

Finding the Right Tool for the Community: Bringing a Wiki-Type Editor to the World of Reusable Learning Objects

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Abstract

In this paper we present a new approach to enabling pedagogically sound reuse and re-purposing of online learning objects in a community of practice. The lack of specific software for non-technical users inspired the development of an innovative toolkit. The toolkit allows users to edit learning objects collaboratively in a Wiki-type editing environment and to add and modify context-rich metadata which greatly assists in the efficient retrieval of learning objects. The focus of this paper is on the development of the Wiki-type editor which provides an effective way of re-purposing learning objects in disparate communities.

1. Introduction

More and more educators realize the benefits of using e-learning materials as a practicable alternative to traditional instructor-led courses, hence the usage of learning objects has become prevalent in the education world. Polsani [1] has defined a learning object as “*an independent and self-standing unit of learning content that is predisposed to reuse in multiple instructional contexts*”. This definition suggests several functional requirements which are essential for creating sensible learning objects. Of particular importance is that sharing and reusing e-learning materials may lead to an improvement in quality of teaching, the sharing of good practice, greater consistency and an enhanced sense of community [2].

Different aspects of learning objects need to be considered in order to promote reusability. One important factor is metadata which facilitates the identification, search and retrieval of learning objects and can be extended to represent different instructional contexts. IMS/GLC [3] has provided specifications and guidelines for metadata standards and extension rules. Context-rich metadata [4], in other words contextual metadata, plays an

important role in understanding the reusability of a learning resource. Particularly the context here refers to the teaching and learning circumstances. Contextual metadata can represent information about the intended target audience, the purpose or instructional methods, pedagogic approach being used and so on. Learning objects with such information attached can then be identified by their context and re-purposed to suit different needs and instructional contexts.

Inevitably it is challenging to reuse learning objects in differing contexts [5] especially in relation to the issues about extensions on relevant standards, exchange formats for contextualization of resources, and the creation of tools for development of contextualized learning resources. It is the authors' intention to address these issues by designing novel toolkits to use with an existing repository of language learning objects, and to test with an established community of practice.

2. Our Approach for Reusing and Re-purposing – The MURLLO Project

The last few years has seen a debate arise between the approaches to designing learning objects in contextualized and “de-contextualized” scenarios [6,7]. Although learning objects are widely developed as free from the context of teaching and learning to facilitate interoperability, the research carried out within the eLanguages group at Southampton¹ found that contextual metadata facilitates greater scope for reuse. Reuse is significantly improved through the inclusion of additional metadata, which describes the pedagogic nature of a learning object.

The MURLLO (Management, Use and Re-purposing of Language Learning Objects) project run by the eLanguages group aims to tackle concerns surrounding the effective re-purposing of Reusable Learning Objects

¹ <http://www.elanguages.ac.uk/research>

(RLOs). We proposed a system with three components/tools to deal with these concerns:

- **The Wiki-Type Content Editor** allows re-purposing of content without the need for extra authoring tools and the storage of this content and its revisions.
- **The Metadata Facilitator** acts as a teacher-friendly interface to allow the application of customized context-rich metadata to RLOs and facilitate storage of resultant content packages in open and closed repositories.
- **The Discovery Agent** facilitates resource discovery by displaying contextual metadata and by allowing selection and export of collections of RLOs.

3. Wiki-Type Editor Requirement and Design

As pointed out in [8], the ease of collaboration in a Wiki can make it a powerful tool for project management and collaborative writing. In our case, a Wiki-type editing tool is a critical component to provide the necessary capability for the adaptation and re-purposing of learning objects. We will focus on the Wiki-type tool in this paper.

3.1. The Community Need for Wiki-Type Editor

From the earlier project L₂O [4] we have discovered that it is difficult for a non-technical educator to adapt HTML content within online learning objects. The need for an easy-to-use editing tool has been stressed many times by our community of users.

Our community comprises practitioners from four regional universities in UK Higher Education (HE) sector. They are mostly language teachers who need technical support for authoring and adapting online learning objects because of their limited knowledge of web related technologies. A Wiki is able to tackle their needs by offering an easy-to-use collaborative content editing environment where expertise can be shared, exchanged and viewed by the community to achieve adapting goals. Furthermore, keeping different versions of adapted learning objects in a Wiki can help the community to track and view changes if needed. To rectify the current lack of relevant tools, the MURLLO project has proposed a Wiki-type editor to fill the gap.

3.2. The Comparison of Existing Systems

According to practitioners' needs, it was a natural inclination for our team to consider using or adapting an existing Wiki system as the learning object editor. In order to choose the most appropriate solution, we looked into a number of different Wiki environments, including Mediawiki, DokuWiki, Zwiki; a Document Management System (DMS), TWiki; and Content Management

Systems(CMSs), Silva and Plone. We compared some of the important features including WYSIWYG toolbars, versioning capability, and their ability to handle embedded media.

We were confronted with difficulties when importing the existing learning objects into the Wiki systems. The learning object content is basically HTML web pages whereas Wikis are created using their own markup language which is totally different from HTML. Therefore a learning object always needs to be converted between HTML and Wiki markups. The underlying problem was that the "round-trip" conversion between HTML and Wiki markups causes a loss of information from the web pages, especially embedded object tags and snippets defining page styles. For DMS/CMS (with built-in HTML editors), it was not necessary to convert between Wiki and HTML but the style information or embedded object tags did not display properly. If this information is not retained, both look-and-feel and functionality is affected. This would have a serious impact on users since they would be unable to re-purpose materials if they could not see how the original learning objects had appeared. Furthermore, there were some other critical problems such as the lack of package importing functions for most Wikis and the unsuitable versioning facilities for the CMS systems. Due to the fact that the existing off-the-shelf systems were not particularly suitable for our case, we came to the conclusion that it would be more efficient to design our own system by integrating an HTML editor and to develop other essential functions like versioning and content package importing/exporting facilities around it.

3.3. Versioning for Learning Objects

It is an important matter to decide how to define and store versions of learning objects being edited in the toolkit as this facilitates adaptation and reusability, while allowing users to be aware of all the changes made and act as protection against potential mistakes that might occur during the editing process.

At this stage the learning object editor was designed to deal with the learning material content which includes possible manipulation of media files (a facility to edit metadata will be incorporated later in *Metadata Facilitator*). It is necessary to consider versioning learning objects as whole packages including media attachments and metadata, but not as in traditional Wikis, where versions are handled at page level (single document). Hence package level versioning was adopted to accommodate the nature of learning objects and future extension on the toolkit to edit metadata and other attachments in content packages. Moreover, the editor needs to keep a full version history with rollback facility so that a faulty change can be reversed.

4. Wiki-Type Editor Implementation

We decided to use a lightweight but powerful HTML editor, FCKeditor², to integrate a *Wiki-type* online editing workspace for our community. We labelled it “Wiki-type” here since we have replicated a Wiki’s collaborative authoring characteristics around a regular HTML editor. It is intended for peer-editing of existing learning objects but is not a “Wiki” in the more general sense of the term. As it was designed for teachers without web expertise, we have made the interface as intuitive as possible. A learning object can be uploaded as a standard IMS content package, and then the system handles de-packaging which separates the learning object content from metadata and other documents. The only step users need to take is to locate the learning object from an index page and click the title link which will lead to the learning object being displayed in their browser. The look-and-feel of a learning object is kept consistent even in the editing mode so that novice users could edit it without being confused by the underlying HTML syntax and they can edit the content as it appears to their students.

5. User Evaluation

In order to check and validate whether the Wiki-type editing tool is appropriate and useful for teachers, we undertook a qualitative evaluation during a workshop given to language teachers and learning technologists from a range of HE institutions within the UK. Attendees were asked to explore and use the tool to adapt a collection of learning objects. They were given a free choice as to the method they employed in order to evaluate the usability and effectiveness of the tool. Twenty one questionnaires were returned at the end of the session and during the session the development team observed the way the attendees interacted with the system. The general observation made was that most users managed to edit learning objects within a few minutes.

The feedback we received from the questionnaires was positive: 86% of the users had a very good impression of the tool; 90% found it easy to navigate and obtain the information they wanted; 75% regarded it an effective tool for adapting learning objects; and 70% considered it easy to become familiar with the tool. This indicated the editing tool is useful in re-purposing learning objects and has the potential to be adopted in the current community. Many of the users can see how this tool could be used beyond its original scope. For example by including templates we could allow users to develop new and innovative learning objects from complicated

components, something many of them find hard to do today.

6. Conclusion and Future Work

In this paper we have described our efforts to encourage and facilitate the reuse and re-purposing of online learning objects within a community of practice with little or no technical expertise. We have explained the needs and the rationale for the design of an editing tool which reproduces the collaborative editing mechanisms of traditional Wikis for use by the community.

We identified that the addition of contextual metadata can enhance the discovery and reusability of learning objects. However adding or modifying metadata could be very difficult for non-technical users without support. This leads to the *Metadata Facilitator* being developed which will bridge this gap. Finally we are planning a *Discovery Agent* to facilitate resource discovery and selection. All three tools will be integrated to form a single toolkit to help the management and reuse of learning objects.

7. References

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² <http://www.fckeditor.net/>