Modelling Pedagogy with IMS Learning Design

The use of IMS LD to *notate* units of learning

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The use of IMS LD to *notate* units of learning

- What is a pedagogical model?
- What is a unit of learning?
- What is a learning design?
- What are activities?
- Representing units of learning?
- Some common 'misconceptions'
What is a pedagogical model?

- **Principles** that describe what *type* and what *ordering* of learning & support *activities work best* to facilitate a certain target group to attain certain learning goals

- Three different views underlying these principles:
  - behaviourist (knowledge transfer)
  - cognitivist (individual knowledge structures)
  - social-constructivist (shared experience)

- Three types of pedagogical models:
  - Instructional Design Theories
  - Descriptions of (best) practices (e.g. lesson plans)
  - Pedagogical Patterns
What is a unit of learning?

• An *abstract* representation of a course, a lesson, a workshop, or any other *formal* or *informal* learning or teaching event.

• This abstraction is *re-usable*, ie: can be used for different learners & teachers at different times, at different locations, different settings (e.g. using different tools), and from different providers.

• Two ways to derive at such an abstraction:
  - 1- develop the abstract units of learning
  - 2- derive the abstract units of learning from the runtime events
Run of a unit of learning

- The actual course, lesson, learning activities that are performed in practice.
- These are the things you can really 'see' (e.g. a course in a school or in a learning management system, i.e. a Moodle, Blackboard, LAMS, WebCT course)
- Often confused with abstract units of learning...
Start developing a runtime course

Start

V1/R1  V1/R2

UOL version 1

V2/R1  V2/R3

UOL version 2

change course
Start developing a design-time course
Examples in every day practice

• University X, Psych. Bachelors, 650 1 year students:
  UOL: introduction into psychology (objectives, book,
        practical, etc.)
  Run: teacher John, class 1 (Sept. 2005-Dec 2005)

• What are the activities of John and Sylvia:
  - preparation by John and Sylvia (differences)
  - changes between semesters
  - changes during semester (one and two teachers)

• Other examples ...
What is a learning design?

- The *description* of the specific ordered learning & support activities that have to be performed (or are performed) by users to attain a specific learning goal.
- This design is inspired by the pedagogical model of the learning designer.

Assumptions:
- Every unit of learning has a learning design that can be described explicitly.
- Learning designs refer to resources (learning objects or services).
- Everyone who is creating or adapting a unit of learning is a 'learning designer' at that moment in time.
Difference with a unit of learning?

• Small difference...
• Every unit of learning contains a learning design and its connected resources
• A learning design refers to learning resources, but does not include the resources themselves!
By the way... What are 'activities'?

- **Learning Activity**: An activity performed by a user (or better: a role) to attain a certain learning objective.

- **Support Activity**: An activity performed by a user to help others to perform their learning activities.

- **Learning or Support Activity Description**: The task that is provided to a user to perform a learning or a support activity (the “instruction”).

- **Activity Structure**: A sequence of activities performed by a single user to attain a higher order learning objective.
Example learning/support activity descriptions

- Read the problem.
- Discuss the problem with your fellow students.
- When you have a question ask your teacher.
- Create different subgroups of students
- Discuss in your subgroup what the best solution is for your problem, create a paper of your preferred solution and have one of the group members present this to the wider group. (combined description)
- When a student asks a question about Topic X, first refer to the FAQ.
- Do the assessment.
Representing units of learning

- Basic problem: Create a standard notation for units of learning
- The notation must be machine readable and platform-independent
- Provide a complete description of the processes in a unit of learning to allow recreation at runtime
- Support the description (and not the prescription) of any pedagogical model (in fact: any teaching-learning process)
- Capture only the design, not the runtime (to support reuse)
- The specification should be agreed upon and owned by a learning technology 'standards' body like IMS
- => IMS LD
Useful comparison

- Music Notation (or HTML, XML)
Characteristics

- Abstract, no runtime aspects (only constraints)
- No included method how to compose music:
  - Traditional: compose -> arrange -> perform
  - Write down improvised music for later reuse
- In history: find balance between over-prescribed (classical) music and more open and pattern-based (modern) music
- Reusable for different settings, musicians, instruments, ... (performer independent)
- Focus on the activities to be performed by musicians
- In XML: many sub- and surrounding specifications
- ...
IMS Learning design

- Is a *notation*, not software! Need software to create, read, store, exchange and change the notation
- Can represent the *abstract units of learning*, e.g. the abstract structure & processes of Moodle, LAMS, Blackboard, WebCT courses. Not the runtime aspects (like forum content, data of individuals,...).
- Captures the processes in such a way that it can be *reproduced* using different technologies, different media. The pedagogical intentions are captured and not the specific way it should be implemented
- *Doesn't prescribe any methodology* for the creation or deployment of units of learning
- Can prescribe activities based on any pedagogical
IMS Learning Design <continued>

- Is a framework that *integrates* other existing and future specifications, like:
  - IMS Content Packaging
  - IMS QTI
  - Metadata standards (LOM, Dublin Core)
  - SCORM
  - IMS Simple Sequencing
  - IMS LIP
- LD *doesn't contain any resource format*: it connects to existing and future formats for objects & services
- Many resource formats are still missing (collaborative services, search, simulations, etc.)
General Objectives of Open eLearning Standards like IMS Learning Design

1. Support the *exchange* of eLearning Resources independent of the delivery system (includes: system interoperability, sharing, selling, ...)

2. Define the *minimum set of requirements* for any delivery system and for any resource for exchange.
How LD fits in the Standards Puzzle
OpenUniversiteitNederland
Digital Repository Interoperable UOL Package
Digital Repository

Interoperable UOL Package

Learning Objectives
Interoperable UOL Package

Content Aggregates

Learning Objectives

Reusable Def. Competencies or Educational Objectives

Learning Design

Portfolio

ePortfolio

LIP

Enterprise

AICC

CMI

Digital Repository

Content Package

Services

Tests

QTI

Forum, Chat

Search, etc.

Multi-role Activities

Multi-role Workflow

Adaptation

Learning Design

CP Organization

Simple Sequencing

RSS

LO Metadata

Ontologies

Taxonomies

LOM, Dublin Core

Metadata

identifiers

Learning Object

Learning Object

Digital Rep. Inter.
Some Common Misconceptions
Compare LD with an LMS

- LD is a *notation* for units of learning, not software to create/deploy runs of a unit of learning
- Like comparing the possibilities of the music notation with the music from Bach, Beethoven, Black-eyed Peas, ...
- So adequate questions to test LD with respect to LMSs are the following:
  - To what extend can LD represent ('notate') the abstractions of the courses that are created and played with the LMS?
  - To what extend is the LMS able to interpret the notation? Can it interpret and play any unit of learning that is imported in the system?
LD cannot handle the grouping of persons well enough

- Grouping of persons is a complex concept that is partly done in design-time and partly in runtime.
- Because of the constraint of LD that it only handles design-time aspects it doesn't specify how runtime grouping takes place (maybe a specific spec needed when the interoperability of grouping is a problem?)
- The design-time grouping is regulated by the 'role' concept. A role represents a set of 1 or more users, so there is no need for a specific 'group' element in the specification that can do things that 'role' cannot.
- Attribute 'create-new' on the role attribute specifies that users may create new roles in runtime.
- Interaction between design-time & runtime grouping
There is only a restricted set of tools and services specified in IMS LD

- That is true: IMS LD does not describe any content or any tool that is used in the learning design. It only provides mechanisms to link to external tools or to integrate the specifications of services and tools (when they exist). Some services setups are integrated to support compatibility with EML.

- This is because the description of content, tools and services are out of the scope of the learning design specification. Builds on / integrates current and future other specifications in this domain.

- But: there is still a heavy need for more specifications/standards (mainly for collaborative tools and other services).
LD units of learning cannot be changed on the fly

- Compares to: HTML can not be changed on the fly.
- Like the HTML specification, the LD specification does *not prescribe any method*, so this is a remark that can be made to some LD tools.
- Both main methods can be used in conjunction with LD: a) develop -> run and b) run and describe (at any time).
- But: most current LD tools suggest to use method a). Maybe because Editors and Players are not fully integrated yet. However, with CopperCore for instance you can change existing runs on the fly.
LD is especially suited for distance education, but less to residential education

- True and not true at the same time
- It is true that distance education has the problem of describing the process and content of pre-designed courses more than most residential education
- It is not true that LD cannot describe courses in residential education.
- Problem is at an other level:
  Question I: do teachers want
  a) to describe the teaching-learning process in a run independent way, and
  b) do they want to re-use (some of) it?
• Question II. Do learners want to study more independent of place, time and pace?
• In most distance education situations these questions are all answered with 'yes'.
• In residential education it depends...:
  Many teaching that can be done without describing the process because there is no need to repeat the process. However: there are also many situations in residential education in which teachers repeat the same course year after year with only small changes. This is rather inefficient.
• When residential education introduces e-learning, it has to introduce some distance teaching concepts.
Thank you!

- You can find this presentation and more LD resources, presentations and papers at:
  
  dspace.ou.nl

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