Online Content of the Future: Sharable Content Objects

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Agenda
- Background
  - Military
  - Higher Education
- Standards
- Objects
- Results
- Future

Learning in the Military

The Department’s Extensive Experience with Learning Technology
- Pioneered the use of flight simulators – 1940s
- Introduced standard procedures for instructional system design – 1970s
- Developed Internet predecessor
- Pioneered the use of Distributed Interactive Simulation – 1980s
- Introduced standards for reuse and interoperability of simulation objects – 1990s

Magnitude of Education and Training in DoD
- Addresses the needs of 2.5 million military personnel, DoD civilians, and their dependents
- Includes approximately 30,000 military training courses
- Costs about $15 billion annually to operate and maintain military schools
- Involves career-long learning: recruit, basic, advanced, and professional development
- Encompasses a broad range of technical and decision making skills for both individuals and teams

Federal leadership in learning technology includes . . .
- Presidential Executive Memorandum citing ADL as a model for federal agencies to follow (January 98)
- Presidential Executive Order 13111 tasking DoD to lead collaborative standards development (January 99)
- Presidential Executive Order reaffirming and expanding learning technology guidance in EO 13111 (June 01)
The ADL Vision

Provide access to the highest quality education and training, tailored to individual needs, delivered cost effectively, anywhere and anytime.

ADL Strategy

- Use network-based technologies
- Create platform-independent, reusable content
- Promote large-scale cooperation to satisfy common needs
- Develop common specifications for interoperability / reuse
- Enhance performance with emerging and next-generation technologies
- Provide incentives for organizational and cultural change

ADL Functional Requirements

- Accessibility: access instructional components from one remote location and deliver them to many other locations
- Interoperability: use instructional components developed in one location, with one set of tools or platform, in another location, with a different set of tools or platform
- Adaptability: tailor instruction to individual and situational needs
- Reusability: incorporate instructional components into multiple applications
- Durability: operate instructional components when base technology changes, without redesign or recoding
- Affordability: increase learning effectiveness significantly while reducing time and costs

Communities of Self-interest Developed Common ADL Specifications

- “SCORM”
- Standards Groups
- Authorsing Tool Vendors
- Industry
- Info Tech Companies
- Software Vendors
- Federal Agencies
- Dept of Labor
- Office of Science and Technology
- President’s Task Force on Training Technology

Landscape

Higher Education
Barriers
- Management systems that track students and content in the academic industry are proprietary
- Content developed at one campus cannot easily be transported to another campus except through cut and paste

Online Courses
"Attempts to put ordinary college courses on the Internet are a mistake. Marshall McLuhan, was correct. The medium not only controls how things are communicated, but what things are communicated. **On the Web, you must do it differently.**"

Peter Drucker

New Opportunities
There is a saying among aficionados of thoroughbred racing: “It’s not how fast you run; it’s how you run fast.” If your goal is to improve student learning, **it’s not putting courses online; it’s how you put courses online.** As we design online learning environments, we need to ask ourselves continually whether we are simply migrating our on-ground teaching approaches online or whether we are **taking advantage of the capabilities** of information technology to improve student learning.

Carol A. Twigg

Academic ADL Co-Lab Established
Provides an environment, unique in the nation, to leverage the expertise of Universities, Industry, and Government by reengineering education and training through the use of cutting-edge technology.

ADL Co-Labs
- ADL Co-Lab Hub
  - ADL integrator for non-DOD government agencies
  - Policies, tools & standards
- Joint ADL Co-Lab
  - ADL integrator for military services
  - Implementation issues
  - ADL acquisition issues
  - Prototypes
What Is the Academic ADL Co-Lab?

- **Focal point** for the nation’s universities and colleges in promoting high quality, reusable content for distributed learning
- Established to promote **collaboration** in the research, development, demonstration, implementation, and evaluation of ADL technologies and products
- Serves as an academic partner and ADL link to test, evaluate, and demonstrate **ADL-compliant tools and technologies** to enhance teaching and learning
- Serves as an academic **demonstration site** for ADL tools and content, including those developed by the federal government, academia, and industry

### Academic ADL Co-Lab Partnerships

- University of Wisconsin System
- Wisconsin Technical College System
- Air Force Institute for Advanced Distributed Learning
- Maryland Community College
- Bloomsburg University
- California Virtual Campus
- Cameron University
- Cape Fear Community Collage
- Community College of Allegheny County
- Columbia College Chicago
- Faneuil College
- Florida Community College System
- Foothill College
- Indiana University Bloomington
- Macquarie University (Australia)
- Mark O’Dade Medical College
- Minnesota State Colleges & Universities
- Mississippi State University
- Nova Southeastern University
- Northern State University
- Penn State
- Purdue University
- Rochester Institute of Technology
- Rutgers University
- St. John’s University
- Southern Regional Education Board
- Texas A&M University
- University of Alabama
- University of California – Berkeley
- University of California – Irvine
- University of Hawaii at Manoa
- University of Illinois at Urbana-Champaign
- University of Maryland University College
- University of Nebraska – Lincoln
- University of New Orleans
- University of Washington
- University of Wollongong (Australia)
- Vanderbilt-Northwestern-Texas-Harvard-MIT (VaNTH) Center for Bioengineering
- West Virginia University

### Why We Need Common Specifications

Surprising as it seems, before June 2000 we couldn’t . . .

- Move a course from one web-based Learning Management System (LMS server) to another.
- Run or reuse course content across different LMS systems (multiple proprietary vendor tools).
- Create searchable learning content or media repositories across different LMS environments (Servers).

### Standards Make Things Work

- Railroad tracks
- Light bulbs
- Power outlets
- Beer bottle caps
- Phone lines
- The Internet

...we take them for granted
Standards Address the Ability to:

- Mix and match content from multiple sources
- Develop interchangeable content that can be assembled, disassembled, and re-used quickly and easily
- Ensure that buyers are not “trapped” by a particular vendor’s proprietary learning technology
- Ensure that our learning technology investments are wise and risk adverse
- Increase the effectiveness of learning by enabling greater personalization and targeting of the right content to the right person at the right time
- Improve the efficiency and ROI of learning content development and management
- Increase the quantity and quality of learning content

SCORM - Definition

**Sharable Content Object Reference Model**

A software model that defines the interrelationship of course components, data models, and protocols such that content “objects” are sharable across systems that conform with the same model.

A Model for Standards Evolution

Sharable Content Objects

Learning Objects

- Definition
  - Stand-alone
  - Meta-data
  - Assembled and contextualized
- LO, RLO, KO, IO, nugget, bite-size learning, SCO
- Classroom, blended, online

Technology Evolution in eLearning
Benefits of Learning Objects

- Increased value of content
- Improved content flexibility
- Improved updating, searching, and content management
- Content customization

Warren Longmire

Reusable Learning Object (RLO)

SCOs

Perceived Benefits of Learning Objects

Source: SRI Consulting Business Intelligence

Status of Learning Object Usage

Source: SRI Consulting Business Intelligence
### Barriers to Learning Objects

- Lack of awareness
- Lack of perceived need
- Budgetary considerations
- Lack of robust standards
- Immaturity of learning object approaches
- Confusion over vendors and technologies
- Lack of IT infrastructure
- Lack of management support

Source: SRIC-BI

### Handheld Instruction

![Handheld Instruction Image]

### Results

### Example of those using / requiring SCORM conformance include . . .

- e-Army University
- Centers for Disease Control
- Internal Revenue Service
- Army National Guard
- Fidelity Investments
- Navy College Program for Afloat College Education
- Department of Labor
- Etc. . .

### E-Learning ROI @ Dow Chemical

**Learn@Dow.now**

- Launched in 1999
- Cost = $1.3 Million
- 1st Full Year of Operation
  - Savings = $30 Million
    - $20.8 Million in salaries
    - $5.2 Million in class materials
    - $3.1 Million in training delivery costs
    - $845,000 in manual record keeping

**One class: Workplace Respect and Responsibility**

- Between October 2000 and February 2001
  - More than 40,000 employees took the course
  - 2 hour overview + 4 hours in their native language
  - Savings to Dow = $2.7 Million
    - $1.2 Million in Salary Savings
    - $1 Million in class materials
    - $300,000 in class facilities and trainers
    - $162,000 in manual record-keeping
E-Learning ROI @ Dow Chemical

Scalability & Commitment

Learn@Dow.now
Launch # of Courses = 15
End of 1st year # of courses = 98
   # of Course Completions = 24,492
Year 2000 # of courses = 426
   # of Course Completions = 208,464

A Global Classroom

Courses Offered in:
Cost Accounting, Ethics, Chemistry, HazMat, etc.
Courses offered in the following languages:
Dutch, English, French, German, Italian, Portuguese, Spanish w/ some in Chinese, Indonesian and Japanese

The Rule of “Thirds”

Use of technology-based instruction reduces the cost of instruction by about 1/3
And, either ... reduces time of instruction by about 1/3
Or ... increases effectiveness of instruction by about 1/3

But the REAL Payoff may be improved Performance

FY 02 DAU Seat Time

Seat Time (Hours)
0
500,000
1,000,000
1,500,000
2,000,000
2,500,000
3,000,000
3,500,000

Total Hours
3,310,478
Classroom Hours
2,133,110
Online Hours
1,177,368

DAU Course Graduates (FY 99 to FY 02 (Projected))

FY97 FY98 FY99 FY00 FY01 FY02 (PROJ)
0 10000 20000 30000 40000 50000 60000 70000

ONLINE GRADS
TOTAL GRADS

DAU Graduates (FY 02 Projected)

Grads
0
10000
20000
30000
40000
50000
60000
70000
80000
90000
100000

Resident Hybrid Resident Online Contractor Satellite Web-based Equiv exam
A Solid DAU Success Example - ACQ101

**BEFORE**
- 9 Days in Class (FY 99)
- 2 Travel Days
- 3,700 Graduates/Year
- 22 Faculty Members

**Annual Costs:**
- Travel $3.4 Million
- Delivery $2.8 Million

**RESULTS**
- 25 On-line Hours (FY 02)
- 10,344 Graduates (FY 01) (8,750 in FY 00)
- 16 Faculty Members (Others reassigned)
- One-Time Conversion Cost $500K (in FY 99)

**Annual Costs:**
- Delivery $1.6 Million
- Updates $60 Thousand

**AFTER**
- 137 Workyears Returned to the Workforce (112 WorkYrs in FY 00)
- 6,444 Add'l Graduates (FY 01) (5,050 in FY 00)

**One-Time Conversion Cost:**
- $9.9 Million ($5.6 M in FY 00)

**Cost Avoidance:**
- Travel $4.02 Million ($3.4M FY 00)
- Delivery $1.2 Million

**TOTAL**
- $29.5 Million in Cost Avoidance, Productivity Time & Travel Costs

On the Road to Excellence

By Restructuring Career Fields to e-Learning DAU sees Several Distinct Advantages

<table>
<thead>
<tr>
<th>Career Fields</th>
<th>Man-Years Returned to the Workforce &amp; Recapitalized</th>
<th>$M in Cost Avoidance</th>
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</thead>
<tbody>
<tr>
<td>Contracting</td>
<td>200</td>
<td>11.6</td>
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<tr>
<td>Test &amp; Evaluation</td>
<td>9</td>
<td>.5</td>
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<tr>
<td>Project Management</td>
<td>300</td>
<td>17.4</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>$29.5 Million</strong></td>
</tr>
</tbody>
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Where are we today – and where are we going?

Status Today

- ADL has established relationships with key organizations world-wide
- A new process for managing the development of technical standards now exists
- We have an exciting and important vision for the future
- Pedagogy and content have moved to front and center

Worldwide Network for Learning Technology

ALIC: Advanced Learning Infrastructure Consortium

[Image of network diagram and ALIC consortium]
A Nationwide Open eLearning Platform in Greater China

**International eLearning Standards**
- Crucial to long-term success of eLearning in China
- China issued Distance Learning Technology Standards V1.0 in April 2001 based largely on AICC, IMS, EELCICL, ADL-SCORM
- XDL for data communication
- Reusable Learning Objects
- Interchangeable Learner Profiles
- International standards converging to SCORM
- Most International Off-the-shelf Contents and Major LMS are AICC-compliant

**SCORM**

**ADL**

SCORM is necessary, but not sufficient...

**How the SCORM Fits**

**Around the World**
- SCORM sets e-learning standard
- The architecture of the e-learning environment will closely resemble to the ADL/SCORM environment, enabling a seamless link to the ADL/SCORM standards.

**Technical Specifications**

**Instructional Capability**

**Standards become transparent**
- The “e” is no longer needed in e-learning and e-government
- Sharing and reusing become commonplace

**www.adlnet.org**

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Thank You!

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