Topics

- The Big Picture
- Terms of Reference
- Standardization Threads
- Trends & Implications
- Questions / Comments
The Big Picture

A look at the history of e-learning standards and standardization
The Standardization Process

Principles discussed
Possible Prototypes
Early Specs
Champions Implement Standards announced
Serious Prototypes Maybe products Markets wait
Products Produced Early Adoption Early test suites
Products Stabilized More Adoption Precision added
Conformance & Compliance Market Adoption Global adoption

Aviation Industry CBT Committee
Advanced Distributed Learning initiative
IEEE Learning Technology Standards Committee
ISO/IEC JTC1 SC36: Standards Learning, Education and Training
IMS Global Learning Consortium

MANY ORGANIZATIONS AROUND THE WORLD

31 January, 2005
Stakeholder Involvement

Principles discussed
Possible Prototypes
Early Specs

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Maybe products
Markets wait

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Conformance & Compliance
Market Adoption
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Involvement by:
• Software developers
• Researchers
• Specification bodies

Involvement by:
• Software vendors
• Content producers
• Standards bodies
• Industry analysts
• (Very) Early Adopters

Involvement by:
• Training Organizations
• Secondary Vendors*
• Certification agencies
• Education Organizations

* Vendors that support or use e-learning

31 January, 2005
Sorting Out Standards - AICC Workshop Presentation
Progression of Learning Technology Standards

- General solutions for specialized communities (AICC, IMS, ARIADNE)
- SC36
- SCORM
- IEEE LTSC
- Content interoperability within the learning community
- Learning is part of a bigger picture

Timeline:
- 1996
- 1997
- 1998
- 1999
- 2000
- 2001
- 2002
- 2003
- 2004
- 2005

First de jure Standard (SCORM) was released on 31 January, 2005.
Terms of Art & Terms of Reference
Specifications & Standards

- **Specification**
  - Detailed and precise description of functionality, methodology and practice.

- **De Facto Standard**
  - Spec that has become the widely accepted method for achieving a particular goal.

- **De Jure Standard**
  - Specification that has been approved as a standard by an accredited standards development organization

- **Profile**
  - Variant of a spec or standard, usually with added or deleted terminology and functionality

- **Reference Model**
  - Documented set of profiles that together can be used to create working technology
  - Model that can be used for understanding the parts and functionality of a system
Circular No. A–119 Revised

Memorandum for Heads of Executive Departments and Agencies

Subject: Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities

3. What Is A Standard?

a. The term standard, or technical standard as cited in the Act, includes all of the following:

(1) Common and repeated use of rules, conditions, guidelines or characteristics for products or related processes and production methods, and related management systems practices.

(2) The definition of terms; classification of components; delineation of procedures; specification of dimensions, materials, performance, designs, or operations; measurement of quality and quantity in describing materials, processes, products, systems, services, or practices; test methods and sampling procedures; or descriptions of fit and measurements of size or strength.
4. What Are Voluntary, Consensus Standards?

a. For purposes of this policy, voluntary consensus standards are standards developed or adopted by voluntary consensus standards bodies, both domestic and international. These standards include provisions requiring that owners of relevant intellectual property have agreed to make that intellectual property available on a non-discriminatory, royalty-free or reasonable royalty basis to all interested parties.

(1) Voluntary consensus standards bodies are domestic or international organizations which plan, develop, establish, or coordinate voluntary consensus standards using agreed-upon procedures. A voluntary consensus standards body is defined by the following attributes:

(i) Openness
(ii) Balance of interest.
(iii) Due process.
(vi) An appeals process.
(v) Consensus.
One Hundred Eighth Congress of the United States of America

AT THE SECOND SESSION

Begun and held at the City of Washington on Tuesday, the twentieth day of January, two thousand and four

An Act

To encourage the development and promulgation of voluntary consensus standards by providing relief under the antitrust laws to standards development organizations with respect to conduct engaged in for the purpose of developing voluntary consensus standards, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

TITLE I—STANDARDS DEVELOPMENT ORGANIZATION ADVANCEMENT ACT OF 2004

Standardization Threads

The main threads in learning technology standardization efforts
Metadata

- **Goal:** Express descriptive, technical & contextual information
- **Origins:** ARIADNE, Dublin Core, IMS
- **Status:**
  - LOM data model is a standard (IEEE 1484.12.1 – 2002)
  - Incorporated into SCORM
  - Many profiles and translations
  - LOM XML binding soon to be an IEEE standard
- **Future:**
  - Automated generation of metadata
  - Harvesting / Federated Searches
  - Registries
  - Semantic Web
- **Uses:** *Search, Discovery, Organization, Reuse, Rights Management, Matching Content to Learners*

Aggregation & Transport

- **Goal:** Aggregate components of learning resources. Package for import / export / disaggregation by different systems.
- **Origins:** AICC, IMS … & … MPEG, DLF, OASIS and others
- **Status:**
  - IMS Content Packaging → SCORM
  - IMS Content Packaging used extensively in learning industry
  - Other similar specifications and standards exist
- **Future:**
  - Resource Aggregation Reference Model (IEEE LTSC)
  - XML Formats for SCORM
  - Other collaborations among communities
- **Uses:** *Transport content, Encode content & metadata, Internal & external “storage” format*

http://projects.aadlcolab.org/scourse/latestgreatest/4_0_1/4_0_1_P1.htm

http://www.i-tor.org/oa_x/retrieving_objects/mpeg_21_didl_approach/
Data Interchange

- **Goal:** Exchange learning information and results data
- **Origins:** AICC & Friends.
- **Status:**
  - IEEE Standard
  - Incorporated into SCORM
  - Wide adoption in training world. Less in education world.
- **Future:**
  - Web-service approach
  - Assessment
  - Middleware
- **Uses:**
  - Track scores and other learning data, personalize experience, enable adaptive branching of content under LMS control,

Learner Information

- **Goal:** Standardize data about learners for use by learning technology
- **Origins:** IMS, AICC (CMI), IEEE LTSC, HR-XML, Others
- **Status:** – ISO work is ongoing
  – Areas: Learner (or participant) information & competencies
- **Future:** – Modularized standards
  – Web Services
- **Uses:** – Certification, Qualification, Personalization of learning experience, Construction of learning plan, Enabling competency-based branching.

Rights Management

- Goal: Express & manage rights for use of learning content
- Origins: ODRL, XrML, Creative Commons, etc.
- Status: – MPEG: Standard & Licensing Authority
  – LTSC defining requirements for Learning, Education & Training
- Future: – Rights management is a key issue for reuse
  – Increasingly important area
- Uses: Enable sharing & reuse, Support business models, Comply with law, Tracking & Attribution, Route Intellectual Property

Learning Design

- **Goal:** Describe *learning experiences* in a machine actionable way
- **Origins:** IMS, Open University (NL), ADL
- **Status:** - SCORM 2004 incorporates Simple Sequencing
  - More sophisticated methods in specification/research phase
- **Uses:** *Incorporate instructional design into computer-mediated learning*

http://www.jisc.ac.uk/uploaded_documents/Learning_Design_ppt.ppt
Games, Simulations, Mobile Learning, & The Next Big Thing

- **Goal:** Apply Emerging Technology to Learning, Education and Training - or - move learning, education & training into this century

- **Origins:** AICC (years ago!), SISO, OMA, Mobilearn, . . .

- **Status:** – SISO Standards Activities Committee looking at SCORM
  – Standards efforts abound (not specific to learning)

- **Uses:** Enable ubiquitous, interactive, compelling learning and performance support.

http://www.academiccolab.org/initiatives/index.html
Interlude

Mobile Learning
A new m-learning architecture will support creation, brokerage, delivery and tracking of learning and information contents, using ambient intelligence, location-dependence, personalization, multimedia, instant messaging (text, video) and distributed databases. Field trials cover “blended learning” (as part of formal courses); “adventitious, location-dependent learning” (during visits to museums); and “learning to interpret information sources and advice” (acquiring medical information for everyday needs). The high connectivity and functionality may lead to new group behaviors, akin to the SMS phenomenon.
What Have We Been Smoking?

- Predictions of the effects of technology are notoriously
  - Too ambitious in the short term
  - Too modest in the long term, and
  - Usually miss the real point.
- E-learning is still tied to traditional instructional models (that have little to do with mobility)
- Fundamental issues need to be resolved:
  - Ownership & Distribution Channels
  - Technology & Standards
Nonetheless … It’s Compelling

- **UBIQUITOUS**
- **AFFORDABLE**
- **PORTABLE**

A COMPUTER ON EVERY DESKTOP ➔ A COMPUTER IN EVERY POCKET
AND PEDAGOGICALLY ADVANTAGEOUS ...
But Why Can’t We All Just Get Along?

- TDMA
- CDMA
- GSM
- GPRS
- iMODE
- UMTS
IEEE Standard for
Local and metropolitan area networks

Part 16: Air Interface for Fixed Broadband Wireless Access Systems

Sponsor
LAN/MAN Standards Committee
of the
IEEE Computer Society

and the
IEEE Microwave Theory and Techniques Society

Approved 6 December 2001
IEEE-SA Standards Board

Abstract: This standard specifies the air interface of fixed (stationary) point-to-multipoint broadband wireless access systems providing multiple services. The medium access control layer is capable of supporting multiple physical layer specifications optimized for the frequency bands of application. The standard includes a particular physical layer specification applicable to systems operating between 10 and 66 GHz.

Keywords: fixed broadband wireless access network, metropolitan area network, microwave, millimeter wave, WirelessMAN™ standards
WiFi? WiMax? 3G?

Fast Mobile Access Next Year*

Mobile Pipeline Voting Booth Poll, January, 2005
DENVER - MPEG LA announced today that an initial group of essential patent holders including ContentGuard Holdings, Inc., Intertrust Technologies Corp., Matsushita Electric Industrial Co., Ltd., Koninklijke Philips Electronics N.V. and Sony Corporation have reached tentative agreement on the terms of a joint patent portfolio license to be offered by MPEG LA for use of the Open Mobile Alliance (OMA) DRM 1.0 specification. The companies were convened in response to MPEG LA's call for essential patents (http://www.mpegla.com/news/n_04-07-20 drm.pdf). The proposed OMA DRM Patent Portfolio License is expected to cover products that use the OMA DRM 1.0 specification, as well as those which use both OMA DRM 1.0 and 2.0.

Under the proposed License, royalty rates for patents essential to OMA DRM 1.0 in connection with products that have OMA DRM 1.0 functionality or OMA DRM 1.0 and OMA DRM 2.0 functionality would be (a) US$1.00 per device (payable by the party that offers the device to an end user) and (b) 1% of any transaction in which an end user pays for delivery of a digital asset employing OMA 1.0 (payable by the service provider). OMA DRM 2.0 essential patents may be added as a result of a pending call issued by MPEG LA on 23 September 2004 (http://www.mpegla.com/news/n_04-09-23 drm.pdf).
And …

Back to the main program

This message was sent from a T-Mobile wireless phone.
Architecture

- **Goal:** Inform the development and integration of learning systems by creating standardized frameworks and reference models.

- **Origins:** IMS, LTSC, JISC, ADL, MIT

- **Status:**
  - IEEE Standard based on 1997 models (not used much)
  - Proliferation of “E-learning Frameworks”
  - Driving implementation & experimentation, not standardization.

- **Uses:** Reduce development time, define services and service interfaces, manage large-scale efforts, help consumers understand what they need and what they are getting.

http://www.elframework.org/
Trends & Implications

What’s Up?
(And what does it mean)
1. Service Oriented Architectures

- Componentization
  - Durable, reliable, easier to maintain, easier to customize

- Change in “product categories”
  - Unbundling of products
  - New service providers

- Playing in a larger world
  - Easier to focus on things specific to learning
  - Integration with HR, Content Management, Analytics etc.
2. Global Collaboration

- Stewardship
  - SCORM
  - Digital Library projects

- A more rational standards picture
  - Organizationally
  - Technically

- Integration with other communities
  - Discovery of commonalities
  - Use of relevant standards from other sectors
  - *Again*: focus on problems specific to learning
3. Certification and Testing

- The learning technology standards community is maturing
- Standards are becoming better products
  - Less hype
  - More interoperability
  - But will never be magic
Questions / Comments

robb@computer.org
(Robby Robson)