IMS Learning Design
An Open Technical Specification for Today’s and Tomorrow’s eLearning

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Open University NL (OUNL)

• First student in September 1984
• Government-funded institute for distance learning at university level.
• Goal: to make higher education accessible to anyone with the necessary aptitudes and interests, regardless of formal qualifications.
OUNL

- Six faculties
  - Cultuurwetenschappen, Informatica, Managementwetenschappen, Natuurwetenschappen, Psychologie, Rechtswetenschappen
- Diploma programmes vs. courses
  - 6 bachelor, 13 master programmes
  - 270 courses
- Staff-student contact possible …
  - Telephone, email
  - 12 study centres in Nederland
  - 6 in Belgium
- … but typically self-study
OUNL students (2005)

• 18,474 students
• Men:Women 49%:51%
  – 25 or younger: 8%
  – 26 to 35: 35%
  – 36 to 45: 33%
  – 46 or older: 24%
• 44% has a full time job (35-40 hrs).
E-learning @ OUNL

- Early, wide use of e-learning
  - web sites supporting courses, email, forums
  - Heterogeneous e-learning systems landscape

- Interest in ICT support for different educational theories
  - Competence based learning, problem based learning

- Could standards help in attaining better e-learning?
Open technical specifications

• IMS develops and promotes the adoption of open technical specifications for interoperable learning technology

• OUNL is contributing member (voting rights)
  – Also Apple, Blackboard, Microsoft, WebCT, Cisco, Sun, Texas Instruments, … +/- 60 members
My first steps in the e-learning world

• Downloaded Microsoft’s LRN 3.0 Toolkit
  – IMS Content Packaging
  – IMS Meta-data

• Downloaded all example content packages

• Things were looking good ….
Chapter 1

Understanding Markup Languages

It's a good guess that you're reading this book because you want to learn how to use XML (Extensible Markup Language). If you are like me, you want to pick up a computer book and start writing code by at least the second or third page. You've probably heard all the hype about how XML will change the Web and bridge gaps among the world's various types of digital information. You're convinced that XML is something you need to learn, and you might be anxious to jump right in and start coding. If you are that type of person, you won't have to wait too long. We'll get into some XML code before the end of the second chapter. But to really understand XML—and after all, that is the goal—you could probably benefit from some background information. These first few chapters provide a framework for the rest of the book—in addition to getting us into a little code. After reading these chapters, you should have a better understanding of and appreciation for XML. Establishing a framework is especially important with XML for a couple of reasons:

- You might not be familiar with some concepts utilized by markup languages. The information in these chapters will help get you up to speed on the basics of these languages and how they work.

- You might have experience using HTML (Hypertext Markup Language) or SGML (Standard Generalized Markup Language). You should understand how XML differs from these two languages and what makes it such a powerful alternative (or complement, depending on how you use it).

In many ways, XML represents a fundamental shift in the way information is delivered on the Web. While XML might not be as "flashy" as some of the other new Web technologies, it has the potential to have as much impact on Web delivery as HTML did several years ago. In this chapter, you'll begin to see why an extensible language like XML is necessary. We'll look at a brief background of text markup and how it works. We'll also examine differences between some of the more common markup languages.
Updating Support Skills from NT 4.0 to Windows 2000

Windows 2000 Advanced Server includes all of the same features as Windows 2000 Server, plus additional features that provide a highly scalable, interoperable, available, and manageable operating system.

In addition to providing the features in Windows 2000 Server, Windows 2000 Advanced Server includes:

**Enterprise Memory Architecture**
Allows applications that perform transaction processing or decision support on large data sets to keep more data in memory, for greatly improved performance. Windows 2000 Advanced Server supports physical memories of up to 32 GB on Alpha-based computers, and up to 8 GB on Intel-based computers.

**SMP Scalability**
Supports up to eight processors.

**Windows Clustering**
Allows you to connect multiple servers to form a cluster of servers that work together as a single system. Windows Clustering provides the following benefits:

- **High Availability.** Provides high availability for mission-critical applications, including the ability to automatically detect the failure of an application and quickly restart it on a different server. In addition, when one server in the cluster fails, another server in the cluster can be used to restore service to users.

- **Network Load Balancing.** Provides high availability and scalability for network-based services, such as TCP/IP and Web services.
Smartforce LRN Sample - Basic Concepts of Exchange 2000 Server

Indexing

**Learning Objective**

- describe how indexing works.

**Launch**

To play this learning object, click the **Launch Object** button.
Fire Safety Demo

- Introduction
- Types of fire extinguishers
  - Water
  - CO2
  - Dry Chemical
- Using a Fire Extinguisher
  - Common features
  - PASS procedure
- Selecting the Correct Fire Extinguisher
  - Selection matrix
  - Selection exercise
- Fight or Flight Decision
- Fire Safety Inspection
- Compliancy Test
- Credits

Recommended Extinguisher

Class A
- Fire extinguisher for class A fires

Class B
- Fire extinguisher for class B fires

Class C
- Fire extinguisher for class C fires
Things were looking good, but …

- Some engaging content, but each example seemed to be a slight variation of the previous;
- Learning felt like (only) consuming content;
- Support often looked like page-turning;
- Is this the style of e-learning that e-learning specifications are about?
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?
Learning situations

• 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*
Educational Modelling

• Can we *describe* 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 (e.g. a course, workshop, event, ...)
• EML => IMS Learning Design (IMSLD)
EML and IMS Learning Design

Two versions of EML: 1.0 & 1.1

EML

Assessments, interactions, content, ...

IMS Learning Design
What IMS LD is not ....

• Not a programming language
  – … although some characteristics are shared

• 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
IMS LD in 4 sheets (1)

• An open technical specification

• Used to model units of learning (UoL)
  – 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

• A model of the activities, content, tools and workflow for learners and staff to accomplish one or more learning objectives
IMS LD in 4 sheets (2)

- 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.
… then orchestrate their interplay

Set up these constructs ….

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Role

Activity

Activity-Description

Environment

Learning objects

Learning services

with thanks to Bill Olivier of JISC
IMS LD in 4 sheets (4)

- IMSLD is a language to describe learning processes
- Software can be written to interpret the language and support students & staff

Designers create Units of Learning (IMS LD, XHTML content, IMS QTI, ….)

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

Design time → Run time
Advanced Modelling

• Sequences & selections of activities
• Completion – user, time, events, …
• Conditions – in these circumstances, do this
• Properties – set/show: numbers, strings, files, URLs, …
• Services: chat, forum, mail, monitor, …
Who does what, when?

Evaluator

- Read problem Description
- Provide assistance

Facilitator

- Read problem Description
- Choose chairperson

Chairperson

- Appoint chairperson

Student

- State Problem
- Clarify Problem

Coordinator

- Make problem description available
Here you see Dizzy Gillespie playing with his Dizzy Gillespie Quintet: "Salt Peanuts". This is a typical example of Bebop, in which melodic improvisation plays the main role in the Jazz.

Listen to the next music fragment.

music clip
First steps in reflecting on greatness

Enter your initial thoughts

Please enter your initial thoughts on greatness. Subsequently, your thoughts will be made available to the whole group, and you will be able to see the thoughts of others. You can find supportive material in the environment.
OK, you said you wanted a notation
Beyond the notation

• Initial awareness raised
  – Needed to help community understand the nature of the spec.
  – Needed to get some basic infrastructure in place

• Now need to build on these first steps …
Road Map for Learning Design

• Specification (febr. 2003)
• Awareness raising (febr. 2004)
• First generation tools (febr. 2005)
• Demonstrators & usability improvement of tools, application profiles and conformance testing (during 2005)
• Development of community of users (2005/2006)
• Pilots, experiments, production use (2006/2007)
What’s happening today?

- EU projects
  - UNFOLD (2003-2005)
  - TENCompetence (2005-2009)
  - ProLearn (2003-2007)
  - Cooper (2005-2007)
  - plus others

- Communities in Spain, UK, Netherlands, Germany, Canada, Australia, France, …

- Emerging support from Open Source VLEs
  - Moodle
  - dotLRN
  - ATutor

- Open source editors, engines, players
Some experience

• Used with students/staff
  – Liverpool Hope University (UK)
  – University of Lausanne (CH)

• “Seems promising but it’s a hell of a job”
Where would we like to be?

- Need better tooling to orchestrate high-quality e-learning arrangements
  - teacher/tutor, human resources manager, enthusiast, hobbyist, …
  - Want to be helped to knit together appropriate/proven combinations of services, content, group work, …. for my situation
  - Want to press a button and have it be delivered & look good
Challenges …

• It’s too hard to make UoLs with the current tools
• Lack of a library of complete, well-founded, field tested, cool & sexy examples
• We can’t yet easily, generically, plug and play new runtime services (blogs, wikis, Google Earth)
• Need to complete the underlying IT infrastructure (e-portfolio, learner information, assessment, )
  • SOA, web services, ..
### UK’s JISC E-learning framework

#### Sample User Agents
- Assignment marking tool
- Authoring applications
- Library System
- Portal
- Student Enrolment Portlet
- Timetabling
- VLE / LMS

#### Learning Domain Services
- Activity Author
- Activity Management
- Assessment
- Competency
- Course Management
- Course Validation
- Curriculum
- Grading
- Learning Flow
- Marking
- Personal Development
- Quality Assurance
- Reporting
- Resource List
- Sequencing
- Tracking
- ePortfolio

#### Common Services
- AV conferencing
- Alert
- Archiving
- Authentication
- Authorisation
- Calendaring
- Chat
- Content Management
- Context
- DRM
- E-mail management
- Federated Search
- Filing
- Format Conversion
- Forum
- Group
- Harvesting
- Identifier
- Logging
- Mapping
- Member
- Messaging
- Metadata Management
- Metadata Schema Registry
- Packaging
- Person
- Presence
- Rating / Annotation
- Resolver
- Role
- Rules
- Scheduling
- Search
- Service Registry
- Terminology
- User Preferences
- Whiteboard
- Workflow
And what about e-learning 2.0?

- Isn’t IMSLD tied to a centralised, specialised course design tradition, e-learning 1.0?
Future somewhere in the middle …

• Orchestrated combinations of roles, resources and learning services not passé ...  
  – Still desirable in many situations

• Do, though, want design by many, rather than a few  
  – Designers-by-assignment, Recreational designers, learners as designers

• And even in non-designed situations, a language for describing and communicating the choices people have made is useful …
Emerging ‘designs’

• If we can’t, or don’t want to, specify the order in which people learn, let designs ‘emerge’ then be described & exchanged with IMSLD …
What do you get with IMS LD?

• **Basis for the next generation of e-learning systems**: increasing the ‘richness’ of different learning activities

• Should bring **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.
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Thank you