Metadata Management System (MMS)

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Abstract: Much have been said about metadata which is "data about data" used for classification and retrieval of information. However, metadata is not created by itself. This paper will present the design, interface and implementation of our own metadata tool called Metadata Management System, MMS that was developed to facilitate the creation, maintenance and storage of metadata. This metadata tool supports two well-known metadata models, Dublin Core and SCORM 1.2 (IEEE Learning Object Metadata). The author will also elaborate on the implementation of metadata in the Malaysia Grid for Learning, (MyGfL) portal. These would include the usage of MMS by MyGfL potential content providers, problems encountered and their feedback about the MMS.

Keywords: web resources, learning objects, metadata management system,

1.0 Introduction

The Malaysian Grid for Learning (MyGfL) portal will be the one-stop center for quality assured online learning content, web resources, tools, and services with the aim to promote life-long learning in Malaysia.

To enhance resource discovery in the portal, each of the content will have its own metadata record. We believe that implementing metadata would result in a more consistent and well-structured descriptions of content available in the portal.

Although metadata standards are still quite new and unknown in Malaysia, some kind of "cataloging" or metadata was already in place at the libraries, archives and some government agencies dealing with vast amount of information.

The Dublin Core (DC) was adopted for describing web resources and the SCORM 1.2 (IEEE Learning Object Metadata - LOM 1.0) was adopted for describing learning objects.

In MyGfL, web resources are the information or knowledge resources on the Web that supports learning whereas learning objects are instructional content that supports the objectives and promotes the achievement of the learning outcome

To facilitate the metadata creation, maintenance and storage, we have encouraged the use of MMS to content provider of MyGfL. The MMS is free for them to use in exchange for the metadata record of their content that will be published in MyGfL.

Their feedback on the usability of the tool was noted and will aid in improving the tool to suit a more diverse need of users.

2.0 Metadata Implementation

The MyGfL portal design emphasis on "who are you?" and "what are you looking for?" as a basis to the placement

of content within the portal. For example, "who are you?" means that the user have to identify who she/he is so that she will be directed to the right content. "what are you looking for?", on the other hand, will indicate what subject the user is interested in.

At the very least, metadata implementation have make this task easy for us because this information was already captured in the element target audience and subject (keyword) in both Dublin Core and IEEE Learning Object metadata during the metadata tagging process.

Figure 1 shows the display of content in MyGfL. The content can be web resources or learning objects and are denoted accordingly. The description of the content will help the user decide whether the content are of interest or relevant to them.

More detailed descriptions of the content will be available if they click "more". Here they will have several more information e.g. the cost, if any which are taken from the data that the content provider have submitted during meta-tagging process. Full metadata record, which is the display of all the elements submitted is available to those who are interested to find out more about the content.

Figure 1: Content in MyGfL portal

To cater for local context, the portal is bilingual. It has both English and Bahasa Malaysia content. This means that the metadata record are available in either languages depending on which language the content is in. However, cross searching in both languages is made possible because the controlled vocabulary for subject (keyword) is in both languages too.

For example, when a user search for a term in English using our subject (keyword) guided search, she/he will find content in English as well as content in Bahasa Malaysia that have the same keyword. This will give users a broader search result on the subject they are interested in.

3.0 Metadata Management Systems, MMS.

Highly structured information, which could be achieved with the implementation of metadata, can only be fully utilized if the right tool and formats for metadata creation process are provided. The web-based Metadata Management System, MMS was designed specifically for creating, harvesting and maintaining metadata records. The target user of this tool is the content provider of MyGfL, organizations and institutions planning to adopt metadata to enhance the discovery of their resources.

We have also analyzed a sample of available metadata creation tool during the initial process of our design stage. These tools include Nordic Metadata Project, Reggie, EDNA's Toolbox Series and UKOLN' DC-dot. As expected, each of the tools has their own strength and weaknesses.

MMS differs from the tools we have examined, in particular on the two different metadata standards that co-exist in the tool and on the role-based management facilities provided by the tool.

3.1 Metadata standards.

Bearing in mind that the users of MMS have differing domains with different knowledge about metadata standards, we have designed MMS to be as generic as possible. Dublin Core metadata standard was chosen to describe the web resources because it has the broadest level of commonality of elements, commonly understood semantics, extensibility, international acceptability and the flexibility it provides for extensions to the basic elements to meet local needs.

Adoption of Dublin Core will adequately cover the most essential information about a resource whether the resources originate from the library, archives, museum or other information/culture-rich organizations.

MyGfL, through the adoption of Dublin Core and the usage of MMS aims to pave the way for interoperability of metadata standards among organizations especially to those that contributes their metadata records to be published in MyGfL.

SCORM 1.2 (IEEE LOM) was adopted for the description of a learning object and is aimed at facilitation of search, use and evaluation of products, components and learning content.

SCORM 1.2 (IEEE LOM) was chosen due to their educational approach and rights management, which are not fully addressed by Dublin Core.

Although all Dublin Core and IEEE LOM elements are optional and repeatable, the design of our portals requires that certain elements need to be mandatory (subject keyword, title, target audience, etc.) and that the resource identifier element cannot be repeatable.

A controlled vocabulary for target audience and language were also defined to cater for our local context and needs.

The Mandatory and Optional elements are placed on separate page in the MMS. Although this may induce our users to submit only the Mandatory

elements, we feel that metadata tagging process should not be too much of a burden to them. The users however are encouraged to provide as much information as they could about their resources through Optional elements.

MMS can also be customized based on the unique resources and special collections that the organization holds. This customization can be in terms of additional elements (if it is really necessary), additional element refinements and schema and also additional or different administration task assignment within the MMS.

3.2 Metadata management

Our metadata management is based on users role, which is detected during login. There are 3 types of role for MMS users:

Metadata Editor:
Users with this role will be able to view, edit and delete their own metadata records.

Metadata Quality Assurance (QA):
Users with this role will be able to view, edit, delete, approve, reject, archive records submitted to them by other Metadata QA.

Metadata Administrator:
Users with this role will be able to view, edit, delete, approve, reject, archive and suggest records to be archived submitted by all Metadata Editor and Metadata QA. They can also perform user registration of Metadata Editor and Metadata QA, and set up data for format and types.

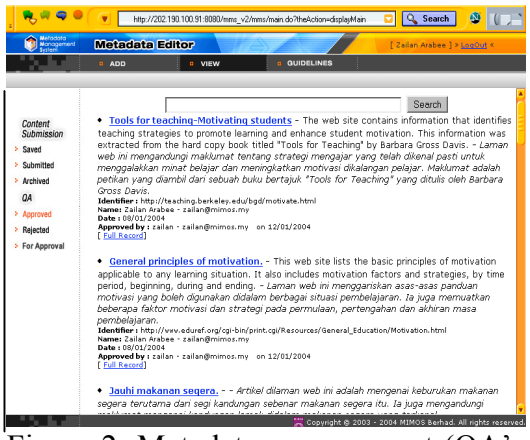

Figure 2: Metadata management (QA's view)

Figure 2 shows the QA's view of metadata records management. This role-based design is utilized for easy maintenance of MyGfL content providers. All metadata records produced by content provider who have the role as metadata editor will have to go through the metadata QA before it can be published in MyGfL.

This is to assure the metadata records are of certain quality and accuracy. At the same time organization implementing metadata for their web resources or learning objects may wish to be a metadata QA themselves for their organization's metadata editor.

3.3 Construction of metadata.

MMS have incorporated the following features to facilitate and manage the construction of metadata:

Add new metadata. This feature will allow authorized users to create metadata for their web resources or learning objects. They have to choose the metadata standard appropriate to them before they can start.

Edit metadata records: Users can edit metadata record that they have saved. Once the record has been submitted to QA for approval, the records can no longer be edited.

View metadata record: Depending on their role, users can view the metadata records in the following categories: saved, submitted, approved, rejected, pending and archived metadata records. The administrator may have the view by records submitted by Metadata Editor (Content Provider, CP) or view by Metadata Quality Assurance (QA).

Catch page: Users of MMS can only submit their metadata records if they submit all the Mandatory elements. A catch page containing an error message will be displayed and informed them to fill up every Mandatory element before they are allowed to submit to QA.

Drop-down controlled vocabulary For the users convenience as well as for uniformity and standardization of information, drop-down menus that contained list of terms or controlled vocabulary are provided for most of the elements.

Help functions and icons. Definition for each element is provided for each element that opens up in a new window so that users can have access to information about unfamiliar elements. A question mark icon denotes this feature. Icons that indicate element's repeatability are also present.

Check URL: Because most of the content in MyGfL is online content, a "check" URL feature in the Resource Identifier element will verify the validity of the website address provided by the content provider. This URL address will be used in the portal to bring the user straight to the content.

3.4 Metadata schema and XML interface

We did not mix and match the DC metadata with the LOM 1.0 schema. However, both standard shares the same controlled vocabulary for some of the elements e.g. audience and subject keywords.

MMS will generate an XML document of the metadata record created by the user. An "upload manifest file" feature is useful when content provider have already created their own manifest file during creation of their learning objects. This feature will allow "translation" of the manifest file into full metadata record, which can be published in MyGfL.

Vice versa, they can use the MMS to create their manifest file through the "generate XML" feature and saving it for their own usage.

4.0 Thesaurus

A controlled vocabulary or thesaurus will significantly improves the potential of metadata and allow for more precise subject searching. We have adopted and translated the UNESCO Thesaurus, a controlled and structured list of terms, as our subject keyword.

We hope that the function of the thesaurus can be extended as a reference that structures and standardize the terminology used for various domain, e.g. agriculture, forestry, medical etc. Our long-term plan is to come out with The National Thesaurus by utilizing existing thesauri, word list,

vocabularies, glossaries and terminology as well as input and collaboration from the relevant subject matter expert.

5.0 Future directions and needs

We are also actively initiating and promoting metadata adoption in various government agencies and organizations that have been identified as the potential content provider for MyGfL.

We have organized a workshop on the awareness of metadata to librarians from all the state libraries in Malaysia. In this workshop, a tutorial on the concept of metadata, its objective and purposes were presented, from the point of view of both the librarian and the MMS usage. A hands-on session on the usage of MMS where the participant was required to create metadata records on their own was also included in this workshop.

Comments from the workshop's participant includes:
"MMS are easy to use", "They understand more about metadata after using the tool", "The need for expansion of the controlled vocabulary to meet their needs and to better describe their resource",

From our observation, the participant need motivation and understanding about the usefulness of the metadata records they created. Top-down approach should be taken in order to expedite the metadata adoption and implementation at their organizations.

We also planned to conduct a nation wide seminar/workshop on "Awareness and Benefit of Metadata" to government agencies and institutions in order to educate them on the usefulness of metadata to manage and enhance the discovery of their resources.

At the same time we are still improving our MMS and adding appropriate features that will enhance its usage.

6.0 Conclusions

A standardized descriptive metadata, which is created through MMS can substantially improve the discovery, retrieval management and control of web resources and learning objects in our MyGfL portal.

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