ABSTRACT

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Moving Learning

Title of session: Metadata – a moveable feast

The Waikato Institute of Technology (Wintec) is currently establishing a Learning Objects Repository using the open source repository solution ePrints integrated with the widely-deployed management system Moodle. Library staff have been involved in determining which of the various metadata schema currently available for describing digital objects would most suit the learning community Wintec is looking to foster through the establishment of the repository.

This presentation will highlight the results of our investigations into metadata used for repositories and will explain why we determined upon a collaborative approach between library, technical and teaching staff as a best solution. A possible lack of knowledge about metadata was seen as an impediment to successful contribution from the teaching component of this tripartite paradigm. To address this issue, a Moodle course has been created on the OSLOR (Open Source Learning Objects Repository) site to look at the use of metadata in the creation of digital objects. The aim is to encourage educators from both the tertiary and secondary sectors to understand the purpose of metadata in describing resources, in making them accessible, reusable and sustainable. The creation of “Metadata Made Simple” will be explained, moving from content to context to a can of corn.

Biography

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Biography: Sarah-Jane Saravani is Library Manager at Wintec. Since July 2005 she has been involved with the eCDF OSLOR project, under the aegis of the Centre for Learning Technologies, and, consequently, has come into contact with metadata in its various guises. Involvement in the project has centred on studying metadata schema with a view to determining which would be most suitable from the perspective of application, usability and scalability. The intention of the learning object repository is to enable the location and reuse of learning resources and, to this end, the quality of metadata sitting in front of these resources will determine their accessibility. It is her firm belief that librarians and e-learning experts should seize every opportunity to co-operate and extend boundaries across the digital environment.
A Divine Comedy – From Mayhem to Metadata
(Slide 1)

(Introduction, welcome)
(Slide 2)
What is chaos, what is mayhem?
For the purposes of this talk, and in the context of the learning environment in which all of us here possess an interest, I shall describe this sorry state as a world without purpose, an environment where nothing is necessarily what it seems, where guidance is lacking, where standards are unknown, where souls cry out in the wilderness for direction. A world without metadata, in other words.

(Slide 3)
Background
In 2005 the Waikato Institute of Technology (Wintec) received a significant grant from the e-Learning Collaborative Development Fund (eCDF), administered by the Tertiary Education Commission (TEC) of New Zealand, to investigate and explore learning objects and how these could be shared across the educational sector. The project commenced with the understanding that the definition of a learning object has been the subject of much debate, which is expected to continue, possibly without a universally-accepted resolution. However, the project team, known as the open Source Learning Objects Repository (OSLOR) team, comprising members of the Centre for Learning Technologies, Library and ITS, adopted a view that the concept of learning objects indicates an element of educational content that will be shareable, dynamic and reusable. At this point I would like to throw in an alternative definition that is not often focused upon but which rather appeals at unexpected moments - “Learning objects” is a clumsy, abstract name for a heterogeneous group of materials”. Needless to say, the team’s decision supported the concept of increasing the availability of information, lowering access barriers and generally contributing to a learning environment exemplified by democratic, participatory change.

Digital repository
(Having sorted that factor out, where did we commence our main operations?). The basic functions of a digital repository are to accept, store, maintain, preserve and ensure access, in other words, to undertake that the contained resources continue to serve their purpose and to be accessible. In addition to these functions, there is also the need to ensure that determined levels of quality are implemented at critical stages, that accepted standards guide procedures and that, where extensibility and interoperability between systems or repositories are likely, these are fundamental drivers in the process of establishing the repository. Once again, this is where metadata comes in.

Metadata saving the digital world from chaos
The most widespread and absolutely basic definition of metadata, and you will all have encountered this somewhere in the course of your professional undertakings, is “Data about data”, it is clichéd to the point of truism now. But it gives you the concept of managing basic, and more complex, information. An example of metadata is the bibliographic record on your library’s online catalogue and the arrangement of information both physically and digitally within your library. There are four main functions of metadata:

- Resource discovery/description
- Administrative/technical
- Structural
- Preservation
The purpose of metadata in its practical application to learning objects is to facilitate the storage, maintenance, access and re-use of these digital resources in a manner suited to purpose. In other words, to eliminate mayhem through the salvatory medium of metadata.

**How one institution faced the challenge of bringing sanity to the madness of flexible delivery**

The Library Metadata Team’s area of focus in the OSLOR project was an in-depth investigation of identified metadata schema suitable for application within an educational context.

A wide range of metadata standards and initiatives relating to digital preservation are now in existence and their number is growing steadily. You may possibly be familiar with such terms as Dublin Core Metadata Element Set, IEEE LOM (Institute of Electrical and Electronics Engineers Learning Objects Metadata), these are a couple of the earlier, most-universally accepted standards.

*(Slide 4)*

The Dublin Core Metadata Element Set contains 15 simple, unqualified elements which are divided into three kinds of information categories: Content, Intellectual property, and Instantiation. All fifteen elements are optional, repeatable and may be presented in any order, allowing for a high degree of flexibility. Many of the elements in the scheme have been qualified (further delineated) and user groups can add these qualified elements to suit their needs.

IEEE LOM contains 70 elements, all of which are repeatable and none of which are mandatory.

The purpose of this explanation is not to lead you down tortuous paths into the labyrinthine mysteries of metadata but rather to give you a very quick overview of what is involved with various standards before we move onto application profiles and their contribution to the ascent to paradise.

**Development of a metadata application profile specific to OSLOR**

In general terms, a metadata profile for learning resources is a multi-part referencing that specifies sub-structures and data elements. For the purposes of the work the Library Team was undertaking, the learning resources were defined as digital, available via the internet, a set of specifiable files and file types and associated with a unique identifier. They required describing in a manner that allowed them to be discovered and accessed within an educational context.

Before I get down to specifics, I would like to digress for a moment to put our work into larger perspective. In July 2005, the launch of New Zealand’s Digital Strategy led to the release of the National Library’s Institutional Repositories for the Research Sector, which set out the argument for open access institutional research repositories playing a key role in New Zealand’s national content strategy to preserve, share and manage digital objects.

*(Slide 5)*

The National Library, in conjunction with the Ministry of Education, has created the Metadata Standards Framework, a three-tiered approach, which establishes clearly the different metadata schema suitable for application within different sectors.

*(Slide 6)*
The widely-used Dublin Core standard was recommended in the previous year’s Open Source Courseware Initiative NZ (OSCINZ) report as suitable for use. A number of fields, taken predominantly from IEEE LOM, identified as mandatory for inclusion in Shareable Courseware Object Reference Model (SCORM) packets were also suggested as suitable for describing learning objects. A list was created identifying which fields would be the responsibility of which level of metadata creator. These fields were tested in the RELOAD software application in creating SCORM packages. As the OSLOR project progressed, it became apparent that neither of these two standards, in themselves, would be sufficiently comprehensive to complete the activities required for most effective utilisation of the repository. The team identified a number of criteria regarded as crucial to the creation of a profile that was fit for purpose and robust. It needed to be:

- Specific for learning objects
- Extensible
- Able to support interoperability
- Reducible
- Able to support identified best practice
  - The ability to describe, maintain resources and allow ease of searching and reuse
- Easy to use
- Able to accommodate the recommended 3-tiered input structure – creator, technical staff and editorial staff
- Applicable to the New Zealand education environment
- Able to withstand scrutiny from other experts in the field of metadata standards and applications

The team looked closely at what others addressing the requirements of educational resources had identified as critical, useful to have or possibly valuable in some contexts. We focused, in particular, on initiatives in Australia – EdNA Online - and New Zealand - Te Kete Ipurangi – to ascertain to what extent profiles could contain project-, or context-specific fields without compromising the identified criteria above.

In the end we created a work of art, a thing of beauty, utterly unique to OSLOR. (Slide 7)

The standards and profiles we used were a combination of Dublin Core-Ed, UK LOM and EdNA.

Because of the need to ensure future usefulness of searching, the profile also carried fundamentally important requirements of being interoperable – the elements chosen can map across to elements in other profiles or standards. Interoperability enables resources to be shared across repositories, organisations and learning/content management systems. Differences in underlying metadata will cause difficulties in retrieval and presentation. The more dissimilar the metadata, the more problematic retrieval will be. The profile also needed to be extensible or reducible, in other words, if the requirements of the repository changed over time, the profile could be amended without necessitating retrospective changes or affecting the searchability of resources.
The intention was that such a profile would serve the institution’s requirements for digital resource submission into the repository.

Who were identified as saviours in this scenario? (Slide 8)

Just as Dante described three conditions in his progress of the human condition, so too did the Library Team identify three tiers of input to ensure the best quality metadata is created. We determined upon a collaborative approach between library, technical and teaching staff as a best solution. You will remember the Creator, Technical and Editor from the profile. So, in the best of all worlds, the future of e-learning lies in a delightfully-satisfying combination of educators, technical people and librarians all contributing towards a common goal and all respecting each other’s expertise.

Allocation of Wintec library resources has been undertaken with a view to ensuring that such developments described will be implemented. Two library positions now include dealing with metadata formats and digital objects, the population of repositories and the digitisation of resources.

In addition to this several Library staff have expertise in metadata standards, an understanding of repository potential and a much clearer grasp of how libraries and programmers can work in close collaboration within the e-learning environment. The Library believes a blurring of boundaries between software developers, online curriculum designers, information specialists, and professional development experts should occur.

Library staff have also acquired expertise in using the Learning Management System, Moodle, and, additionally, have been trained in putting course material online. This opens up new scenarios for Library involvement in course development, in conjunction with the Centre for Learning Technologies staff.

Contributing to the repository project enabled Library Team members to benefit from an appreciation of the network of inter-relationships that typify this type of undertaking. Libraries hold considerable resources that may not be accessible beyond their in-house library management system and which may not transfer easily into another environment. The interface between various technologies, systems and paradigms requires attention and recommendations for best practice.

Professional Development

The OSLOR team were conscious that for learning object repositories to function fully, simple, self-explanatory solutions had to be explored and implemented so participants would not be overwhelmed by the need to acquire advanced software application or library cataloguing skills.

Metadata Made Simple

A short course, explaining the fundamentals of metadata has been created on the OSLOR working site http://oslor.elearning.ac.nz/moodle/course/category.php?id=3 (Slide 9)

This was regarded as an integral part of making best use of the repository. Professional development underpins effective usage and needs to be factored in from the start of a project; it should not be an afterthought.

The driver behind this particular professional development activity was the intention to introduce the concept of metadata to those unfamiliar with either its terminology or application. As it was anticipated that many of the contributors to the learning objects
repository would be practitioner/specialists in particular subject areas rather than information specialists, it was felt that an understanding, and possibly appreciation, of the initial activities involved in submission would assist overall outcomes.

The course was created using the open source Learning Management System software Moodle, and loaded on the OSLOR site, along with other training packages being created by members of the OSLOR team. Enrolment in the course requires an account to be established. The course is designed to be entirely self-paced, i.e. there is no facilitator involvement, quiz results are available to the participant and assignments are not marked.

The Introduction states the aim "As you work through the following 10 modules on Metadata Made Simple you should gain an understanding of what metadata is, why it is used and how, what standards apply, practical applications and future developments."

The structure of 10 modules, each of approximately one hour's duration, is designed to encourage learners to study the explanations and links, attempt the quiz and work through an assignment that exemplifies the main issues. The assignment is one that can be related specifically to the classroom environment. A can of corn appears throughout the modules as an analogical prompt to prove that metadata is not an esoteric concept, closely guarded within the confines of librarianship, but rather a way of describing meaningful aspects of the world around us and can usefully be applied to everyday situations.

**Future Developments**  
(Slide 10)

It is anticipated that from the OSLR project strands of ongoing research may be pulled. The metadata profile created could easily be developed in further directions, for example, including METS elements, as used and recommended by the National Library. These include, in particular, the following which are for delivering and the navigation of complex digital objects

- File Inventory
- Structural map linking
- Structural map
- Behaviours section

More rigorous testing against a variety of complex digital objects, testing against interoperability and extensibility are anticipated to extend the scope of the project in areas beyond its original scope. An analysis of user behaviour is always something worth pursuing with a view to determining whether the work undertaken has a practical value and worth beyond the confines of the project.

The development of metadata and its application to libraries, information management and the support of e-learning has received considerable focus in recent years. In particular, librarians worldwide, in one of their many chameleon-like phases of re-determining the focus of librarianship to accommodate the changing landscape, have stated clearly that the support of digital resources in a manner that focuses on learning and teaching goals is a critical path for libraries to follow.

**(Slides 11 and 12)**

Questions?