SearchLT—an online catalogue of Engineering learning resources for UK HE

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Overview

About the Project

Project/Service Name:
SearchLT

Project/Service URL:
http://searchLT.engineering.ac.uk

Main Concern of Project/Service:

- Describing learning resources
- Facilitate discovery of learning resources

Staff Expertise
Library,
Technical,
Learning Technology.

Cataloguing by
Third party cataloguers

Record management

Number of resource descriptions
Ca. 500

Granularity/typical resource size
From simple simulations lasting 10 minutes to multimedia course packs lasting several hours.

Record Management
Records stored in relational database, can be exported as XML files.

Tools used
The project developed a database and web interface using MySQL, PHP.

Specifications / Standards

Relevant specifications/standards
IMS Metadata, IEEE LOM

Way of using spec/standard
Mapping between own description schema and specification/standard.

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1) Summary

The metadata schema used for the SearchLT database has many elements in common with IMS metadata and hence the IEEE LOM. A major benefit of using elements from the IMS schema was to be able take advantage of the work already done on learning resource description. In addition the project team hope that use of a widely accepted standard will make data sharing easier, should an opportunity arise. The main drawbacks were to do with interpretation of the IMS meta-data documentation (ref. 7) and the vocabularies suggested for some of the elements.

2) Background

SearchLT (Ref 8) is designed to help lecturers teaching engineering, in higher education, to find suitable computer based learning materials for their courses. It was designed and implemented by the JISC funded FAILTE project. The team responsible included people with skills in learning technology, library science, engineering sciences and computer science. Other organisations involved in the project include EEVL (Ref 1), and LTSN engineering (Ref 9).

The database aims to include 500 records describing resources which vary in size from single JAVA applets to several lectures worth of material. In order to be selected for the database, a resource has to fulfil a set of criteria:

1. It must have a web presence.
2. It must not be a collection of pointers to third party resources.
3. It must be classifiable as an engineering resource (under the EEVL engineering subject headings).
4. It may not contain only advice on teaching and learning.
5. It must be suitable for use in UK Higher Education.
6. It should be useful to other teachers apart from those for whom it was created.
7. It should be designed for teaching and learning.

Designing the metadata schema for the database involved about 3 months of work but modifications were made afterwards. Librarians, members of the EEVL project and people from LTSN Engineering were also consulted. The most important issue was which information would be useful to academics, however, factors such as conforming to IMS and interoperability were also considered.

3) Implementation Details

The initial approach to the database was to decide which fields would be necessary, based on what the end user would require, and then try and make the elements similar to those in IMS metadata v1.2. The reasons for using the IMS metadata specification were twofold. Firstly the project wished to benefit from the expertise which had gone into producing the IEEE LOM and IMS metadata specification. Secondly, it was hope that by following IMS metadata guidelines it would be easier for the resource descriptions to be used by others with minimum support from the project staff (thus, for example, should the project finish it would be possible to export the resource descriptions for use in any successor project).

The cataloguing is a third-party effort: i.e. the people who write the records are employees of the FAILTE project, EEVL or LTSN Engineering rather than the users or creators of the resource. Cataloguers come from a variety of backgrounds including librarian and scientific. In order to make sure that the records are consistent, a member of the FAILTE team validates the records before they are entered into the database. Extensive guidelines (reference 3) have been written about each element and how it should be used.

The database and interface were custom designed and built so that data could be entered online. The database uses MySQL and is essentially relational. It is possible to export elements from the database using a system based on templates so that the records can, in principle, be exported with the XML binding of any schema to which the elements used in FAILTE can map. There is currently no way to import records.

The technical aspects of sharing records have not been considered in detail, since there was no one to share data records with. However some preliminary work has been done. In order to assist possible record sharing in the future, a document (reference 2) demonstrating 2 way mappings between SearchLT and IMS v1.1 is available along with the XML template for exporting data.

4) Elements in the SearchLT Metadata Schema

There are 37 metadata elements in total and a full description of all of them can be found in the Guidelines for FAILTE Metadata document (reference 3). The schema was to build on the EEVL resource descriptions, by adding elements which describe the learning features of the resources. Close attention was given to IMS meta-data v1.1 when designing this schema.

A lot of work was put in to creating vocabularies. Where ever possible the classification encoding schemes used were the same as EEVL uses. For most additional elements, the IMS meta-data vocabulary and recommendations were considered and standards from ISO were implemented for date, country and language fields. Attention was also paid to a number of other sources when deciding on the vocabulary including SESDL (reference 5), GEM (reference 6) and the British Educational Thesaurus. The team was particularly pleased with the resource type field they developed, that was considered to be useful to end-users and inadequately covered by IMS meta-data v1.1.

In the following part of this section, the elements have been grouped in terms of their closeness to the relevant LOM elements. The elements that map directly require no explanation as they are described in the LOM (reference 10.) and IMS meta-data v1.2 specification (reference 7). However the other elements which are not so easy to map are given some brief comments to explain issues such as function, how they could be mapped to the LOM and the vocabulary used. More lengthy explanations can be seen in references 2 and 3.

Elements which map directly to IEEE LOM

The following elements have direct mapping to IEEE LOM. All the date fields use ISO 8601 format.

LOM Element	**SearchLT Element**
1.2 general.title	Title
1.3.1 general.catalog	Catalog
1.3.2 general.catalogentry	Catalog Entry
1.5 general.description	Description

2.1 lifecycle.version	Version
2.3.3 lifecycle.contribute.date with 2.3.1 contribute.role = publisher	Publication date
2.3.3 lifecycle.contribute.date with 2.3.1 contribute.role = editor	Modification date
3.3.2 metametadata.contribute.date with 3.3.1 = creator	Date record entered
3.3.2 metametadata.contribute.entity with 3.3.1 contribute.role = Validator	Record Validator
3.3.2 metametadata.contribute.entity with 3.3.1 contribute.role = Creator	Record Creator
3.5 metametadata.language	Language of Metadata
4.3 technical.location	Main URL
4.3 technical.location	Secondary URL
5.9 educational.typicallearningtime (description only)	Estimated time to use resource
5.10 educational.description	Educational Description
7 relationship	Relation
9 classification with 9.1 purpose = Discipline	Subject Classification

LOM elements with different vocabularies

These elements could be mapped to the IMS schema but the vocabularly used differs in some ways. For example, the language elements have five options and the resource type vocabularly is completeley different to the equivalent IMS element.

LOM Element	SearchLT Element	Comments
1.4 general.language	Language	The SearchLT vocabulary {eng,fre,ger,jap,spa} uses ISO 639-2/B
2.3.1 lifecycle.contribute.role & 2.3.2lifecycle.contribute.entity	Contact Details	Details of people who can be contacted by database users, and their roles in the creation of the resource are given in a complex element which can be mapped to 2.3.1 and 2.3.2. Vocab is creator, contributor, distributor, publisher, rights holder, unspecified.
5.2 educational.learningresourcetype	Resource Type.	This is an indication of the resource content. It has different vocabulary {Unspecified, Assessment/test, Activity/Simulation, Tutorial/explanation, Assignment/task, Illustration, Resource Pack, Case Study}.
5.5 educational.intendedenduser	Intended End User.	This field give an indication of how resource might be used. The controlled vocabulary {Tutor, Student, Author} is the same as 5.5 except there is no manager option.
8 Annotation	Reference	A hyperlink has to be accomodated in the annotation description.
9 Classification where 9.1 purpose = educational level	Educational Level.	SearchLT uses its own vocabulary {Unknown, Introductory, Advanced, Foundation, Intermediate, General}. It is not the same as LOM 9.2.2 but has elements in common.

Elements which have no obvious LOM equivalent

SearchLT Element	Comments
Interactivity	This gives an idea of how interactive a resource. The vocabulary used was {Unknown, Expositive, Interactive, Highly Interactive}. This field mixes LOM 5.1 interactivitytype and LOM 5.3 interactivitylevel.
Cost	There is field LOM 6.1 which can be used to say if resource is free but can not map vocabulary {Unknown, Free, Under 20, Under 50, Under 100, under 500, over 500}.
Alternative Title	There is no field for this but could be put into LOM 1.5.
Awards	These are educational awards. Vocabulary is {Unspecified, EEVL, EASEIT–Eng, Scout Report, EASA, Bobby, UCISA}. No LOM equivalent.
Medium	The medium of the resource could be mapped to LOM 4.3 but not exactly. Vocabulary is {web-base, CD-ROM, ftp download, VHS, DVD, Print, Diskette, Streaming Media}.
Technical Requirements	The information is similar to LOM 4.4 but SearchLT uses a free text field.
Country of Origin	No LOM equivalent. This field uses ISO 3166-1993 country codes.
Tutor Support	Level of documentation for tutor. Vocabulary is {Unspecified, Minimal, Extensive, Comprehensive}.
Record Contributors	Names of people who contributed. Can use LOM 3.3.1 with creator but not quite right since may be modifier and LOM recommends only one creator

There were also several elements that are only intended to be used internally:—
Record ID; Date record was created; Date last reviewed; Date last modified; Decision on whether to accept; Comments.

Elements Used for Searching

SearchLT uses the following elements for searching: Title, Alternative Title, Main URL, Secondary URL, Description, Educational Description. In addition there is a search option in the database which allows users to filter the records using the elements: interactivity, cost, educational level and medium. Other filters and access points such as learning resource type may be implemented in the future.

There is also a subject classification field that corresponds to LOM 9.2.2, which can be used for browsing. This is based on the EEVL engineering subject classification system (Reference 1) which proved reasonable though not ideal as it was not specifically designed to map to HE engineering courses. For example, most of what a Chemical Engineering student studies is classified under Mechanical Engineering and Related Industries.

Elements which Were Difficult for Catalogue

There were several elements that caused some difficulties, especially since the cataloguers were neither the creators nor the target users of the resources.

Element	Nature of problem
Technical Requirements	It is difficult to say what systems software will work with so there is a chance that people could be put off a resource which may work on their system.
Subject Classification	Requires specialist knowledge and even so, it is sometimes difficult to judge which category a subject comes under. Also EEVL scheme (Ref 3) is not specifically designed to map to Higher Education courses.

Cost	Problems with using field with controlled vocabulary as the nature of licenses vary for different resources. For example some licenses are for a year and others are for life.
Contact Details	Legal implications of storing personal information means that the person must be contacted first.
Educational Description	Requires specialist knowledge and is difficult for cataloguers to be consistent.
End User	Sometimes it is difficult to classify a resource in terms of then end user as it requires thinking about how it might be used.
Interactivity	The use of two fields in IMS for interactivity was a little confusing. It was quite hard to identify types of interactivity and to assess the level.
Educational Level	It is sometimes tricky to know how to classify a resource without knowledge of the subject.

6) Reflections

Relative Value of the LOM Elements.

During the evaluation of searchLT (Reference 4), the most valued fields, from an end user's point of view, were found to be: Main URL, General Description, Cost, Copyright, Requirements, Interactivity

On further discussion, a lot of users considered Main URL and General Description to be completely sufficient for their purposes. Furthermore educational descriptions were considered to be subjective and maybe not so useful. The project team, however, doubt whether such a minimal approach would provide sufficient routes for resource discovery.

A member of the FAILTE team mentioned that being able to express the relationship between resources was a useful feature as it allows the database user to browse through the levels of granularity of aggregated resources.

IMS Documentation

The project used the IMS guides to the LOM, a few problems were encountered with this documentation, including:

Required Knowledge One member of the FAILTE team felt that the manual required technical, cataloguing and educational skills for a full understanding. For example smallest permitted maximum element in table of elements was unclear to some.

Context The IMS meta-data was perceived to be designed for the US training sector. Hence there were some problems with vocabulary e.g. In the US, Learning Management System means the same as Virtual Learning Environment in the UK.

Controlled Vocabulary It was felt that the vocabularies were not adequately explained. For example in the educational group, it was unclear what university first cycle and second cycle meant. Specifically, it was thought that the vocabulary for resource type could be improved.

Technical For producing XML binding (reference 2), the IMS documentation was considered difficult to read as the "semantic density was too high".

References

1. "The Internet Guide to Engineering, Mathematics and Computing", http://www.eevl.ac.uk/,

   EEVL is an award winning service designed to provide access to quality networked engineering, mathematics and computing resources.

2. "Comparison of FAILTE resource Description Scheme with IMS Learning Resource Metadata Information Model", http://www.failte.ac.uk/documents/comparison_with_ims.rtf, An element by element comparison of the FAILTE metadata elements with IMS Metadta v1.1 (and vice versa) with explanation of our reasoning where we have chosen to adopt an element which differs from the IMS specification. Also an example of the template which we use to export data from the FAILTE database into XML encoded IMS.

3. "Guidelines for FAILTE Metadata", http://www.failte.ac.uk/documents/guidelines/guidelines.rtf, Version 1.2 of the set of metadata elements for the FAILTE database, describing the elements that have been chosen, comparing them to existing metadta schemas and standards and giving instructions on how it is intended that the metadata will be recorded in the FAILTE database

4. "Evaluation of SearchLT", http://www.failte.ac.uk/documents/eval_report.rtf, Report on what lecturers and other interested parties thought about the usability and content of SearchLT database.

5. "The SeSDL Taxonomy",http://www.sesdl.scotcit.ac.uk:8082/taxonomy/ed_tech.html,

   The taxonomy was developed primarily to facilitate the creation of a browse tree for the electronic Library. It covers the fields of Educational Development, Educational Technology, Academic Management, Resource Types and Subjects.

6. "The Canadian Heritage Information Network", http://www.chin.gc.ca/English/Standards/metadata_educational.html, This web page contains information about metadata standards for educational resources.

7. "IMS Learning Resource Meta-data Specification", http://www.imsglobal.org/metadata/index.cfm#version1.2.2, This site can be used to download the latest version of the IMS meta-data schema.

8. "The SearchLT database", http://searchlt.engineering.ac.uk/, This is the website for the SearchLT database of Engineering teaching and learning resources.

9. "Learning Teaching Support Network home page", http://www.ltsneng.ac.uk/, LTSN Engineering is part of the Learning and Teaching Support Network. It aims to promote quality learning and teaching by stimulating the sharing of good practice and innovation in learning and teaching through the provison of subject-based support.

10. "IEEE 1484.12.1—2002 Learning Object Metadata (LOM) Standard" http://ltsc.ieee.org/wg12/index.html, IEEE standard addressing the problem of how to discover, manage, and use learning objects by defining a structure for interoperable descriptions of learning objects.

Publication Details

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