

IMS Learning Design and eLearning

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Abstract

This article explains what the IMS Learning Design specification is all about. It starts off with a review of the shortcomings in the present instructional design approaches in online content development. One shortcoming is that it is very content driven. Learning cannot proceed without any content. As such, many online courses end up with the learners having to read many documents online. In contrast, the IMS Learning Design specification focuses more on the activities that go on in any online course. The details of the IMS Learning Design specification are then described, using the theatrical play model. Examples from software like the RELOAD software, the CopperCore system and the LAMS system are shown. The conclusion is that an understanding of the basic eLearning standards like metadata and content packaging is becoming essential in eLearning environments that are becoming multi-learner and centred on learning activities.

1 Introduction

So far, the eLearning standards world has centred on the content area and the single learner. We have international specifications on metadata, content packaging, assessment and performance, eBooks, integration with the backend systems, learner profile and many more. However, researchers are now turning their attention to the learning activities and the design of learning

environments. This article looks at the new IMS Learning Design Specification [1] which was released to the world on 13 February 2003.

1.1 Background

The IMS Learning Design is a specification used to describe learning scenarios. It allows these scenarios to be presented to learners online, and enables these scenarios to be shared between systems.

Because in the IMS Learning Design the structure of the learning scenario is separated from the learning materials and services, materials can be reused within different scenarios. The scenarios can also be reused and new materials added.

Let us review some difficulties in the current eLearning systems and content development processes.

1.2 The Difficulties

The current eLearning standards/specifications assume the following:

- i. The learner is a single person and is usually very isolated from other learners.
- ii. The primary focus is on content delivery.
- iii. Interactivity is provided by self-test questions and simple reinforcement exercises.
- iv. The course length can last from 30 minutes to a few hours.
- v. Most eLearning courses are based on the following pedagogical approaches:

- a) Transmission model of education,
 - b) Computer as authority by proxy, and
 - c) Learning in terms of short, bite-sized “chunks”, widely known as “learning objects”.
- vi. The focus is mainly on the technical details, not learner experience.

1.3 The Concerns

Because of the above difficulties, eLearning becomes more of page-turning exercises and the single-user learner becomes less motivated because of the impersonal and isolating environments.

1.4 The Solution

This is where the IMS Learning Design (IMS LD) Specification comes in to fill the gap.

The IMS LD provides a counter to designing content and learning for lone-learners reading passively from the computer screens. In addition, the IMS LD guides staff and educational developers to start with learning activities and the achievement of learning objectives, and NOT with content only.

According to the IMS LD designers, learning can happen without learning objects. Learning comes from being active in the various learning activities. Learning also happens when learners cooperate to solve problems in social and work situations. Learning is different from content consumption.

1.5 Pedagogical Models and Standards in IMS LD

The IMS LD developers make the following assumptions:

- Single or multi-learner environments and with flexible groupings
- Primary focus is on the sequencing of learning activities (not on the content)

- Interactivity is provided by discussion groups, chat rooms, etc (as well as by self-tests & simulations)
- Content delivery is included as one type of learning activity and
- Ability to describe long-term learning

In terms of the pedagogical theories, the IMS LD Specification:

- Supports different models such as constructivist, transmission, behaviourist, cognitivist
- Computer as gateway to other learners and resources, not as the “instructor” or the “proxy”
- Learning is still broken down into “chunks”, but it can be part of a broader whole

2 IMS Learning Design Specification

The IMS Learning Design Specification defines Learning Design as “a description of a method enabling learners to attain certain learning objectives by performing certain learning activities in a certain order in the context of a certain learning environment”.

2.1 IMS Learning Design and the EML

The IMS Learning Design Specification adopted but modified the Educational Modeling Language (EML) which was developed by the OUNL (Open Universiteit Nederland) in the late 1990’s. The IMS Learning Design v1.0 Final Specification was approved on 10th Feb 2003 and released on 13th Feb 2003.

2.2 The IMS Learning Design Specification

The objective of the Learning Design Specification is to provide a containment framework of elements that can describe any design of a teaching-learning process in a formal way.

In this specification, there are three important steps in building the conceptual models for educational content:

(i) classifying the elements, (ii) aggregating the elements and (iii) designing & running a teaching-learning process.

A teaching-learning process can only take place when there are meaningful learning activities performed by the learner, and this implies that we need learning objectives.

2.3 IMS Learning Design Core Concepts

The IMS LD Specification has the following core concepts:

- Persons in different roles
- Structured learning activities
- Learning objects and services in an environment
- Learning objectives

In addition, learning is categorized into three levels: Level A, B and C.

In terms of objectives, the IMS LD Specification aims to:

- integrate the activities of both the learners & teachers
- integrate the resources & services used during learning
- support a wide variety of approaches to learning
- support both single & multiple user models of learning
- support mixed mode (i.e. blended learning) as well as pure online learning and to
- capture processes rather than content.

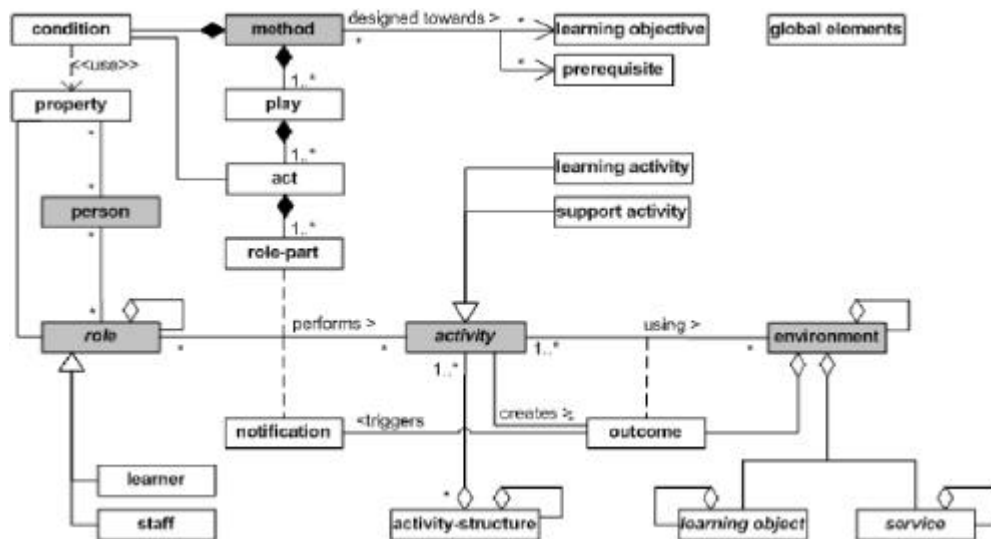


Figure 1 – Conceptual Structure of the IMS LD Specification

As can be seen from Figure 1, the activity is at the central core of any learning activity.

The conceptual structure can be described using a theatrical play such as the following:

1. A play has acts, and each act has one or more roles or parts.
2. Acts follow each other in a sequence.
3. The roles within an act associate each role with an activity.

4. The activity describes what that role is to do and what environment is available within the act.
5. Thus a method consists of one or more concurrent play(s); a play consists of one or more sequential act(s); an act consists of one or more concurrent role-part(s), and each role-part associates exactly one role with one activity or activity-structure.

6. The roles specified are those of learner and staff.
7. Each of these can be specialized into sub-roles.
8. Activities can be assembled into activity structures. An activity-structure can model a sequence or a selection of activities.
9. In a sequence, a role has to complete the different activities in the structure in the order provided.
10. In a selection, a role may select a given number of activities from the set provided in the activity structure.
11. Environments contain the resources and references to resources needed to carry out an activity or a set of activities. An environment contains three basic entities: learning objects, learning services and sub environments.
12. A method may contain conditions. For example: "If the person has an exploratory learning style, then provide an unordered set of all activities", or "If the person has prior knowledge on topic X, then learning activity Y can be skipped".

2.6 Levels A, B, and C in IMS Learning Design Specification

Learning Design includes the following elements for:

Level A:

- comprising a series of activities (e.g. assessment, discussion, simulation),
- performed by one or more players (learners, teachers etc.) - roles,
- exists in an environment consisting of learning objects or services.

Level B adds

- properties (storing information about a person or group), and
- conditions (placing constraints upon flow).

Level C adds

- notifications (triggered events - e.g. if a student asks a question, the teacher

needs to be notified that a response is needed).

In terms of coding, the IMS Learning Design's Unit Of Learning (UOL) is embedded in an IMS content package (CP) and is placed inside an <organizations> element.

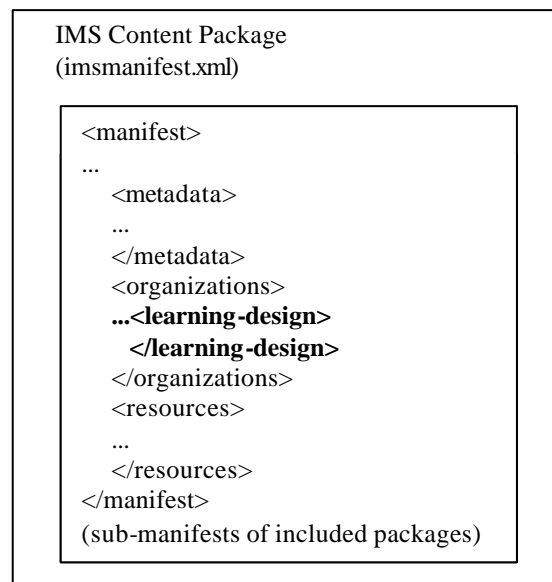


Figure 2 - Learning design component

The main parts in the Learning Design are illustrated in the diagram below:

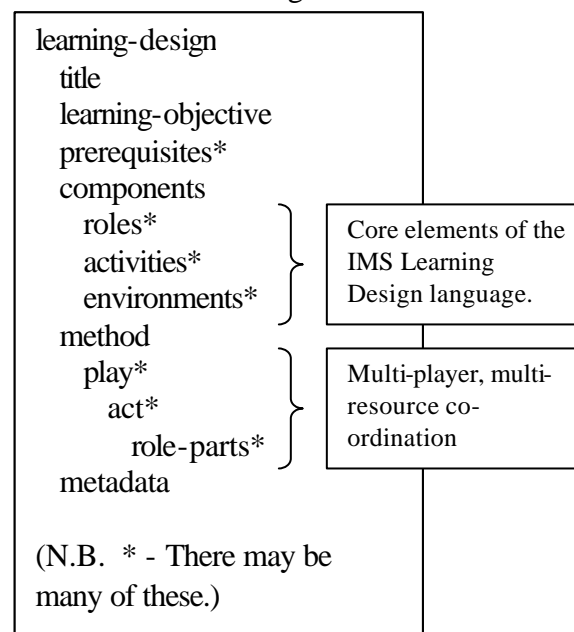


Figure 3 - Learning design structure in imsmanifest.xml file

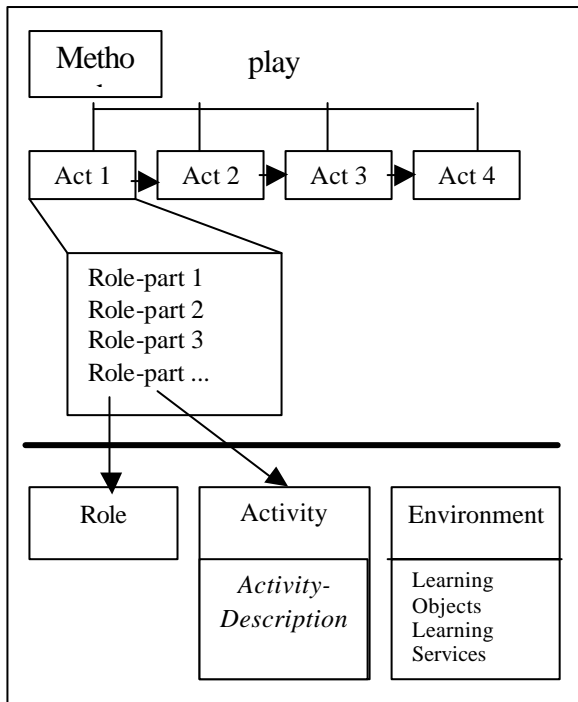


Figure 4 - The Dynamics in Learning Design

3 Implementations of the IMS Learning Design

The IMS Learning Design Specification is a complex and semantically rich specification. Fortunately, software tools are being developed and released for learning technologists to test them. The following are just 3 examples.

3.1 RELOAD Learning Design Player

The RELOAD [4] Learning Design Player is based on and uses the CopperCore Design Engine [5]. Its interface allows for easy import/removal of Learning Designs into the CopperCore Engine. It also automatically reads a Learning Design and populates the CopperCore engine with a default run and active user for every role found within the manifest.

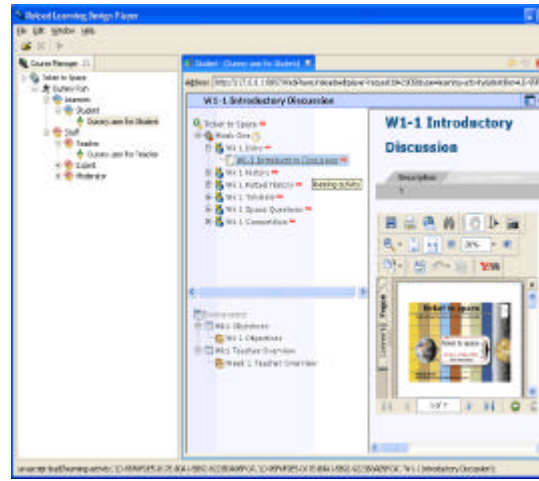


Figure 5 – Learning Design Player in action (Source: www.reload.ac.uk)

3.2 CopperCore player

The Open Universiteit Nederland released the version 2.2 of CopperCore. CopperCore is claimed to be the world’s first open source IMS Learning Design Engine that supports all three levels of IMS Learning Design (i.e. A, B and C).

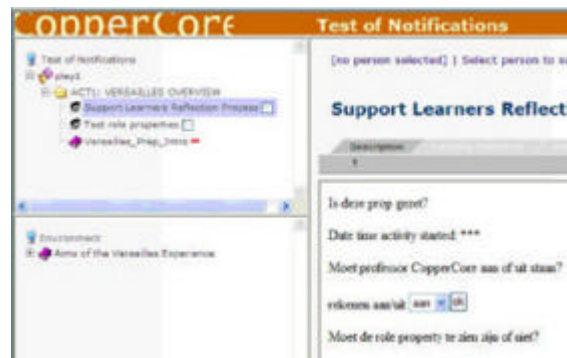


Figure 6 – Screenshot of the CopperCore player with 3 panes (Source: coppercore.org)

3.3 Learning Activity Management System (LAMS)

LAMS [6] stands for Learning Activity Management System. Since 13 April 2005, LAMS is an officially open source software under the GPL License.

LAMS provides teachers with an intuitive visual authoring environment for creating sequences of learning activities.

These activities can include a range of individual tasks, small group work and whole class activities based on both content and collaboration. Although not IMS LD compliant yet, the company that is developing LAMS has stated that they will make LAMS compliant to the IMS LD, at least up to Level A initially.

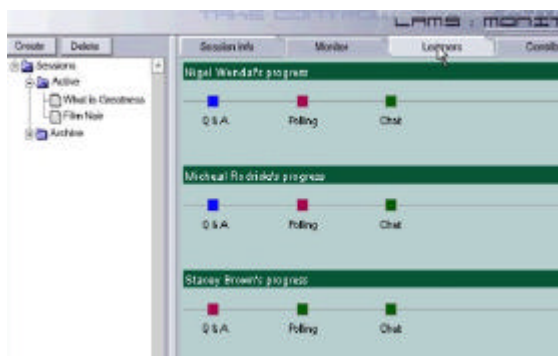


Figure 7 - Teachers can monitor the progress of the students' learning activities
(Source: www.lamsinternational.com)

4 Summary

With the release of the IMS Learning Design Specification and software tools, we are beginning to see some developments in the Learning Design area. This Specification is relevant to the ordinary teachers in the following ways:

- i) By using the IMS Learning Design Specification, we can describe a Unit of Learning (UOL) using the XML document. This makes it easy to capture best practices in teaching.
- ii) With such XML documents, teachers will be able to exchange, browse and search for learning materials that match their own pedagogic approach, target learners, assessment strategies, etc.
- iii) Learning Design does not impose a particular pedagogical perspective on its users. Because of this it has been specified not as a limited number of pedagogical templates, but as a language which can be used to

describe any learning methodology, ranging from, for example, discussion groups with no content materials, to structured read and test approaches with no personal contact.

- iv) Learning Design supports the definition of learning activities and services for both the single user and groups of people as well.
- v) Learning Design can be seen as a planning methodology which will allow learning activities to be defined in greater detail and shared between teachers and learners.
- vi) A Learning Design's Unit of Study clearly states all the information required for setting up a learning activity.

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