Metadata for learning resources: developing and implementing an application profile for the NSW Department of Education and Training

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Abstract

The Centre for Learning Innovation of the NSW Dept of Education and Training (DET) is leading a project to develop and implement metadata specifications for DET’s learning resources. The need for a new Departmental metadata application profile was highlighted by the development of TaLe (Teaching and Learning Exchange) – an online gateway to DET’s learning resources – and the release of the Australian VET Metadata Application Profile (VETADATA). The application profile (DET Learning Resource Metadata – DETLRM) is a subset of the Learning Object Metadata standard and includes vocabularies to meet both school and vocational education and training (VET) requirements. Crosswalks to the VETADATA, Education Network Australia and The Le@ming Federation schemas were also developed. Metadata capture will be linked with the Department’s learning resource publishing systems and processes.

Introduction

This report discusses current work on learning resource metadata in the NSW Department of Education and Training (DET). The process of developing and implementing a new application profile for the Department has raised issues and challenges that appear regularly in discussions of educational metadata, e.g. achieving interoperability while meeting local needs; defining the scope of the term “learning resource”; and providing simple and efficient processes for capturing and processing metadata. DET faces a particular challenge in meeting the metadata requirements of both school and vocational education and training (VET) sectors.

Background

DET is the largest single organisation, public or private, in Australia and is responsible for a quarter of the State of NSW’s budget. It coordinates all public education and training services in the state, from pre-school through to adulthood. In recent years there has been a merging of the school and VET operations of DET, and a corresponding need for interoperability of their learning resources and systems. Also, there has been a growing realisation that without a standard approach to resource description, discovery of and access to the Department’s valuable resources
will be difficult, with the consequent risks of under-utilisation of resources and duplication of development effort. In 2004, the Department set up a new centralised unit, the Centre for Learning Innovation (CLI), with the role of “providing excellence in learning resource production and leadership in the strategic use of technology in education and training”[1]. Included in CLI’s role is the setting of standards for learning resource development across DET, including metadata standards.

A major initiative of CLI is the Teaching and Learning Exchange (TaLe), an online gateway to provide teachers in DET’s 2200 schools and 130 TAFE colleges with access to quality teaching and learning resources and professional learning support. A common metadata approach is necessary to provide the required search, browse and display functionality of TaLe. Description of DET resources to national and international standards is also necessary to facilitate their discovery and use outside the Department.

In 2000, the Technical and Further Education (TAFE NSW) arm of the Department had developed an application profile based on the Education Network Australia (EdNA) standard with some Learning Object Metadata (LOM) elements. The profile was developed primarily to describe learning resources produced by TAFE but also to accommodate description of all resources produced by the Department, both learning resources and corporate documents (e.g. policies, Departmental intranet and internet sites). This TAFE NSW schema had been an effective profile but limitations to its use as the future DET metadata profile for learning resources had become apparent:

- The profile did not conform to the new LOM-based Australian VET Metadata Application Profile (VETADATA)[2], developed in 2004 to ensure a high degree of interoperability in that sector. CLI is involved in two projects (VET Learning Object Repository and Flexible Learning Toolboxes) that require our resources and repositories to meet VETADATA specifications.

- The two types of resource the profile was designed to describe have quite different metadata standards requirements: Australian Government Locator Service (AGLS) in the case of corporate documents and, increasingly, LOM in the case of learning resources. Rather than imperfectly meet these different needs with a single profile, a separate profile specifically for learning resources would allow the standards needs of both types of resources to be fully met. Crosswalks could be used to achieve interoperability (e.g. to perform searches across all DET resources).

- The TAFE NSW profile did not easily accommodate some important contextual data such as related national competencies, training packages, TAFE courses and modules.

- There had only been limited inclusion of school-specific requirements in the profile development as it was developed primarily for VET resources.

In addition, existing metadata processes and systems could be improved. There was very little automation of metadata capture and all tagging took place at the end of the resource development lifecycle. Information specialists applied the great majority of the metadata values: a time-consuming task that often involved entry of data that had
already been captured elsewhere. This model also faced problems of scale when faced with the increasing number of learning resources requiring description.

A project was therefore initiated by CLI in December 2004 to develop new metadata specifications for DET learning resources, comprising an application profile, metadata processes and systems, and training guidelines. The project is scheduled for completion by the end of September 2005.

**Application profile development**

We began by establishing principles on which our learning resource application profile should be based, with the aim of achieving maximum cost benefit:

- Simplicity – based on a single schema if possible
- A minimum number of elements
- Interoperability with relevant national and international standards
- Cross-sectoral (i.e. schools and VET) applicability
- Building on previous work in DET

We then gathered requirements to identify which data elements the profile needed to support. This process involved consultation with representatives from across the Department, both school and VET sectors. The two major requirements were the search, browse and display needs of TaLe, and the need to comply with VETADATA and the Sharable Content Object Reference Model (SCORM) specifications. TaLe users also needed to discover professional learning resources and the Department’s imported Le@rning Federation (TLF) learning objects (described with metadata to TLF specifications). The focus of the profile was primarily on resources developed by the Department to support teaching and learning of DET-endorsed curriculum, but the scope also needed to include external resources considered relevant/useful to DET teaching and learning. There was no restriction on the granularity of resources included.

A LOM profile provided a number of advantages over the existing TAFE NSW EdNA-LOM hybrid profile. In addition to the simplicity of being based on a single schema, conformance to the (LOM-based) VETADATA and SCORM profiles could be more easily achieved. The LOM Classification category also provided an effective way to capture useful information on related school syllabuses, key learning areas, TAFE training packages, courses and modules. The final application profile, named DETLRM (DET Learning Resource Metadata), is therefore a subset of LOM: 33 elements from eight categories. While we tried to extend LOM as little as possible, vocabularies for four LOM elements were extended or replaced to accommodate local requirements: Contributor Role, Learning Resource Type, Intended End User Role and Context. Detailed crosswalks were developed between DETLRM, the existing (EdNA-based) TAFE NSW profile, VETADATA, and The Le@rning Federation schema to promote interoperability within and outside the Department.
Learning resources and scope

Some of the difficulties we found in applying LOM to our environment related to the scope of the term “learning resource” and what specific types of learning resource we wanted to identify in our metadata. The LOM definition of “learning object” – the LOM equivalent term to learning resource – is notoriously broad: “any entity, digital or non-digital, that may be used for learning, education or training”[3]. A similar definition has been proposed in the working documents for the ISO/IEC standard – Metadata for Learning Resources: “any object that may be used in a learning experience”[4]. In other words, a resource need not have been developed for the purpose of teaching and learning to be regarded as a learning resource.

Faced with a potential universe of resources to cover, we attempted to narrow this definition to the DET context for our profile. Initially we proposed to restrict the scope to only resources developed by DET, in accordance with DET quality assurance processes, and purposed for teaching and learning of DET endorsed curriculum. However, the need to describe external resources considered relevant or useful to DET teaching and learning has necessitated a widening of scope. A related issue is the granularity of resources included for description. While the base assets (e.g. images, audio files, animations) may not, on their own, have any direct pedagogical application, they are essential in building larger learning resources. We have therefore not placed any limit on the granularity of resources covered by the profile.

Resolution of the question of scope influenced other decisions in the profile development. This was particularly the case with the vexed LOM element, Learning Resource Type. The recommended LOM vocabulary for this element covers only a small number of the potential types of resource and includes types based on both form and function. However, the task of developing a better list is a difficult one, to say the least. We started with the VETADATA vocabulary and consulted with experts from the school and professional learning sectors of the Department to build a cross-sectoral Learning Resource Type list of twenty-three types. In an attempt to simplify metadata capture we have developed a table mapping our resource types to another difficult LOM element, Aggregation Level. For instance, a lesson plan is considered aggregation level 2, a TAFE module level 3.

Metadata systems and processes

As when developing the application profile, we began the process of implementation by proposing general principles on which our new metadata systems and processes should be based. An important overall aim was to make metadata “invisible” as far as possible to both resource creators and users[5]. These principles were:

• A clearly defined systems architecture
• Informed by and linked with current DET resource-discovery and publishing procedures
• Automating capture wherever possible
• Integrating capture with resource development wherever possible
• Emphasising the targeted intervention of information specialists to assign metadata that could not otherwise be captured during the resource development process
• Cross-sectoral (i.e. schools and TAFE) applicability

The project team realised that considerable efficiencies could be achieved by integrating metadata capture with resource development processes. Content creators were already entering an overview in their learning objects: this could be captured in the Description metadata element. They are also the most appropriate people to assign contextual metadata such as the target audience, sector and educational level. Other information such as file format and creation date can be captured automatically when publishing. Information specialists can concentrate their work on applying controlled vocabularies and assuring overall metadata quality.

The major challenge ahead of us now is to manage the transition from the current metadata systems and processes to a new environment built on these principles. Rather than building new systems from scratch, we are generally adapting existing repositories to support the new DETLRM profile. The use of crosswalks will be important in at least the near future to achieve interoperability across new and legacy metadata.

Conclusion

This project has been an exciting opportunity for CLI to develop and implement a metadata application profile for learning resources from first principles. The size and complexity of the DET environment and the diversity of learning resources requiring description has made the task a challenging one. However, by taking a standards-based approach we are confident we can meet the metadata requirements of the Department while maintaining a high level of interoperability with external systems to facilitate sharing and use of our resources.

References


