Describing learning objects: Seeking simple solutions

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Abstract: It has been argued the development and deployment of learning objects in digital environments has the potential to be cost effective and provides an efficient and meaningful way of creating quality content. However, the potential benefits from the use of learning objects can only be realized if participants can locate, review and re-use the objects created. This paper describes how a project team of the Open Source Learning Object Repository, a Tertiary Education Commission of New Zealand, funded project, looked for simple ways to describe learning objects.

Introduction

In 2005 the Waikato Institute of Technology received a significant grant from the e-Learning Collaborative Development Fund, administered by the Tertiary Education Commission of New Zealand, to investigate and deploy an open source learning object repository to meet the needs of the diverse cultural populations of Aotearoa/ New Zealand. One of the key outcomes of the project is to be the identification and deployment of a number of learning objects to test-bed the selected systems robustness and ease of access. From the beginning of the project it was accepted the debate on the definition of a learning object was widespread, inconclusive and ongoing. However, the project team adopted a view there was general agreement Learning Objects (LOs) should be reusable, be durable, be affordable, be searchable, be retrievable and be stored for others to use. This paper explores how the project team worked through the process of creating a process and procedure for describing learning objects.

Describing a learning object

How often have we used a search engine (such as Google or Yahoo) on the web to locate digital information and have been overwhelmed by the range of information available? For example using the general search engine Google I looked for the term “learning objects” (7.2.06) and the results displayed were a portion of about 38,700,000 references for learning objects. The results of the search were displayed in random order and I had limited control of how they were reported. Only when I started to use the advanced search functionality of Google did the results became marginally more manageable and meaningful. However, did this refined search find all the relevant material available to me, I think not. It is clear relevant digital material can only be located firstly; if it has been described in a specific way and secondly, it is searched for using terms or phrases used in the descriptive process. From the OSLOR teams perspective to be of use the learning objects created needed to be easily located, readily retrieved and repurposed were necessary. The project team was aware any learning object deployed needed to be labeled in such a way so a search engine could scan the labels, or fields, and locate and display the location to the searcher. The team soon realized we were once again faced with the combination of two disciplines; the discipline of computer science, the technical functionalities of search engines, and librarianship, the cataloguing and description of educational material.

Metadata

Labeling digital material is a information set, or record, described as metadata, which is essentially "data about data" or "information about information" (IMS Global Learning Consortium, 1999). The IEEE Learning Technology Standards Committee (cited in (IMS Global Learning Consortium, 1999) model for meta-data definitions relies on a hierarchical structure based on the metaphor of a tree. The top, or first, layer is the "root" element. This root element may contain sub-elements and if a sub-element itself contains additional sub-elements they are called a "branch." Sub-elements that do not contain any sub-elements are called "leaves." Each element identified in this hierarchy has a specific definition, data type, and allowable value. In essence the metadata record describes the characteristics of the learning object. It describes who created the object, when the object was created, what the learning object is designed to achieve, what level it is aimed at, how can people access and use it and any digital characteristics of the object . (The relationship between the root, branches, and leaves is depicted in the Figure 1 below).

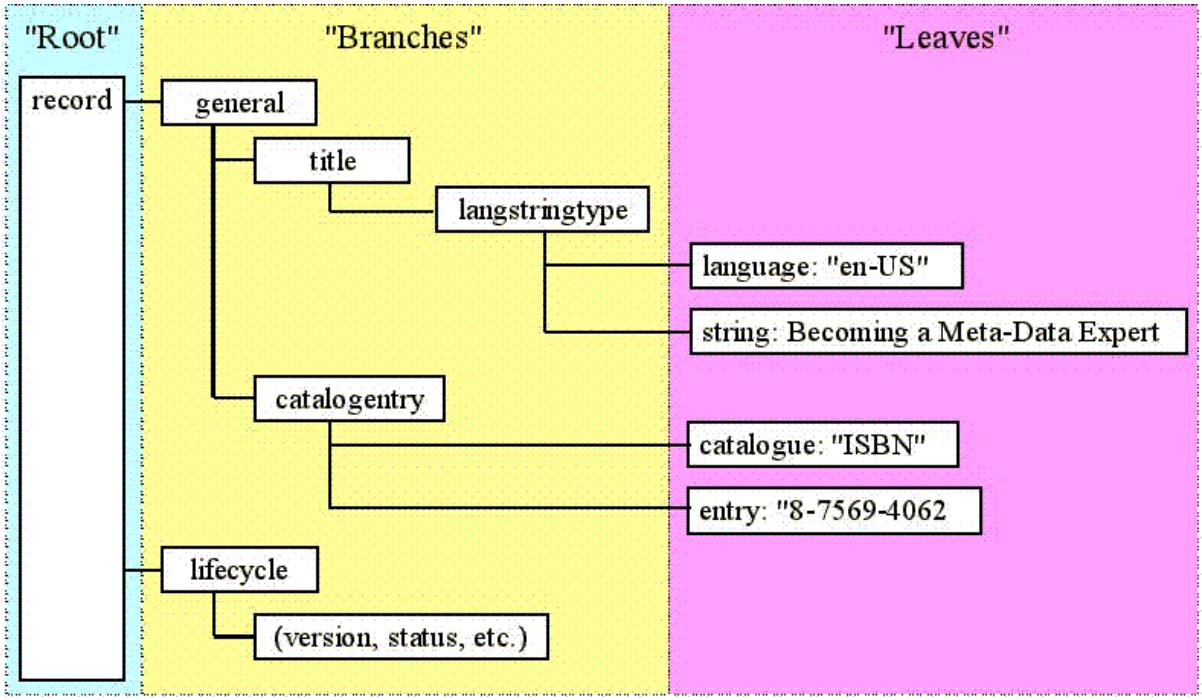

Figure 1. Hierarchical view of metadata elements
(http://www.imsproject.org/metadata/mdbestv1p1.html#Meta-datasystem)

The project team reviewed these elements and soon realized, as (Wayne, 2005) did, we were in danger of the requirements and complexity completing the metadata record consuming the project. We needed to reduce the complexity.

Creating metadata

To reduce the complexity of completing the metadata record for specific learning objects the team had to firstly, identify a relatively simple self explanatory scheme and secondly identify who would be responsible for entering the metadata record. The project team were conscious metadata was used for three basic purposes, to locate relevant objects, to interpret stored information and to integrate data (Saravani & Clayton, 2005). They also realized there were three

ways of creating the metadata record. Firstly, it could be entered by the creator of the resource secondly, by a metadata specialist and finally a collaboration activity between the creator and the metadata specialist (Paulsen & Maxwell, 2005).

The Dublin Core initiative has the goal of developing a common set of elements that describe Internet and other information resources (Smith, 1999). It consists of 15 basic elements, title, creator, subject/keyword, description, publisher, contributor, date, type, format, identifier, source, language, relation, coverage and rights (Paulsen & Maxwell, 2005). While the 15 elements are very basic and might not satisfy all needs (Zealand, 2000) it appeared to be a suitable foundation for the purposes of describing learning objects for use within the OSLOR environment. They appeared simple enough for the creator of the resource to enter simple data while providing enough information for metadata specialists to extended the record where appropriate.

The simple solution

The project team reviewed the elements contained within Dublin Core and, to integrate within the New Zealand educational context, added contextual fields to represent the compulsory school and tertiary sectors.

The following are the proposed metadata fields to be used when creating a learning object for the OSLOR project.

Compulsory fields

- Title *(Dublin Core field)*
- Creator name *(Dublin Core field)*
- Description *(Dublin Core field)*
- Language *(Dublin Core field)*
- Format *(Dublin Core field)*
- Learning resource type *(Educational)*
- Context *(Educational)*
- Level *(Educational)*

Optional fields

- Category *(Moodle field we can use)*
- Keywords *(Dublin Core field)*
- Size *(Dublin Core field)*
- Rights *(Dublin Core field)*
- Learning time *(Educational)*

Contextual Fields (New Zealand specific)

- Primary (Years 1-6)
- Intermediate (Years 7-8)
- Junior secondary (Years 9-10)
- Senior Secondary (Years 11-13)
- Tertiary (Levels 4 -8)

Conclusion

It has been argued in this paper defining learning objects has its roots nourished from two disciplines, librarianship, the cataloguing and description of educational material and computer science, the need to develop technical specifications for the deployment of search engines. From the OSLOR teams perspective it appeared confusion could result if a detailed technical or cataloguing approach was applied. In essence we believed we would meet resistance from learning object creators if the metadata required for describing learning objects was overly complex and burdensome. We looked for a simple solution. The OSLOR project is conscious the approach outlined in this paper is but only one way to describe learning objects. We are also conscious the solution proposed will be the subject of intense and ongoing debate. However, for the potential of learning objects in educational settings in education to be realised, this debate should be encouraged with papers such as these.

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References

IMS Global Learning Consortium. (1999, 5 May 2000). *IMS Learner Resource Meta-data Best Practices and Implementation Guide v1.1 Revision: August 1999*. Retrieved 23 January, 2006, from http://www.imsproject.org/metadata/mdbestv1p1.html#Meta-datasystem

Paulsen, C., & Maxwell, J. (2005). The contribution of metadata to e-learning. In J. Clayton & B. Gower (Eds.), *Open Source Courseware Initiative New Zealand. Final report to the Tertiary Education Commission (e-Learning Collaborative Development Fund)* (pp. pp139-151). Hamilton: Waikato Institute of Technology.

Saravani, S., & Clayton, J. (2005, 7 - 9 September). *Meatdata - its contribution to e-learning.* Paper presented at the Teriary Information Technology Conference, Waiariki Polytechnic, Rotorua, New Zealand.

Smith, A. (1999). *Metadata: Dublin Core for Dummies*. Retrieved 9th February, 2006, from http://www.vuw.ac.nz/staff/alastair_smith/technophile/TPh9908.html

Wayne, L. (2005, November 2005). *Iinstitutionalise metadata before it institutionalises you.* Retrieved February 1, 2006, from http://www.fgdc.gov/metadata/documents/InstitutionalizeMeta_Nov2005.doc

Zealand, N. L. o. N. (2000). *Metadata Standards Framework for National Library of New Zealand*. Retrieved 9th February, 2006, from http://www.natlib.govt.nz/files/4initiatives_metafw.pdf