

*What Is...*

# IMS Learning Design?

by Ann Jeffery and Sarah Currier

## *In Brief*

### What is IMS Learning Design?

IMS Learning Design is a specification used to describe learning scenarios. It allows these scenarios to be presented to learners online, and enables them to be shared between systems. It can describe a wide variety of pedagogical models, or approaches to learning, including group work and collaborative learning. It does not define individual pedagogical models; instead it provides a high level language, or meta-model, that can describe many different models. The language describes how people perform activities using resources (including materials and services), and how these three things are coordinated into a learning flow.

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

IMS Learning Design relies on a number of elements. These include: **roles** that people perform (who does what); **activities** (what they do); and **environments**, which include where they do them (**services**) and what they do them with (**learning objects**). The overall scenario or design is described within the **method** element, which contains **play**, **act**, and **role-parts** elements, and is analogous to a theatrical play. A learning design may be based around the achievement of specified **learning objectives** by learners; it may also define **prerequisites**. As well as allowing an entire design to be shared or reused, IMS Learning Design allows these elements to be reused in other learning designs.

IMS Learning Design is based on the Educational Modelling Language (EML) developed at the Open University of the Netherlands (OUNL). The OUNL no longer updates or maintains EML; instead it contributes

to the ongoing development of IMS Learning Design. See the People, Products and Services section below for more information.

### What is IMS Learning Design for?

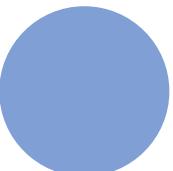
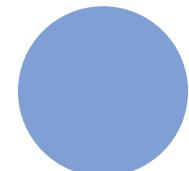
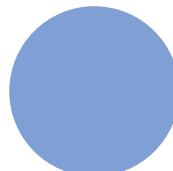
The main things that IMS Learning Design allows you to do are:

Describe and implement learning activities based on different pedagogies, including group work and collaborative learning.

- Coordinate multiple learners and multiple roles within a multi-learner model, or, alternatively, support single learner activities.
- Coordinate the use of learning content with collaborative services.
- Support multiple delivery models, including mixed-mode learning.

IMS Learning Design also enables:

- Transfer of learning designs between systems.
- Reuse of learning designs and materials.
- Reuse of parts of a learning design, e.g. individual activities or roles.
- Internationalisation, accessibility, tracking, reporting, and performance analysis, through the use of properties for people, roles and learning designs (see Levels of Implementation on Page 2).



# Technical Details

## How IMS Learning Design works

Learning Design specifies a language for describing learning activities, and gives a binding for this language to XML (Extensible Markup Language). An IMS Learning Design player is a software tool that interprets the XML notation of a learning design as participants work through it: at run time. This interpretation is analogous to a browser interpreting web pages. The player may be a stand-alone tool, or it may be part of a virtual learning environment (VLE).

IMS Learning Design describes how a learning design unfolds through the analogy of a theatrical play. Just as a play can be staged with different actors, in a different theatre with alternative props, so learning designs can be run again with different learners and tutors, on different systems, with alternative learning resources or tools.

- The play is presented in a series of acts, in which roles are played by those taking part, for example learner, tutor, mentor, and so on.
- People playing the roles undertake a series of activities within an act. For a learner these might

include discussing with classmates the relative merit of a piece of source material. A tutor's activity may be to comment on their conclusions.

- Each role is presented with its own learning objects and services (e.g. communication tools) within an activity.
- An act is completed after all the activities of a specified role, or roles, are finished. Alternatively, a time limit may be set, after which an act completes.
- When one act completes, the next act is started. The play finishes when all the acts are completed; the learning design finishes when all the plays are completed.

Designing a scenario begins with the method element, which describes the play with acts and role-parts. The method element references the other elements in the learning design, which are located separately so that they can be reused and updated easily. For instance, within an act, each role-part element links a role to an activity. This is analogous to the script used by an actor during a play. The end of an act provides a point for synchronising roles during the play, so that all participants start on a new set of activities at the

## Levels of implementation

There are three implementation levels within IMS Learning Design:

**Level A** contains the core of IMS Learning Design: people, activities and resources, and their coordination through the method, play, act and role-parts elements. This simply provides for a series of time ordered learning activities to be performed by learners and teachers, using learning objects and/or services.

**Level B** adds greater control and complexity through the use of properties and conditions. Properties may be internal (local) or external (global). They are used to store information about a person, such as test results or learner preferences; a role, such as whether the role is for a full-time or part-time learner; or a learning design itself. Internal properties persist only during a single run of a learning design, while external properties retain their values beyond the end of a run, and can be accessed from different runs and/or different learning designs. Currently the reuse of external properties is confined to the learning design author or to agreed usage within a community or institution. However, it is intended that external properties will include the use of those that are defined externally and widely agreed upon, such as the accessibility fields defined in the IMS Learner Information Package specification. Conditions allow the learning flow to be constrained according to specific circumstances, preferences or learner characteristics. For instance, a particular learner may be presented with resources in random order, if their learning style or preference requires this.

**Level C** offers the opportunity for more sophisticated learning designs through notifications (messaging), which allow for notification of new activities to be triggered automatically in response to events in the learning process. It enables the automation of learning flow activities, which are triggered by the completion of tasks, rather than the learning flows being pre-planned. For instance, a teacher may be notified by email that an assignment has been submitted and needs marking; once the score has been posted, the learner may be notified to undertake a new activity according to the result.

same time. If this is not needed then the play can have just one act.

Activities are organised into activity structures, which can be assembled as either a sequence or a selection. Selection means that activities can be carried out in any order. Sequence means that activities are presented in a set order, with the next one being made available only after the previous one is completed. Activities reference an environment that contains the services and learning objects required for that activity. An activity can have its own learning objectives and/or prerequisites.

A role may have multiple players assigned to it, e.g. there may be many learners. Learning objects and activities are assigned to each role separately each time the learning design is run; they can also be shared between roles. Roles run simultaneously, and may do different things at the same time; there may also be interaction between them.

Services offer generic functions such as email, conferencing, searching and announcements. The locations of services are not specified during design, but are made available at run time, after people have been assigned to their roles. Both services and learning objects are referenced by activities. Again, this means that these elements are located separately so that they can be reused and updated easily.

## Related specifications

IMS Learning Design may make use of, include, or be extended by a number of existing specifications.

- IMS Content Packaging - A learning design may be integrated into the structure of an IMS Content Package.
- IMS Learning Resource Meta-data / IEEE Learning Object Metadata - IMS Learning Design includes placeholders for metadata in a number of its structures. IMS and IEEE metadata may be used in these places.
- IMS Question and Test Interoperability (QTI) items and tests can be integrated with IMS Learning Design. IMS is currently producing a best practice guide for this.
- IMS Reusable Definition of Competency or Educational Objective (RDCEO) – Relevant elements in IMS Learning Design, such as learning

objectives, can reference resources defined by this specification.

- IMS Learning Information Package (LIP) can be mapped to Learning Design properties.
- IMS Simple Sequencing is another IMS specification that deals with the sequencing of learning activities. It is used to describe navigation paths through a collection of learning materials, and only supports single user, self-paced learning scenarios. A Simple Sequencing activity sequence could be integrated into a learning design.
- ADL SCORM – IMS Learning Design is not included in the SCORM. However, it is possible to include SCORM content within an IMS Learning Design, although the delivery system must be able to deliver SCORM content.

For more detailed information on IMS Learning Design's relationship to these specifications, visit the IMS website, the CETIS EC-SIG, the OUNL Learning Networks site or the UNFOLD project website, all of which are referenced below.

## Implementations

There is currently one full implementation of the IMS Learning Design specification, and tool development is progressing rapidly in this area with a number of tools already supporting mainly level A and B of the specification.

Developed by the OUNL, CopperCore is the first open source IMS Learning Design Engine that supports all three levels of IMS Learning Design (A, B and C). More information is available at: <http://coppercore.org/>

LAMS (Learning Activity Management System) is an authoring tool inspired by IMS Learning Design. LAMS is now available as open source software. Ongoing development includes making LAMS IMS LD compliant. More information is available from the LAMS website. Go to: <http://www.lamsinternational.com/>

RELOAD (Reusable e-Learning Object Authoring and Delivery) is a JISC-funded project that developed an editing tool that supports many IMS Content Packaging based specifications, including IMS Learning Design. The RELOAD Editor is open-source, free and downloadable from the project website. Go to: <http://www.reload.ac.uk/>

# Resources

## People, products and services

The CETIS Educational Content Special Interest Group (EC-SIG) offers information, support and advice to people working with IMS Learning Design.

Go to: <http://www.cetis.ac.uk/educational-content/>

The CETIS Pedagogy Forum also has IMS Learning Design related material:

<http://www.cetis.ac.uk/pedagogy/>

The Open University of the Netherlands (OUNL) developed EML, the language that IMS Learning Design is based on. They now take an active role in the ongoing development of IMS Learning Design and related specifications and standards. They host an active user community resource called Learning Networks, which offers opportunities for questions and discussion on IMS Learning Design related issues, as well as useful support materials, such as their IMS Learning Design FAQs page. The OUNL also developed an EML player called EduBox. More information on this tool can be found on the Learning Networks site. Go to:

<http://learningnetworks.org/>

There is also an independent international IMS Learning Design developers' community called the Valkenburg Group. Originally formed as an EML developers' community, they meet regularly. They have an online forum on the Learning Networks site. Go to:

<http://www.valkenburggroup.org/>

The IMS Learning Design specification is published on the IMS Global Learning Consortium website. The current version, Version 1.0 Final Specification, was released on 13 February 2003. Visit:

<http://www.imsglobal.org/learningdesign/>

## About this guide

This guide was produced by the CETIS Educational Content Special Interest Group and edited by Sarah Currier and Scott Wilson, with Bill Olivier, Pierre Gorissen and Colin Tattersall.

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## About CETIS

CETIS is the JISC's Centre For Educational Technology Interoperability Standards. For more information visit the CETIS website at <http://www.cetis.ac.uk/>

