How does IMS LD represent pedagogical scenario’s

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WARNING !!
First, lets look at some images of common Learning Situations
What did you see?

- Large variety of *learning activities*
- Large variety of *learning environments* (generic, task specific)
- Sometimes *individual*, sometimes *group* interactions
- In most situations some kind of *support* (teachers, tools)
- Sometimes *self-directed*, sometimes *teacher directed*
- When appropriate using *computers* and other new *technologies*
Basic Question for Learning Design:

- Can we describe these learning events in a generic way?
- Can we make a *generic description* of all
  - the learning & support activities,
  - including the environment in which they take place?
- => search for a *notation* of the teaching-learning process in
  a Unit of Learning (e.g. a course, workshop, event, ...)

auld lang syne, We'll drink a cup o' kindness yet For auld lang syne.
EML
Educational Modelling Language
XML Notation for Units of Learning

1998 - 2003
OpenUniversiteitNederland

PAST

EML

2000

EML Runtime Environment
version 1, 2, 3

Edubox
How it works...

Role: Teacher
- Tell about X
- Write on blackboard
- Ask questions
- Manage group

Activities:
- Listen to Information
- Take Notes
- Answer questions

Environment: Classroom

Tools:
- Controls
- Tables, Pen, Paper

Communication Services:
- face-to-face comm.
- blackboard

Role: Student
Basic Learning Design Model

Role

performs

Activities

within an

Environment

Tools:
- Pencil
- Table
- Prototype

Comm. Services:
- Mobile Phone

Environment

role: architect

activities:
- make design
- create prototype
It is not static, it is a process

Act

Activity Description

Sequence

Environment

man stands up

walks forward & looks
then continues to exit

ring ring ... man stops

man looks up in confusion
then says his抽象

continues walking off
Fade Out
Example XML LD Coding

<imsld:title>Play</imsld:title>
<imsld:act identifier="act-b6a15166-3fe6-67ea-a7ad-9af5f046ec3f">
  <imsld:role-part identifier="rolepart-2caee9ee-4b15-356d-df84-9881f6541a2b">
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    <imsld:activity-structure-ref ref="as-017b1e6b-13e9-ff5-f186-62f0624dd408" />
  </imsld:role-part>
  <imsld:role-part identifier="rolepart-e5b42709-4d50-c394-95d1-268003c8e887">
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</imsld:complete-act>
<imsld:complete-play>
  <imsld:when-last-act-completed />  
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Nota Bene (1)

This notation is nothing more or less than a notation: it does not say anything about:

- how to record/create the notation
- how to adapt/edit the notation
- how to aggregate several notations
- how to use the notation
IMS LD uses other specifications to express metadata, tests, ontologies, competency definitions, packages,... Specifically important are the use of ontologies to describe the specific pedagogical approaches (e.g. type of activities, learning objects, etc.)
Some Example Pedagogical Constructs that can be expressed with LD

- The traditional pedagogical approaches
- Exploratory learning approaches
- Active and Collaborative learning
- Adaptive learning and personalisation
- Automation of workflow in the teaching-learning process
- Dynamic task selection
- Conditional text and runtime tracking of user performance
- ePortfolio's and new forms of assessment
- Multi-role activities (e.g. role-playing games)
- Modelling of pedagogical patterns
- …
LD does NOT prescribe a Development Methodology (similar to UML, XML, HTML, etc.), nor does it prescribe any usage:

So, how to develop and use LD?
Scenario 1: Deductive Design

1. Course Team

2. Unit of Learning Package

3. Runtime system provides personalised activities for roles

4. Persons perform activities

Role: Teacher

Role: Student

Or:

Individual designer

Open Universiteit Nederland
Scenario 2: Inductive Design

1. Course Run

2. Capture activities

3. Runtime Provides activities

4. Other groups replay activities

role: teacher

role: student

adapt or rewrite
NOTA BENE

The computer provides to end-users:

• the sequenced and personalised activity descriptions

• the description of the learning environment in which the activities must be performed

• the references to digital and non-digital resources in the environment that are needed for the activities

• The (adapted) digital resources (learning objects, audio-visuals, conferences, collaborative tools & other services)

• the administration of user-data, including ePortfolio data
Scenario 3: Course Interoperability

LMS1

UOL Package

LMS2

export LD

import LD
Scenario 4: Repositories

- Study UOL
- Search UOL

Repository

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Scenario 5: Research

Standard Descriptions

Educational Practice

Analysis

We have to look for patterns!

What are the differences?
Summary IMS Learning Design

- Interoperable Description of the learning and teaching process in a Units of Learning
- Learning & Support activities at the centre, not content
- Released as an open standard by IMS (imsglobal.org) in 2003
- Integrative framework for a large number of open standards: IMS CP, LOM, SCORM, LIP, QTI, …
- Supports all types of pedagogies, also the newer ones based on social-constructivist approaches
- Supports advanced eLearning concepts like adaptation, collaboration, agents, ..
IMS LD in Three levels

- IMS LD in three levels: A, B & C
- Level A: basic modeling (role – activities - environment)
- Level B: adds dynamics, adaptivity & learner dossiers (properties, global elements, conditions & monitor objects)
- Level C: adds mail notifications
Road Map for Learning Design

2. Awareness raising (febr. 2004)
3. First generation tools (febr. 2005)
4. Demonstrators & usability improvement of tools, application profiles and conformance testing (during 2005)
5. Development of community of users (from 2006)
What IMS LD is expected to bring....

- **Basis for the next generation of e-learning systems**: increasing the ‘richness’ of different learning activities in different online or real-world situations.

- So, it will extend the possibilities of e-learning: **new** more effective, efficient & attractive **learning models** (active learning, problem-based, ...)

- **Integrate** the large number of isolated existing standards (LOM, CP, QTI, RCD, LIP, ..) to create executable and interoperable units of learning ('courses')

- Support automation of the **workflow** in the teaching/learning process to decrease workload (especially of teachers)

- Every other advantage that a **standard notation** brings: reflection, communication, sharing, reuse, research, similarity studies, evaluation, etc.
Tools

- **LD Engines**: CopperCore (web engine)
- **Editors**: Reload, CopperAuthor, Cosmos, Alfanet editor
- **Graphical Designers**: MOT+, ASK LDT, LAMS
- **Players**: only demos: CopperCore Player, SLED
- **Integrated Environments**: Edubox (EML) and Alfanet (prototype)
CopperCore layered architecture

Client using CopperCore

SOAP Interface Layer

- LDEngine Delegate
- CourseManager Delegate
- Timer Delegate

Delegates

J2EE Container

- LDEngine Session Bean
- CourseManager Session Bean
- Timer Message Bean

LD Components Layer

Property Access Layer

Data Access Layer

Relational DBMS

Client using CopperCore

- SOAP over HTTP

Native Java call

EJB remote call

JDBC call
CopperCore and other components

- QTI component
- LIP component
- searching
- authentication
- authorization
- conferencing
- policy management
- user management
CopperCore integration: Alfanet

J2EE Application Server

Security Layer

Presentation Layer

Tracker

Dispatcher

IMS-LD Interpreter

Interaction Module

Contents Server

IMS-QTI Interpreter

Adaptation Module

MAPM

Services

Object Model

Common Repositories

WebDAV Server

WebDAV Client

Authoring Tool

Data

Server

System Manager

Courses Manager

User Manager

IMS-LD Interpreter

Contents Server

IMS-QTI Interpreter

Adaptation Module

MAPM

Services

Object Model

Common Repositories

WebDAV Server

WebDAV Client

Authoring Tool

Data
CopperCore integration: Alfanet

Diagram showing integration with Alfanet, focusing on the IMS-LD Interpreter within the J2EE Application Server.
CopperCore integration: JISC ELF Framework

Service Based Learning Design
Learning Activities, structured into sequences and selections

An activity description for the selected activity

The environment associated with the selected activity
4.2 Geheugen

1 introductie

Om u nieuwsgierig te maken...

Doelstellingen

2 wat

Bestuderen

Bestudeer hoofdstuk 7 uit het tekstboek.

Studeeraanwijzingen

In hoofdstuk 7 worden verschillende technieken beschreven om het geheugen te verbeteren (geheugensteunjes). Sommige daarvan zou u kunnen gebruiken bij het bestuderen van het tekstboek. Dat geldt met name voor het vormen van anagrammen (blz. 297) en de OSLORO-methode (blz. 288). Als u een reeks punten wilt onthouden, zou u een anagram kunnen vormen van de beginletters (bijvoorbeeld CBO voor de stadia in het geheugenproces: coderen, bewaren, oproepen). De OSLORO-methode (overzie, stel vragen, lees, overdent, reciteer en overhoor) is een efficiënte manier om teksten voor een tentamen te leren. De methode - waarop in de loop der tijd tal van varianten zijn bedacht - is door onderwijspyschologen ontwikkeld en stimuleert een actieve verwering van studiemateriaal, waardoor telsten beter kunnen worden onthouden.

Verwerkingsopdrachten

Muisexamen

Bijzondere verplichtingen

Complete ok
Some practical information ...
User Communities

- EU UNFOLD Project (www.unfold-project.net)
- LearningNetwork for Learning Design (LN4LD) at moodle.learningnetworks.org
- Valkenburg Group (EU + other countries)
- CETIS Pedagogies SIG (UK)
- SURF SIX (The Netherlands)
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Some recent publications

- Some publications: 'Learning Design' book from Springer (overview)
- Special Issue IEEE Educational Technology & Society, Jan. 2006 on Learning Design
- Special Issue Journal of Interactive Media in Education on Learning Design (Dec. 2005)
- Preprints of articles & presentations at dspace.ou.nl
Some Current Research Topics

- Authoring environments & other tools for Learning Design
- Learning Design Patterns
- Graphical notation of learning designs
- Ontologies for specific pedagogical models, to support the learning design process
- Runtime & design-time adaptations
- Runtime Collaborative Services integration
Conclusion

Research

Standards

Tools

Designers

Users
Thank You!