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From Discovery to Innovation...

The Learning Object Economy

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Outline

- Arguments for Using Learning Objects
- Learning Object Design Principles

BREAK

- Creating and Delivering Learning Objects
- The Learning Object Economy



Arguments for using Learning Objects

- The Idea of learning Objects
- Arguments for Online Learning
- Arguments for Learning Objects
- Sharing Resources
- Remaining Issues
- Essential Features of Learning Objects



The Idea of learning Objects

- The Lego Analogy
- The Atom Analogy
- The Checkerboard Analogy



Arguments for Online Learning

- Need for Accessible and Affordable Learning
- Accessible:
 - Accessible in time, place
 - Accessibility as Choice – More Offerings
 - Accessibility as Lifelong learning
- But affordability remains an elusive goal



Arguments for Learning Objects

- The individual artisan approach
- Cost savings obtained by sharing common materials
- Higher quality is therefore also obtained
- Courses are too large to share



Sharing Online Resources

- History of sharing (physical) objects
- Examples of Online Sharing
 - Schoolnet - <http://www.schoolnet.ca/>
 - Merlot - <http://www.merlot.org>
 - MarcoPolo - <http://marcopolo.worldcom.com/>
 - XanEdu - <http://www.xanedu.com/>
 - Corbis - <http://www.corbis.com/>



Remaining Issues

- Difficulty Locating Learning Materials
- Existing Portals offer only a Fraction of Materials
- Problem of Consistency of Quality



Essential Features of Learning Objects

- Sharable
- Digital
- Modular
- Interoperable
- Discoverable



Learning Object Design Principles

- Rapid Application design
- Object Oriented design
- The Essentials of Objects
- Objects and Standards
- Learning Object Metadata
- Standards Initiatives
- Classifying Learning Objects



Rapid Application Design

- Analogy: Online courses are like computer programs
- Modern programming using RAD:
 - Integrated development Environment
 - Resuable Components (Objects)
 - Analogies: The Modern Chef, Mechanic



Object Oriented Design

- Examples of Objects in Computing:
 - Windows task bars
 - Javascript Alert Box
 - Data Objects



The Essentials of Objects

- Definitions as Prototypes
- Objects 'Cloned' when Needed (Blessed, too)
- Objects Perform Functions
- Objects Interact



Objects and Standards

- A Standard is a Common Language
- Example: HTML
- Open versus Proprietary Standards
- Open Standards Enable Interaction
- Types of Standard:
 - Transport Protocol (HTTP, FTP)
 - Mark-Up Languages (HTML, XML)
 - Program Interface



Learning Object Standards

- XML – The Basics
- Representing Learning Objects in XML
- The Role of Schemas
- Program Interfaces:
 - Launch
 - API
 - Data Model



Standards Initiatives (1)

- Standards define schemas, interfaces
- Standards promote interactivity
- Interoperability means interaction
- Interaction requires common definitions of objects
- Standards vs Specifications
- Schemas vs Application Profiles



Standards Initiatives (2)

- Specifications
 - Dublin Core - <http://dublincore.org/>
 - IMS - <http://www.imsproject.org>
 - ARIADNE - <http://www.ariadne-eu.org/>
- Standards
 - IEEE P1484 - <http://ltsc.ieee.org/>
- Application Profiles
 - AICC - <http://www.aicc.org/>
 - SCORM - <http://www.adlnet.org/>
 - CanCore - <http://www.cancore.ca>



Classifying Learning Objects

- Classification Helps in Retrieval
- Metadata is Used to Classify
- Classification via Extensions in IEEE, IMS
- Classification Using Taxonomies:
 - Library of Congress -
<http://www.tlcdelivers.com/tlc/crs/shed0014.htm>
 - McRel - <http://www.mcrel.org/standards-benchmarks/>
 - American Mathematics Metadata -
<http://mathmetadata.org/ammtf/taxonomies/>



Creating and Delivering Learning Objects

- How L.O.s are Authored
- Content Authoring Tools
- Creating Learning Objects
- Design Considerations
- Creating Metadata and Wrappers
- Creating Packages
- The LCMS
- Delivering Courses
- Pedagogical Issues



How L.O.s are Authored

- Components of a Learning Object:
 - Content
 - Wrapper
- HTML is *NOT* Used – It is Not Portable
- Portability: Separate content and presentation information
- Author Content with XML Authoring Tools



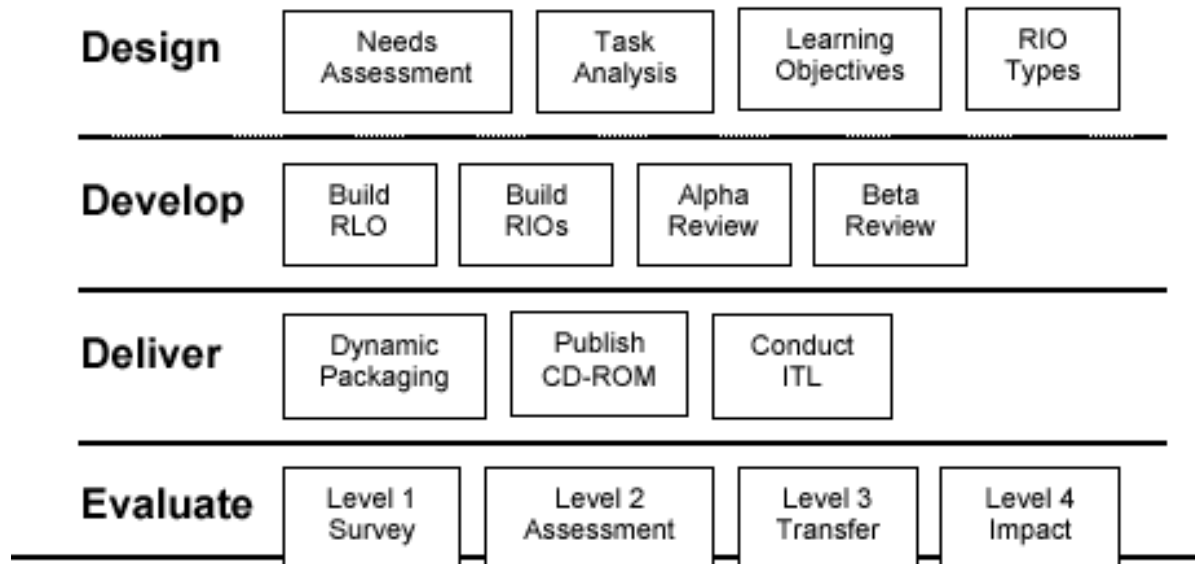
Content Authoring Tools

- Different Tools for Different Content
- Examples:
 - Hot Potatos – Tests
 - Virtual Cell Modelling
- Vendors Offer Suites of Authoring Tools:
 - <http://www.e-learningcentre.co.uk/eclipse/toolbox/authoring.htm>

Creating Learning Objects

- Similar to Creating Instructional Content
 - Eg. From Cisco

http://www.cisco.com/warp/public/10/wwtraining/elearning/implement/rlo_strategy_v3-1.pdf





Design Considerations

- Design Based on Learning Needs
 - Learning Outcomes
 - Task Analysis
- Develop Using Specifications – Example: IDEAS
- Deliver via for Multiple Media
- Evaluation Process. Eg. Kirkpatrick
 - <http://www.learningcircuits.org/2001/jun2001/elearn.html>



Creating Metadata and Wrappers

- Most Authoring Tools Create Metadata
- Metadata May Be Stored Externally to Object
- Legacy Content: Use Conversion Tools
- Wrappers



Creating Packages

- Courses are Packages of L.O.s
- Packages Organize Sequentially (If, Loop)
- Learning Objects are Nested
- Packages Defined Using Manifests
- Packages Created with an LCMS



The LCMS

- Essential Components of an LCMS
 - Authoring Feature – CASE
 - Collection of L.O.s (Repository)
 - Delivery Interface
 - Administration Tools
 - <http://www.learningcircuits.org/2001/aug2001/ttools.html>
 - <http://www.internetime.com/itimegroup/lcms/>
- Using an LCMS
 - Search, Preview, Retrieve, Select, Insert into Package
 - Use LCMS like a CASE
 - LCMS Typically Includes Content Authoring Tools



Delivering Courses

- Courses are Delivered via an LMS
- An LMS Integrates Instruction with Support Tools, such as Chat or Discussion
- An LMS Provides Student Tracking and Gradebook Services



Pedagogical Issues

- Learning Objects are used in an Educational Context
- Dimensions of Context:
 - Discipline, Environment, Organizational Goals, etc
- One Object, Multiple Contexts
- Tailored Wrappers, Context Frames
- Jigsaw Puzzles and Checkers



The Learning Object Economy

- Course Portals
- Course Packs
- Learning Object Repositories
- Certification and Review
- Publishers and DRM
- DLORN



Course Portals

- TeleCampus - <http://teleeducation.nb.ca/>
- Unext / Cardean University - <http://www.unext.com>
- Hungry Minds - <http://www.hungryminds.com/>
- Fathom - <http://www.fathom.com>



Course Packs

- Packages of Materials to Support a Course
- Offered on own or via an LMS
- Examples: WebCT Course Packs, XanEdu



Learning Object Repositories

- Merlot - <http://www.merlot.org>
- CAREO - <http://www.careo.org>
- POOL - <http://www.newmic.com/pool/>
- NSDL
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The header features a composite background. On the left, a portion of a globe is visible. In the center, there is a faint image of a computer keyboard. On the right, a stylized sun with rays is set against a blue and purple gradient sky. A thick, wavy orange and yellow bar runs horizontally across the middle of the header.

SECTION TITLE

NRC: A NATIONAL ORGANIZATION

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