How does IMS Learning Design work?

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Agenda

- What’s the specification about?
- How to use it?
A word on Learning Objects

- Units of Content
  - An animation of how a fridge works
  - A map of the middle east
  - An article on the occurrence of foot diseases in members of the Dutch Government

- The idea:
  - pick-and-mix these units from repositories to create or adapt an e-learning course which is then presented to the learner
From Learning Objects to Learning Activities

- What about situations in which learning happens without learning objects?
- What about when several learners cooperate to solve a problem?
- Where are the teachers and staff?

- Need a way of describing the whole teaching-learning process, not just the learning objects involved
  - pedagogy, *the act or process of teaching*

- IMS Learning Design: Interoperability of e-learning content & processes
What IMS LD is not …

- Not an instructional method
  - … can be used to describe many methods
- Not pedagogically neutral in the sense of not caring about pedagogy
  - … rather it requires the designer to be explicit about his/her pedagogical choices in the learning process
- Not a guarantee of good education
  - … can use it to describe poor learning processes
- Not a programming language
  - … although many characteristics are shared
What is IMS LD then?

- A learning technology specification
- IMS Learning Design is used to model units of learning
  - A unit of learning (UoL) is any delimited piece of education or training, such as a course, a module, a lesson, etc.
  - more than just a collection of ordered resources to learn
  - activities, assessments, services and support facilities provided by teachers, trainers and other staff members.
- A **model** of the activities, content, tools and workflow for learners and staff to accomplish one or more learning objectives
  - Who does what, when, with whom and using which learning objects and services
What’s a model and what use is it?

- Learning processes are described (who does what, when, etc) using the concepts in the IMS LD language;
  - For example, we can create a model of problem based learning

- These models can be ‘played’ in an IMS-LD-aware player;
  - Analogous to marking-up learning materials in HTML and having a browser interpret them
IMS Learning Design meta-model

- Stage-play metaphor
  - People act in different roles
  - working towards certain objectives
  - by performing learning and/or support activities
  - within an environment, consisting of learning objects and services used in the performance of the activities.
Method

Act 1 → Act 2 → Act 3 → Act 4 → Act 5

Role
Role-part 1
Role-part 2
Role-part 4
Role-part 5

Activity
Activity-Description

Environment
Learning objects
Learning services

Components

with thanks to Bill Olivier of CETIS

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How does IMS LD work, then?

Designers create Units of Learning ...

Learners (and staff) use an LD-aware software application in (a part of) their learning process

Design time

Run time
Learning Activities, structured into sequences and selections

The environment associated with the selected activity

An activity description for the selected activity
A possible learning design process (1)

- Starting point is a narrative description of some educational process
  - “Students are presented with some information on Italian Wines. The tutor is available to take questions …”
  - “The lecturer posts a problem on the bulletin board. Each group of learners elects a spokesperson who summarises the problem and clarifies …. ”
  - “Think about your experiences as a school child, creating three statements which should be typed into a document and stored on the shared space. Once this is done ….”
A learning design process (2)

- Once examples of the meta-model concepts have been identified, a slightly more formal representation can be created (eg a table listing the sequence of activities, split by role)
- UML activity diagrams can be helpful
  - Used in the IMS LD Best Practice and Implementation Guide, but use is not mandated
UML Activity Diagram

- Evaluator
  - Read problem description
    - Provide assistance
  - Appoint chairperson
- Facilitator
  - Read problem description
    - Choose chairperson
- Chairperson
- Student
  - Make problem description available
  - Clarify problem
- Coordinator
  - State problem
A learning design process (3)

- What’s next?
  - Say it with XML
- IMS LD has, in common with all IMS specs, a so-called XML binding
- If you represent your UoL in the data format indicated by the binding, a conforming application will be able to do the right thing
A learning design process (4)

- In theory, this is all in the underworld of IT plumbing, from which we are shielded by applications
- In practice, today, we are not yet there in terms of tool support and sometimes have to deal with XML

```xml
<roles>
  <learner identifier="Learner">
    <title>Learner</title>
    <information>
      <title>The Learner role</title>
      <item identifierref="R-information-for-learner"/>
    </information>
  </learner>
</roles>
```
What’s the learning design process produce?

- An IMS Content Package
  - Used for exchange of content
- IMS Learning Design is integrated with an IMS Content Package as another kind of organization within the `<organizations>` element.
- An IMS content package is called a 'Unit of Learning' if and only if it includes a valid IMS learning-design element in the organizations part of the package's manifest.
How does IMS LD work?

Designers create Units of Learning containing IMS MD, XHTML content, IMS QTI, ....

Learners (and staff) use an LD-aware software application in (a part of) their learning process

An IMS Content Package
IMS LD: The Levels

- Level A: Core concepts:
  - Roles, activities, environments, method
- Level B: Adds
  - Properties and Conditions
- Level C: Adds
  - Notifications

- The levels help when teaching about IMS LD & help tool developers in delivering incrementally, but should not get in the way;
Level A core concepts

- **Components**
  - Roles
    - E.g. Learner, Tutor, Mentor, Facilitator, ….
  - Learning/Support activities
    - What has to be performed
  - Activity structure
    - Sometimes activities need to be carried out in a *specified order* or the learner may choose what to do.
- **Environment**
  - Materials might be needed to perform an activity
  - The learner might need to communicate with others

- **Method**
  - Play, Act, Role-Part
Activities and Activity Structures

- An activity has an activity-description
  - a resource which has content indicating what should be done - “do this to learn that”

- Activities can be structured …
- Do these activities in order
  - SEQUENCE
- Chose one of these alternatives
  - SELECTION number-to-select=1
- Do all (eg 4) of these activities but in any order
  - SELECTION
Activity Structures: Sequences vs selections

### Activity Structure: Sequence
- Learning Activity 1
- Learning Activity 2
- Learning Activity 3
- Learning Activity 4
- Learning Activity 5
- Learning Activity 6
- Learning Activity 7

### Activity Structure: Selection
- Learning Activity 1
- Learning Activity 2
- Activity Structure: selection
  - number-to-select = 1
    - Learning Activity 3
    - Learning Activity 4
    - Learning Activity 5
- Activity Structure: selection
  - number-to-select = 2
    - Learning Activity 3
    - Learning Activity 4
    - Learning Activity 5
Environments

- Resources needed when performing activities
  - Learning Objects
    - Web pages
    - MS-Word document
    - Pictures
    - Videos
    - etc

- (Learning) Services
  - send-mail, conference, and index search
Completion

- Need to indicate under which conditions the flow “moves on”
- When/How does a Unit of Learning, a play, an act, an activity, finish?
  - Can be a time-limit or user-choice
- Can also add an on-completion element to give some feedback
  - Reference to a resource (eg XHTML file) in resources section
  - Could in turn reference sound, video, …
Levels B and C in a nutshell

- You can do quite a lot with level A, but certainly not everything you’d like to do
- However, adding just a few more elements opens many new doors
  - Allowing the learning flow to be influenced not just by user-choice or time-limit but by other factors
  - Allowing more sophisticated approaches to sequencing than provided by selection and sequence
Level B – properties & conditions

- Completion of activities, acts, etc can **depend** on properties
  - Only let this activity complete when these properties hold
- Completion of activities, acts, etc can **influence** properties
  - When this activity completes, set this property
- Conditions: if a certain situation holds, then show or hide something or change a property
  - which may in turn trigger another condition to fire and show or hide or change etc
Level C – notifications

- Notifications inform a role that something has happened
  - Via email
  - By setting a new activity
- Can trigger in the completion process
- Can trigger in conditions
Colin, that’s rather a lot of information

- True, but there’s help available

- www.unfold-project.net

- **Aim:** to accelerate the adoption, implementation, use and further development of open standards such as IMS LD

- **How:** Via Communities of Practice
OK, but where are the tools?

- You will need:
  - A way of creating Units of Learning
  - A way of coupling an abstract Unit of Learning to specific learners (instantiating it in a “run”)
  - A way of playing the run so that learners/staff can experience the Unit of Learning

- End of 2004/start of 2005 will see authoring+player software being made available, together with examples
Architectural context

- **Authoring**
- **Repository**
- **Run tool**
- **Learner & Staff Administration**
- **Portal**
- **Learning services**

Design time: Unit of Learning
Run time: Unit of Learning
Run: Learner & staff details
Summary: How does IMS LD work?

- The specification provides a language in which to describe learning processes;
- Software which is written to this specification can play such a description and support learners and staff in the learning process

Designers create Units of Learning …

Learners (and staff) use an LD-aware software application in (a part of) their learning process