Towards an Open Repository of Teaching Resources

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ABSTRACT
In this paper we describe our work to create a set of usability tools for CLARE, an EPrints installation storing Learning Objects. These tools include Web 2.0 style presentation and comments, and a concept map browser. Although the evaluation of our tools was broadly positive through workshops with the language teaching community we discovered that a Learning Object repository is too heavyweight to be used as an everyday tool for sharing learning resources. In this paper we present the new requirements we elicited from the community, who wanted a lightweight, learning resource repository, with little metadata overhead, following the interface best-practices of popular online repository sites such as Flickr and YouTube.

Keywords
Repositories, Learning Objects, EPrints, Web 2.0

1. INTRODUCTION
More and more educators realize the benefits of using e-learning materials as a supplement or alternative to traditional instructor-led courses, hence the usage of learning objects has become popular in the e-learning world. Polsani has defined a learning object as "an independent and self-standing unit of learning content that is predisposed to reuse in multiple instructional contexts" [6]. This definition suggests several functional requirements which are essential for creating sensible learning objects. For example, they need to be stand-alone, reusable, tagged with metadata, and be able to be aggregated.

Open Repositories are an opportunity to support the sharing of learning resources between teachers and lecturers. Sharing and reusing e-learning materials in this way may lead to an improved quality of teaching, the sharing of good practice, greater consistency and an enhanced sense of community [1]

The authors have previously been involved in a number of projects to explore how learning objects might be defined and reused. One of these projects, the JISC funded L2O project, created a Learning Object Repository based on EPrints called CLARE (Contextualised Learning Activity Repository).

The project also produced a metadata profile for Learning Objects. The last few years has seen a debate arise between the approaches to designing learning objects in contextualized and "de-contextualized" scenarios [3,4]. Although learning objects are widely developed as free from the context of teaching and learning to facilitate interoperability, the L2O project found that reuse is significantly improved through the inclusion of additional metadata, which describes the pedagogic nature of a learning object. Other projects have also discovered the benefits of using contextual metadata, such as RAFT [8], ProLearn Query Language (PLQL)[1], and the digital library DocSouth [6].

The challenge is that this extra detail, while enabling expert users (such as institutional e-learning specialists) to better understand and reuse Learning Objects, also adds extra complexity. Currently tools for creating, storing, describing and locating learning objects are really suited for these expert users. This presents a significant obstacle for teachers and other non-technical users to reuse or repurpose learning objects [9].

In the follow up project to L2O, called CLARET (CLARE Tools), we created a set of usability tools for CLARE to address this problem. These took the form of Web 2.0 style interface changes, and the inclusion of a concept map browser to help users navigate the repository.

During this evaluation of these tools it became clear that while the tools addressed many of the issues of interface usability, there was a deeper issue concerning the level of complexity of the Learning Objects themselves. In addition the community's expectations of a repository interface have changed, shaped by the new Web 2.0 generation of online applications and sharing sites [5].

This paper briefly describes the CLARET tools, and presents the evaluation of the updated CLARE system. We then present a number of specific requirements that we believe would lead to a lightweight Web 2.0 style repository to match user's expectations of a living community site for sharing teaching and learning resources.

2. USABILITY TOOLS
We undertook four workshops to engage with the UK language teaching community. We are fortunate in that we have a history of working with this community, and they are enthusiastic about the potential of repository tools for their teaching. The workshop structures were:

- **Workshop 1** (March 2007) – Evaluate existing CLARE repository and explore the communities understanding of Web 2.0 interface patterns.
- **Workshop 2** (April 2007) – Evaluate early concept map model and brainstorm Web 2.0 functionality.

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[1] http://ariadne.cs.kuleuven.be/lomi/index.php/QueryLanguages

- **Workshop 3** (June 2007) – Evaluate final concept map model and beta concept map tool.
- **Workshop 4** (Nov 2007) – Evaluate final concept map tool and completed Web 2.0 interface elements.

In the first workshop it became clear that the community's expectation of a repository had changed from previous projects. The interfaces of online sharing sites such as Flickr and YouTube have redefined people's expectation of what a repository should look like. Example comments were:

"It seems very flat, there doesn't seem to be any depth."

"It's hard to see the most important information, because it's mixed in with so much detail."

"I can't click on anything, the navigation could be better."

We believe that this was referring to the large number of metadata fields and the lack of linking; in most online repositories you can click on keywords and metadata values to see all the other items with that keyword or value. The level of interactivity was also thought to be low:

"There's no place to record how other people have used the Learning Object"

This is referring to the need for learning object repositories to collect contextual metadata about how learning objects have been used. The comments we received indicated that users were interested in a lightweight way to report this, rather than more formal metadata fields.

Based on the initial workshop we decided to create three extensions to Clare to help with navigation and interaction:

More targeted metadata on resource pages – In CLARE there were many metadata fields and they were all presented as a long list on the resource page. This made the page look like it was about the metadata, rather than the learning object itself. We rewrote the resource page generator so that key metadata (title, author, date, description) were rendered in a more specific way, and further metadata was available by clicking a 'more info' link (which expanded the list of metadata and values in the existing page). A resource page is shown in Figure 1.

Comments and Ratings – As an initial way of collecting usage and commentary we implemented a simple ratings and comments system. Based on our feedback we divided the single rating into three dimensions: usefulness, ease of use, and attractiveness. User comments and ratings are also shown in Figure 1.

Concept Map Browser – To help solve some of the navigation problems we implemented a concept map browser that sits over the repository pages. We created the map based on a series of expert meetings (with members of the community), and evaluated and refined the map in our workshops. Users browse the map, opening sub-concepts as necessary to refine their search. Selecting a concept queries the repository for

Learning Objects attached to that concept or its sub-concepts. The resulting list of applicable resources is shown in the right hand pane. The concept map and results pane is shown in Figure 2.
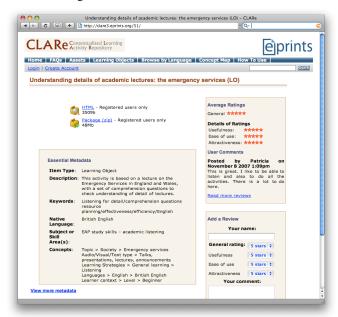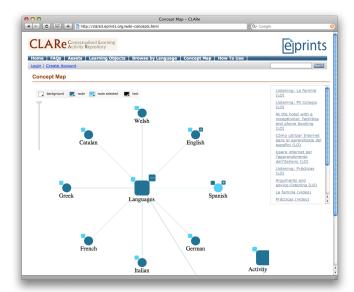

Figure 1: CLARE Screen showing resource page

Figure 2: Concept Map Tool

While it was clear by the end of our fourth workshop that a number of further changes would be necessary to meet the communities Web 2.0 expectations (such as linked metadata, and a more dynamic front page) this was beyond the scope of our initial project, and instead we have incorporated this into our requirements list.
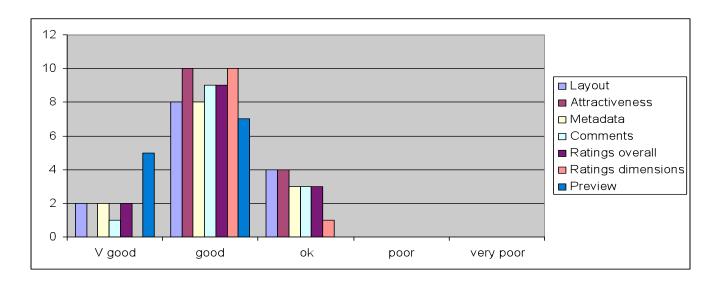
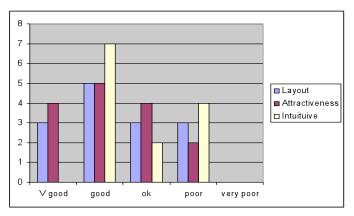**Figure 3: Results of Evaluation of CLARE Tools**

Figure 4: Results of Evaluation of Concept Map Tool

3. EVALUATION RESULTS

We evaluated our usability tools in the community workshops, using task-based worksheets to drive user interaction, and personas and scenarios to motivate the participants.

Figure 3 shows the evaluation results for the main repository pages (layout of the pages, attractiveness of the repository, metadata presentation, comments functionality, ratings functionality, rating dimensions and the existing preview facility which allows users to view the learning object online). The x axis shows the ratings given, and the y axis the number of responses for that rating. Figure 4 shows the evaluation of the concept map tool (layout of the map, attractiveness of the tool and intuitiveness of the interaction).

The results were broadly positive, with the majority of responses on the repository falling into the 'good' category. Reaction to the concept map tool was more mixed, perhaps reflecting people's individual navigation preferences. There was broad agreement that the usability tools much improved CLARE, however there was a sense that the repository was still not delivering entirely what the community needed.

During the evaluation we received a number of comments about the Learning Objects themselves, in particular when attendees downloaded a Learning Objects their comments were:

> "I recognise the zip file, but when I open it up I don't know what to run to make it work."

They were also uncomfortable with the LOM-based metadata descriptions:

> "I don't know what half of these terms mean."

This was despite a concerted effort by us to create meaningful metadata descriptions. One example was a metadata field called 'associated scaffolding', a perfectly sensible term to a pedagogical specialist, but not to a pedagogical practitioner.

We concluded from this that the community were nervous of the complexity of the repository; not the complexity of the interface, but of the learning objects themselves. Other comments supported the view that there was a mismatch between the assumptions inherent in a learning object approach and the reality of practitioners. For example, one teacher said:

> "I don't have digital resources to share. I print out my handouts and if I need them again I photocopy them or type them in again."

It seems that while there is certainly a need for complex learning object models at an institutional level (so that providers can properly describe learning activities and consumers know both what they are receiving and also how to deploy them), at the personal level practitioners need a much more lightweight approach. It also seems that they need encouragement to start thinking about their own materials in terms of digital resources.

4. REQUIREMENTS FOR AN EVERDAY TEACHING REPOSITORY

Based on our experience with creating these tools for CLARE we have come up with a set of requirements for a lightweight teaching repository that would better fit into the realities of practitioner's lives.

Requirements

1. A minimum set of *manual metadata* (such as title, description, topic, etc.)

2. A maximum set of *automatic metadata* (such as creation date, author, file sizes, media duration, etc.)

3. Simple atomic resources (no content packages)

4. Ability to preview online

5. No need to download (can use from a URL)

6. Interlinked metadata (can select a metadata field to automatically perform a query)

7. Targeted comments (e.g. How a resource has been reused) rather than general comments

8. A promiscuous search system (search that tries its best to return results, for example by searching all metadata fields, and assuming OR logic in multi-word search terms)

9. An open look and feel as well as an open policy (e.g. a visual appearance that reflects the activity in the repository – for example, a 'most popular resources this week' list on the front page)

We might summarise these requirements by saying that the community want a *living site* for sharing resources, rather than a *static repository* for storing them

Some open questions remain. In particular there is still a lot of discussion in the community about how copyright should be managed (if it is needed at all). There are also related concerns about authority – what are the sources of learning resources? – and also authorship – what happens to author attribution if a resource is copied or altered slightly?

Such issues are already being addressed in the Web 2.0 space (e.g. with online video editing sites [2]) and our view is that these questions cannot be answered or explored properly without an experimental repository to drive debate.

5. CONCLUSIONS

In this paper we have presented a number of usability tools that we created for CLARE (a Leaning Object repository based on EPrints). We discovered that while the community was impressed with the tools, they did not address the real problem, which was that the Learning Object Repository approach is too heavyweight for everyday practitioners. We have presented a number of requirements for an alternative lightweight repository for resource sharing, which would build on user's Web 2.0 interface expectations.

We are just beginning a new project called FAROES. This project will embrace these requirements, and aims to:

- Create a lightweight, simple repository that replicates the best-practice openness and user experience seen in commercial Web 2.0 sites such as Flickr or YouTube.

- Engage with the language teaching community to support them in creating and sharing their digital resources.

- Develop technologies to create a single searchable space over several repositories

- Explore how tags might evolve into folksonomies to aid in navigation (extending the concept map approach)

- Investigate how targeted feedback might support learning resources over a lifetime of shared usage

Our intention with FAROES is to take a perpetual beta approach, with an early deployment that can form the basis of a conversation with the community. Our hope is that FAROES will produce a simple useable repository that will help teachers and lecturers to see the worth of their own digital resources, will encourage them to share with their colleagues in other institutions, and will form a context for answering difficult questions concerning copyright, authority and authorship.

6. ACKNOWLEDGMENTS

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