

Mapping IMS Learning Design and Moodle. A first understanding

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Mapping IMS Learning Design and Moodle. A first understanding

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Abstract. The specification IMS Learning Design (IMS LD) and Moodle look for a common understanding focused on the integration of both e-learning approaches. The final goal is that Moodle will be able to play an IMS LD package and any IMS LD tool will be able to import a Moodle course and use it as a base, or even to import a Unit of Learning made in IMS LD to be used and played in the Moodle Course Management System. The Unit of Learning in IMS LD (UoL) and the course in Moodle become the perfect marriage where to find several elements that should match one to each other. This paper show how to make this understanding between notations, mapping related elements in both to get a list of pairs easy to translate from one to each other, and to define also a list of requirements for this protocol.

Keywords: Moodle, IMS Learning Design, mapping, e-learning notation

1 Introduction: Why mapping IMS LD and Moodle

IMS Learning Design [1] is aimed to transform regular lesson plans into interoperable Units of Learning (UoL). This specificatiobn is able to use any pedagogical model to get a UoL runnable and editable in an interoperable way. Furthermore, IMS LD is able to describe a full learning flow with several elements -such as roles, activities, environments or resources- and features -such as properties, conditions, monitoring services or notifications- [2, 3]. The interoperable UoL can be edited with any LD editor, like CopperAuthor [4] or Reload LD Editor [5], and later played with any LD player, like CopperCore Player [6], Reload LD Player [5] and Sled [7]. On the other hand, there are a couple of challenges related to the spec: a) IMD LD has no Learning Management System able to handle and to play these UoLs; and b) there is a low-level approach of the editors and the technical profile that a learning designer or teacher needs to hold in order to create a UoL in an easy way [8].

Moodle [9] is a Course Management System (CMS) easy to install and to use and wide abroad disseminated, with more than 100.000 registered users, 12.000 registered websites and translation into 70 languages. Also, Moodle has a very strong virtual community of active users carrying out an increasing amount of face-to-face and

online activities, and supporting each other via the official site¹ and a number of ad hoc assorted websites. Moodle is able to manage every feature of a course and the related environment, such as user definition, groups, access, resources, internal links and a long et cetera. This is a difference with IMS LD. From a social constructionist approach a course is created from scratch in a few minutes. Moodle also allows for the execution of other information packages, like Scorm and Lams, as an encapsulated module inside a course. On the other hand, the pedagogical expressiveness of Moodle is limited by the absence of features included in the IMS LD model, such as defined adaptive learning flow, flexible roles and adaptive content. Currently, Moodle is working intensively to provide these missing features so that it is able to support IMS LD more fully over time. The main issue is that IMS LD and Moodle are not comparable at all, as they have different approaches to work on e-learning as well as they are different releases [10].

In this context, the mutual understanding between IMS LD and Moodle seems like an improvement for both parts. IMS LD provides a pedagogical flexible approach in the creation of UoLs, as well as the specification support and the technical background focused on standardization and interoperability, and Moodle provides a well-known and easy-to-learn CMS and an active community of non-technical profile. To this end, Moodle and The Open University of The Netherlands² founded a working group in June 2005, then hosted by the UNFOLD Project³ and Learning Network for Learning Design⁴ and currently supported by the ProLearn⁵ and TENCompetence⁶ projects.

2 How to make it: basic structure and mapping

There are a few attempts to integrate UoLs with stand-alone LD players like Sled and Moodle [11]. Sled is able to run a UoL stored in a LD server via an Internet Explorer player in the client (Telcert). A link from a Moodle resource to the ip address where Sled is allocated allows a simple first level of integration. This structure is not focused on the reusability of the lesson plans but on the integration of current systems to form a de facto more complex approach, collecting several technologies.

What the mapping of Moodle and IMS LD aims to is the re-usability of a lesson plan/course/UoL of one of them into the another, to be used as a base for a further development or as they are actually defined. Furthermore, it is focused on the interoperability and the reusability of an information package/UoL, no matter the original platform that is used for it.

In order to achieve the best understanding between IMS LD and Moodle, the mapping process is divided in three steps:

¹ <http://moodle.org>

² www.ou.nl and www.learningnetworks.org

³ www.unfold-project.net

⁴ <http://moodle.learningnetworks.org>

⁵ www.prolearn-project.org

⁶ www.tencompetence.org

1. Moodle is able to export one course to a UoL, translating the Moodle notation to IMS LD
2. Moodle is able to import one UoL into the Content Management System and translate the IMS LD notation into a Moodle notation
3. Moodle is able to play a UoL inside the system, following one of the approaches on types of integration between information packages and players suggested in Tattersall et al, 2006: Moodle stores an IMS LD information package and it runs an internal player

To realize this three blocks we need to establish a general framework:

- Besides the Moodle course, the rest of the Course Management System environment is out of scope (calendars, blocks, log-in, language...) as they are used as processes and instructions and not like a core part of the basic unit of interchange for information (i.e., a Moodle course or an IMS LD UoL)
- There is a need of matching every single Moodle feature-component to an equivalent in IMS LD or to define it like an external process/instruction
- In order to make a taxonomy of the elements in a Moodle course and to find a mirror in the IMS LD specification, we define four main groups: 1) Setting -basic configuration-, 2) Activity, 3) Resource, 4) Administration –out of scope-

If we take a Moodle course we can match every element of the course with an element in the basic structure of an IMS LD Unit of Learning. Table 1 shows the result:

Table 1. Elements in an IMS LD Unit of Learning mapped to elements in a Moodle course.

| Issue | Moodle feature-component | IMS LD structure | Remarks |
|-------|---------------------------------|---|--|
| 0 | Full course | 1 UoL, 1 play, 1 act, 1 activity structure (type selection) | |
| 1.1 | Setting: Full name | Title of Learning Design | |
| 1.2 | Setting: Short name | Title of Play | |
| 1.3 | Setting: Hidden sections | Activity Structure:IsVisible | Possible, but suggested for a next iteration |
| 1.4 | Setting: summary | LD learning objectives | |
| 1.5 | Setting: Your word for Students | roles:learner:title | |
| 1.6 | Setting: Your word for Teachers | roles:staff:title | |
| 2.0 | Topic | Learning activity | If a resource or an activity is defined |
| 2.1 | Topic 0 | Learning activity (first one) | |

| | | | |
|-----|---------------------------|---|---|
| 2.2 | Summary of Topic | Activity Description | there will be an environment If there is no activity description in Topic it should be auto-generated with a standard text or just empty |
| 2.3 | Activity: Chat | Synchronous conference (conference-type) | Services |
| 2.4 | Activity: Forum | Asynchronous conference (conference-type) | Services |
| 2.5 | Activity: Glossary | - | Generate as dynamic HTML |
| 2.6 | Activity: Quiz | - | Possibly it generates QTI |
| 2.7 | Activity: Scorm | No match | For a next iteration |
| 2.8 | Activity: Survey | External | Generated by Level B |
| 2.9 | Activity: Workshop | External | Generated by Level B |
| 3.0 | Resource | Learning object | All the resources ended as learning objects except Directory and Link |
| 3.1 | Resource: Directory | - | Generated by Level B |
| 3.2 | Resource: Label | Learning object | Could map to a title of environment if needed |
| 3.3 | Resource: Link to file | Learning object | File should be included in content pack |
| 3.4 | Resource: Link to website | Learning object | Link should be an absolute URI |

3 The first step: Exporting a Moodle course to an IMS LD Unit of Learning

The first step in the integration process is focused on the exportation of a Moodle single course to an IMS LD UoL. In order to achieve this goal we establish a list of assumptions: a) there is no round tripping for the first stage, b) the exportation is completely made in batch mode (therefore, no dialog nor user interaction), and c) this task is planned as an iterative process where the first iteration gets the basic skeleton for conversion and the subsequent versions will extend it.

IMS LD is defined as a metaphor built around a theater using roles, plays and acts. Inside, some elements describe the educational framework: learning objectives, activities, environments, property of visibility, method, type of learning flow, etc. In Figure 1, there are several couples of elements IMS LD-Moodle for the most basic structure of a Moodle course:

| IMS Learning Design UoL | | | | Moodle course | |
|-------------------------|--|--|--|---------------|--|
| Unit of learning | | | | 0 | 1 UoL, 1 play, 1 act, 1 AS (type selection) |
| Title | | | | 1.1 | Full name |
| Learning objectives | | | | 1.4 | Summary |
| Roles | | | | 1.5 | Students |
| | | | | 1.6 | Teachers |
| Play | | | | | |
| Title | | | | 1.2 | Short name |
| Act | | | | | |
| Title | | | | | |
| Activity structure | | | | | |
| Title | | | | | |
| isVisible | | | | 1.3 | Hidden sections |
| Learning Activity | | | | 2.0, 2.1 | Learning Activity |
| item-description | | | | 2.2 | Summary of topic |
| Learning Objectives | | | | | |
| Environment | | | | Several | Activity and resource: External, Learning Object or Conference |
| isVisible | | | | 2.14 | Activity: Assignment: visible/hidden |
| | | | | 3.6 | Resource: visible/hidden |

Fig. 1. Basic match between an IMS LD UoL and a Moodle course.

4 Mapping services

Some activities in Moodle need a special process, as they have some basic data used for the appropriate execution (i.e., forum, wiki, quiz...). Every activity or resource in Moodle needs to export some additional information that is not supported by IMS LD, i.e., timing in Forums or grades in Workshops. If IMS LD is not able to manage this information it will be lost and no later retrieval will be possible from IMS LD to Moodle, in future versions, although no round tripping is assumed in the first approach.

A possible way is to associate a file with all the extra information related to an activity. For instance, a Moodle Forum is matched to an asynchronous conference-type service in IMS LD and there is a linked file with the information about starting time, ending time, or discussions policy. We could call the file `serviceparams.xml`. This file is a resource in the content package, type `servicecontent`, although other types are possible: `webcontent`, `imsldcontent` and `imsqti_item_xmlv2p0`. The field `serviceparams.xml` needs to be associated with the service `service-conference`, but this is not possible yet in the current IMS LD 1.0's information model. One approach is to associate an additional learning-object with a service. The final approach is as follows:

```
<imsld:environment>
  identifier="env-Topic-0-News-Forum">
    <imsld:title> Moodle Summary Topic </imsld:title>
    <imsld:service identifier="service-conference"
  isVisible="true">
```

```

        <imsld:conference conference-type="synchronous">
            ...
        </imsld:conference>
    </imsld:service>
    <imsld:learning-object identifier="ForumParams">
        <imsld:item identifier="PARAMS"
identifierref="RefToParams"/>
    </imsld:learning-object>
</imsld:environment>

...

<imscp:resource identifier="RefToParams" type="servicecontent"
href="params.xml">
    <imscp:file href="params.xml" />
</imscp:resource>

```

Following this structure we could map any resource or activity without any loss of important information in Moodle. Although this approach of Moodle is mis-using the notion of a learning object, it could serve as a temporary solution until a modification of the XML Schema in a new version of IMS LD could happen.

5 Conclusions

IMS Learning Design and Moodle are two entities that work on the process to reach a kind of integration that allows for the exportation of a Moodle course to an IMS LD format, the importation of a UoL to a Moodle CMS, and the execution of an IMS LD information package into a Moodle CMS. Following this three-step process a working group formed by Moodle and The Open University of The Netherlands looks for an understanding between both e-learning notations in order to achieve some degree of interoperability and re-usability of online lesson plans and courses.

The first step to take is focused on the exportation issue and it aims to get a basic mapping between both, taking a simple Moodle course that could be extended with additional features in a second round. For this exportation, a challenge is to keep some information in services or activities that Moodle uses for their configuration and execution. An approach points to keep this information in a file stored inside the information package as a resource and to link it as a learning object to the called service. This way, all the needed information is fully exported to an IMS LD package but leaving it out of the main manifest, where it couldn't be properly handle, as there are no possible match yet. A second approach points to a modification of the XML Schema in IMS LD 1.0 where this situation could be managed directly.

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