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# EVOLUTION OF STANDARDS FOR E-LEARNING ENVIRONMENT

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***ABSTRACT* - E-Learning standards are the system of common rules Learning Management System which contains contents, authoring software etc. These rules specify how courses can be generated and delivered over several platforms so that everyone operates seamlessly together at the same time. Technical standards were created to govern how e-Learning content and Learning Management Systems communicate with each other. The primary benefit of these standards is interoperability. Courses that are developed to be standards-conformant integrate easily into LMSs that are compliant with the same standards. Accredited standards ensure that the investment in time and intellectual capital could move from one system to the next. Currently, e-learning standards are being developed by four main organizations: AICC, IEEE, IMS, and ADL. The article presents some aspects of these standards.**

***Keywords: E-learning, standards.***

## I. INTRODUCTION

Just like humans need a common language to communicate with each other, e-Learning courses and learning management systems (LMS) need a common language so that courses can send information back to the LMS from students taking those courses. To accomplish this, the industry has come up with several eLearning standards that allow courses created by any vendor to "talk" with an LMS created by any other vendor. The goal of standards is to provide fixed data structures and communication protocols for e-learning objects. This enables interoperability between applications, by providing uniform communication guidelines that can be used throughout the design, development, and delivery of learning objects. When these standards are incorporated into off-the-shelf products, developers can base their purchasing decisions on quality rather than compatibility.

## II. BENEFITS OF E-LEARNING STANDARDS

Some of the benefits of having a standard based integrated teaching and learning system is:

- Immediate feedback - so students and instructors can take action as needed.
- A comprehensive library of training materials in one repository.
- The resources to mix and match off-themselves content with custom content.
- Access to reports that allow for better measurements of usage and results.
- Reduction of the costs associated with the implementation of multiple systems.
- Support for a wide selection of authoring tools.

## III. HISTORY OF STANDARDS

The Department of Defence (DOD) established the ADL Initiative in 1997 to standardize and modernize training and education management and delivery. The ADL Initiative created an international community to collaboratively develop a cost-effective distributed learning model that is consistent across national and organizational borders. To achieve this goal, ADL worked with the Institute of Electrical and Electronics Engineers (IEEE), the Aviation Industry CBT (Computer-based Training) Committee (AICC), the IMS Global Learning Consortium, Inc., and the Alliance of Remote Instructional Authoring & Distribution Networks for Europe (ARIADNE). These organizations develop guidelines and specifications that make learning software accessible, interoperable, durable, and reusable.

## IV. E-LEARNING STANDARDS

Currently, E-Learning Standards are being developed by four main organizations: AICC, IEEE, IMS, and ADL.

### *1 Advanced Distributed Learning Initiative (ADL)*

In 1997 the Department of Defence (DoD) established the Advanced Distributed Learning (ADL) initiative to develop a DoD wide strategy for using learning and information technologies to modernise education and training and to promote cooperation between government, academia and business to develop E-Learning standardization

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The ADL (http://www.adlnet.org) initiative "is a collaborative effort between government, industry and academia to establish a new distributed learning environment that permits the interoperability of learning tools and course content on a global scale." The ADL is accountable for the Sharable Content Object Reference Model (SCORM), a widely implemented and accepted standard that is built upon the work of other standardization bodies such as AICC (Aviation Industry Computer Based Training Committee), IMS (Instructional Managements Systems Project), IEEE (Institute of Electrical and Electronics Engineers), or ARIADNE (Alliance of Remote Instructional Authoring and Distribution Networks for Europe).

*1.1 SCORM*

- A Web-based learning Content Aggregation Model (CAM) for assembling, labelling, and packaging of learning content. The basic units of interest in the Content Aggregation Model are Sharable Content Objects (SCO) and Content Packages that are used to bundle content
- A Run-Time Environment (RTE) which includes Launch, a content-to-LMS (Learning Management System) communication Application Programming Interface (API), tracking, data transfer and error handling.
- Sequencing and Navigation (SN) for sequencing and content navigation, which affects how the content is assembled, and consequently presented to and navigable by the learner.

*1.2 Alliance of Remote Instructional Authoring and Distribution Networks for Europe (ARIADNE)*

ARIADNE (http://www.ariadne-eu.org) aims "to exploit and further develop the results of the ARIADNE and ARIADNE II European Projects, which created tools and methodologies for producing, managing and reusing computer-based pedagogical elements and telematics supported training curricula." ARIADNE's work in educational metadata. In collaboration with the IMS Project, had a major influence in the development of the IEEE Learning Objects Metadata (IEEE/LOM) standard.

*1.3 Aviation Industry Computer Based Training Committee (AICC)*

The AICC (http://www.aicc.org) is considered the oldest e-learning standard in the world. "The AICC is an international association of technology-based training professionals. The AICC develops guidelines for aviation industry in the development, delivery, and evaluation of CBT (Computer-Based Training) and related training technologies.

The objectives of the AICC are as follows:

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

The main artifacts of AICC are subsumed under the AICC Guidelines and Recommendations (AGRs). Relevant e-learning AGRs issued by the AICC include:

AGR-002 (Courseware Delivery Stations): Includes technical recommendations for the acquisition of CBT stations.

AGR-006 (Computer-Managed Instruction – CMI): Recommends guidelines for the interoperability of CMI systems, enabling them to use CBTs from different origins.

- AGR-007 (Courseware Interchange): Includes guidelines for interchange of CBT courseware elements such as text, graphic, audio, etc.
- AGR-010 (Web-Based Computer Managed Instruction): Adapts the AGR-006 interoperability guidelines particularly for web-based CMI systems

*2. IEEE Learning Technology Standards Committee (LTSC)*

The LTSC (http://ltsc.ieee.org) "is chartered by the IEEE Computer Society Standards Activity Board to develop accredited technical standards, recommended practices, and guides for learning technology." The IEEE/LTSC is organized into 20 workgroups (WGs) elaborating on different aspects of learning technology. Among the currently most often cited in the field are:

- WG1 (Architecture and Reference Model): WG1 has issued the Learning Technology Systems Architecture (LTSA), a pedagogically neutral standard that "specifies a high level architecture for information technology-supported learning, education, and training systems that describes the high-level system design and the components of these systems."
- WG12 (Learning Object Metadata): WG12 is working on specifying the syntax and semantics of Learning Object Metadata (LOM), which is defined as the attributes required to fully/adequately describing a learning object.

*3. Instructional Managements Systems Project (IMS)*

The IMS standard is another popular eLearning standard. The IMS (http://www.imsproject.org) "develops and promotes the adoption of open technical specifications for interoperable learning technology. Several IMS specifications have become worldwide de facto standards for delivering learning products and services. IMS is a worldwide non-profit organization that includes more than 50 Contributing Members and affiliates. These members come from every sector of the global E-Learning community." The core deliverables of the IMS are specifications. Currently, the IMS is working on the following relevant specifications: Accessibility, Competency Definitions, Content Packaging, Digital



Repositories, Enterprise, Learner Information, Learning Design, Metadata, Question and Test Interoperability, Simple Sequencing, and Vocabulary Definition Exchange.

*4. International Standardization Organization (ISO)*

A subcommittee of the world-wide operating standardization body ISO (http://www.is o.org), the JTC 1 / SC 36 committee, is working on standardization issues in information technology for learning, education and training in liaison with the IEEE LTSC. The ISO/JTC1/SC36 committee is organized in five workgroups on

- Vocabulary.
- Collaborative Technology.
- Learner information.
- Management and delivery of learning, education, and training.
- Quality assurance and descriptive frameworks.

Under direct responsibility of this committee, no standards have been published yet, but it seems likely that the ISO as the major standardization body will be a key player in the development of a general e-learning standards bundle integrating the diverse efforts existing to date.

*5.SingCore*

SingCore is a Singapore-defined standard for metadata. It is based on the IMS standards and is primarily used to tag learning objects and assets so that they can be reused later.

## V. CONCLUSION

The utility of any teaching material is inappropriate unless it does not qualify certain norms and standards. E-learning standards can be described as certain parameters that make e-learning course apt and useful for its user. Standards are a part of all aspects of learning. To be successful with standards, must realize that, although standards are helpful, might not always need to use every aspect of each standard. No standard is perfect for every use, so be ready to pick and choose.

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