The Higher Level Skills for Industry Repository

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Overview

About the Project

Project/Service Name:
HLSI

Project/Service URL:
http://www.hlsi.org.uk

Main Concern of project/service:
To create a repository of online learning material to support engineering/manufacturing sectors.

Staff Expertise
Sofware Developers, Academic, Management

Cataloguing by
Submitters of resources (normally the resource creators).

Record Management

Number of resource descriptions
2500

Granularity
Ranges from single images to complete documents.

Record Management
Records stored in XML repository.

Tools Used
A tool was developed to allow partners to enter content and metadata online.

Specifications/Standards

Relevant specifications/standards
IEEE LOM v1.0, IMS Metadata v1.2

Way of using spec/standard
Most of the elements are taken directly from the IEEE LOM v1.0

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1) Summary

The elements used for the metadata schema in this project are taken from the IMS 1.2.2, which was based on a draft of the LOM*. The aim of using a recognised metadata schema was to help facilitate record sharing and reuse of resources. The people who submitted resources also provide the metadata, which gives them some ownership over the records. The drawback is that the quality of metadata varies.

2) Background

The HLSI project has built a repository of online learning material to support the delivery of learning programmes in the broad subject areas of engineering/manufacturing from GCSE to Higher Education levels. It aimed to have currency across a number of sectors, starting with FE colleges, Higher Education and private companies.

Resources in the repository can be used and added to by the 12 partner organisations involved . It is funded by Yorkshire Forward (The Yorkshire and Humber Regional Development Agency).

Currently there are about 2,500 resource descriptions which vary in size from single pictures or small pieces of text (IMS manifest file), through pages (IMS manifest resource) to complete documents (IMS manifest organisation). The material is intended to be used in VLEs.

3) Implementation Details

The system is based around an XML repository. Content creators use a MS Word-based tool, which was created by the project, to put pieces of material together for use in the repository. After the material is entered, the system detects the component parts and stores them in the repository as objects. Material can be downloaded from the repository, reworked and then reinserted into the repository.

All resources are stored using IMS content packaging v1.1. The manifest file contains:

- The XML file for the whole document.
- The generated HTML files, including CSS.
- The assets used in the document.

The IMS v1.2.2 metadata schema was used for this project as it fitted in with IMS content packaging. It was also considered to be important for interoperability and it seemed to be the

* The only elements which are used here which changed between the version of the LOM used for IMS 1.2.2 and the final standard are the technical requirements, which in the later version can be expressed as an “Or Composite”

most mature schema available.

A list of the recommended elements for HLSI and how to use them has been written, although any IMS v1.2.2 element may be used. This document contains details about each element including: vocabulary, how it is used in searching and an example of how this element would be written using XML.

Two attempts have been made to swap content and metadata with other projects. Both of them had problems with the content packaging and so the interoperability of the metadata has not been tested.

Metadata Authoring

Metadata is added through the MS Word-based content authoring system. The people who produce the learning resources are also responsible for tagging it with metadata. This gives them the opportunity to classify the resource themselves using guidelines provided by HLSI. The difficulty with this process is making sure that the authors understand the purpose of the metadata and the methodology used to enter it. A balance had to be struck between getting high quality metadata and not going above the skill level of those entering the metadata.

At the moment there is quite a large variation in the quality of metadata for the resources. For example some have spelling errors. This affects the performance repository so several steps are being taken to improve the process:

- Providing more education and documentation to guide people through the process of entering metadata. This would include explaining why metadata is important.
- The project may employ someone to validate resources and improve the metadata.

4) Elements in the HLSI Metadata Schema

The tables in this section are based on the current guidelines for HLSI metadata. Feedback is being obtained from the end-users about the use of each element and in the next round of content creation, improvements may be made.

In the following part of this section the elements have been grouped in terms of difficulty to map to appropriate LOM metadata fields. Elements which map directly and require no explanation, as they are described in the LOM specification (ref 6), are shown in the following table.

Elements which map directly to LOM v1.0

LOM Element	HLSI Element
1.2 general.title	Title
1.4 general.description	Description: typically one or two sentences long.
1.5 general.keywords	Keywords
2.1 lifecycle.version	Version
2.2 lifecycle.status	Status
2.3.1 lifecycle.contribute.role	Role
2.3.2 lifecycle.contribute.entity	Entity
2.3.3 lifecycle.contribute.date	Date
4.1 technical.format	Format. Uses MIME Types (RFC 2048)
4.2 technical.size	Size.
4.3 technical.location	Location
4.7 technical.duration	Duration
5.6 educational.context	Study Level
5.8 educational.difficulty	Difficulty

6.1 rights.cost	Cost
6.2 rights.copyrightandotherrestrictions	Copyrightandotherrestrictions
9.1 classification.purpose	Purpose
9.3 classification.description	Description
9.4 classification.keyword	Keyword

A few of the elements are from the IMS metadata schema but have different vocabularies. They are described in the following table.

Elements which have different vocabularies

LOM Element	HLSI Element	Comment
4.4.2 technical.requirements.type	Requirement type	Vocabulary chosen was {operator, browser, free text}. LOM does not have free text. Not part of an OrComposite element.
4.4.3 technical.minimum version	Minimumversion	Not part of an OrComposite element.
4.4.4 technical.maximum version	Maximumversion	Not part of an OrComposite element.
5.2 educational.learning resource_type	type	Vocabulary has been extended {Exercise, Simulation, Questionnaire, Diagram, Figure, Graph, Video, Animation, Slide, Table, Narrative Text, Exam, Experiment, Problem Statement, Self Assessment}. LOM does not have video or animation.
6.3 rights.description	Restriction Description	Description of rights restrictions, including name of organisation which holds the IPR for the resource [It should be noted that permission has been obtained for all materials in the repository to be used by the partner institutions]
9.2 classification.taxon path with 9.1 purpose = “discipline”		Uses Dewey Decimal Classification System. Entry is a three digit number.

There are additional elements stored about resources, which are for internal use only and don’t form part of the metadata schema.

Elements Used for Searching

There are several methods of searching the repository. The simplest method is to look at a list of all the materials provided by the partner institutions, which consists of folders of materials labelled using course or module names. This is essentially a browsing method and allows moving through levels of granularity from document to page to object.

There is also a simple word search, which allows the user to search for a word occurring in any record. An advanced search option allows the user to look for words in keywords, description, and author. Options can be chosen form pull down menus for required format, resource type, difficulty, study level, granularity, duration and subject field.

Use is made of granularity (vocabulary is {object, page, document}) although this information is not stored in the IMS metadata record. The materials are stored in folder systems to represent the hierarchy. i.e. document folders contain pages and pages contain objects.

5) Reflections.

Several versions of the IMS specification were looked at during the course of the project. Some problems with the specification were:

Examples	The examples given for how to use the elements were unclear, particularly in the earlier documentation.
Best Practice Guidelines	There were not enough best practice guidelines.
Unclear Explanations	The catalog entry field caused some confusion initially. It was unclear if catalog and catalog entries were to be used for external searching.
New Versions	The IMS specification changed several times during the course of the project. It is quite difficult to automate the processes of upgrading and downgrading, particularly when vocabularies changed and when the specification changed to allow more than one lifecycle contributor.

The elements with definite values such as educational.difficulty were considered to be more useful than descriptive elements, which were thought to be too subjective. However, it was also thought that elements with specified vocabularies may be used for different purposes in different systems which could cause problems. For example the technical requirements element may be used as text element which the end-user can look at so incorrect entries in some systems may not be a big problem. On the other hand, in HLSI, this element is very important and has the following function:

Technical Requirements	For multimedia objects, the information in this field is captured automatically. Information can also be captured about size of file and what version of software is required to run it. This field is vital for displaying the resources so it would be important if resources are being shared.

The HLSI project team considers obtaining consistent metadata content to be a major difficulty. The technical obstacles involved with metadata were considered less difficult to solve.

Overall the team are satisfied that the project has produced a good method of producing learning materials and encouraging reuse of resources. Future training is planned to help specialists produce learning packages and apply high quality metadata tagging.

References:

1) "HLSI", http://www.hlsi.org, project website for High Level Skills for Industry. Information about the project and access to the repository is available for partners from here.

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

3) "IEEE Learning Teaching Standards Committee", http://ltsc.ieee.org/wg12/-, The committee are responsible for forming the LOM standard. The most recent specification can be obtained from here.

Publication Details

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