defense and industry in the 21st century. ADL is developing a common technical framework for computer and Web-based learning that will foster the creation of reusable learning content as "instructional objects." (ADL 2001: 1-11).

An important part of the standardisation initiatives for e-learning are learning management systems (LMS). This is essential for an e-learning framework in order to distribute, administrate, navigate, document, report and manage e-learning for users and enterprises with different needs and strategies. The standards that eventually will be established will not only apply for e-learning content but also for learning management systems in the market.

E-learning is dependent on an LMS (or some kind of management system) for distribution and administration, but from a standardisation perspective e-learning should be independent of different types of LMS. E-learning should work without problems across different technological platforms. This will make the choice of learning technology, if it is for e-learning or LMS, independent of vendor. Hopefully, this will open the market for more vendors and give a higher degree of variation in learning technology and e-learning products.

As we see, the upcoming standards has an organisational dimension, where the intention is to manage large volumes of content and users in order to get more effective learning solutions without having to deal with technology problems. For large organisations like the US defence industry and the aviation industry, the standards will have an enormous effect on internal training for both implementation and administration. Anyway, the intention of the standardisation initiatives is not administration, but as ADL puts it: "(...) to ensure access to high-quality education, training and decision aiding ("mentoring") materials that can be tailored to individual learner needs and made available whenever and wherever they are required". (ADL 2001:1-11).

## Technological standards and pedagogy

*"It's a siren song few training professionals can resist: e-learning content that's free of proprietary confines and manageable as discrete building blocks that can be mass-customized for learners"* (Barron 2000:1).

The standardisation initiatives have, as their primary goal, to increase access to learning material, training and education of high quality that can be tailored to actual needs. Standards do not imply anything directly about what kind of pedagogical approach to take when creating e-learning content, or what type of functionality a LMS should have. But most likely standards will have implications for how content and an LMS should be developed and work. To take this one step further, it could be argued that possible implications would set premises for what you could expect of high quality content in different competency areas.

## Learning objects model

Sometimes you get the impression that working with industry standards for e-learning is just about technology. In articles and speeches on the subject you get to know that technological standards, and metadata specified by these standards, in principle doesn't have anything to do with the content. The metadata is only a reflection of the actual content (REN 2002).

To retrieve, reuse and blend different learning objects are some of the main goals of the standardisation work. A presupposition to realise this goal is to structure and tag the content according to a standard. For example the content must be structured in such a way that each "module" is an independent unit, which is expressed through a set of metadata. This opens up the possibility of mixing different e-learning units and put them together for new purposes and in new learning tracks.

Today's prominent standardisation work is based on a model called the learning object model or object-oriented design (Barron 2000, Koper 2001, Downes 2001, Longmire 2000). The fundamental idea behind this model is that learning content can be split up and put back together in new learning tracks/courses in the same way you play with blocks of LEGO™.

This model belongs to a systematic and prescriptive approach to pedagogical design. The approach has its parents in behaviouristic psychology and systems engineering (Molenda 1997). According to Gress & Purpel (1988) most of the American research and literature on pedagogical design comes from this approach. Theoreticians that are known for work in this field are among others Franklin Bobbit, Ralph W. Tyler, Taba, Gagnè & Briggs, Weinstein & Fannini, Robinson, Ross & White, Dick & Carey.

The systematic approach to the pedagogical field is one among several approaches. Other approaches go under names and terms such as dialectical, dynamic, evolutionary,

hermeneutical, and constructivistic. Common for all these approaches to pedagogical design is that they are critical to a systematic approach and the use of prescriptive and linear models on all kinds of competency areas. It is believed that there are areas of competence where prescriptive and linear models are unsuitable for creating useful and effective learning experiences. For more complex learning experiences, they are regarded as too static.

As was said earlier, metadata and the course structure are said to have no implications for the content of the course. An important question when you look at standards in relation to pedagogy is if structure and content can be separated? Could structure and content be treated separately without consequences for each other? Could this be a misunderstood theoretical approach that would be impossible to implement in reality? Will a predefined course structure set important premises for pedagogical design of e-learning?

If you look at these questions in the light of the learning object model, the distinction between content and structure are unproblematic. In such a pedagogical approach the structure would be predefined independent of the content. But if you look at the question in the light of, for instance, a dialectical approach, content and structure would evolve in interaction with each other. The structure could not be predefined because it is decided on in relation to the content.

Rob Koper from The Open University of the Netherlands, is one of few who work with issues of standardisation in a pedagogical perspective. He has taken another pedagogical approach to the standardisation work other than the learning object model, and is contributing constructively to include another pedagogical perspective in the standards. In his article "Modelling units of study from a pedagogical perspective" (2001) he directs a critical question to the concept of learning in the learning object model. As it has been pointed out earlier in this article, the learning object model takes for granted that you can split and put together learning units to create new learning tracks. Koper (2001) means that such an approach is too simple, especially when more complex learning processes are needed. In his article he takes on a situated learning approach described by Lave & Wenger (1991). According to this approach's learning concept, learning is an activity that takes place in a sociocultural context. Learning will thus depend on this context.

In Kopers (2001) analysis of the way the learning object model were used in the standardisation work, he found that how these learning objects would be used in context, was not accounted for. In other words he found a lack a framework. Koper writes: " The learning object model expresses a common overall structure of objects within the context of a unit of study, but does not provide a model to express the semantic relationship between the different types of objects in the context of use in an educational setting" (Koper 2001:5).

Kopers intention is not to say that the standardisation initiatives only will do for simple learning processes. What he tries to accomplish is to set focus on the need to develop a meta-model that includes the description of the learning objects in a semantic context.

### **The relationship between technology and pedagogy**

There is good reason to question the idea that a single model for pedagogical design is enough to be used in all areas of competence. If the technological standards limit variation in pedagogical approaches, the use of e-learning for training and education will also be limited.

A relevant question in this matter is where possible limitations exist. Is it in the technology or in the chosen pedagogical approach? Because people with a technological background dominate the standardisation work there is reason to ask, without the intention of being rude, if they have the necessary knowledge about pedagogical design and learning to include different pedagogical approaches in the work. If they don't know the field of pedagogy they would probably use their own models and methods when designing e-learning, which in this case is similar to object oriented design and the notion of learning objects. Fuhua Lin, who criticise the way learning objects is used and written about, expresses it like this: "The LO model reinforces the notion that course development now needs to follow a systems development life cycle. It is quite clear that courses are more than a collection of learning objects" (Lin 2001:2).

If it is so that the ideas and thoughts of people working with standards sets the premises for pedagogical variation and quality in e-learning, standardisation work should actualise *the relationship between technology and pedagogy*. Because the technologists today have come far in the work with industry standards for e-learning, it is very important that pedagogues start to engage in the work. This is order to broaden the perspectives, and to get the necessary acceptance in the pedagogical communities, that eventually will be using these standards.

### Flexibility or rigidity in e-learning?

Standards for e-learning technology are created in order to make technology and market more flexible and open. This is indisputable a good intention. But will flexibility also be the case for pedagogy and learning? Because today's standardisation initiatives base their work on a single model for pedagogical design, the consequence could possible be rigidity in pedagogy and learning. If this is the case, and it needs to be looked at in further detail, it gives rise to a new set of questions. One of them would be if standards make e-learning less suitable for different learning experiences, hence restricts a wide use and acceptance of e-learning.

It has not been the intention in this article to be negative towards the standardisation initiatives. The intention is to look at the complexity of the issue, and possible consequences today's standardisation work could have for pedagogy and learning. Hopefully, this article can contribute to an interesting debate in both technological and pedagogical communities of whom all are interested in a successful future for the e-learning industry.

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